



Final Environmental Study Report (ESR)

Volume 3 - Technical Appendices

City of Kitchener

Biehn Drive Municipal Class

Environmental Assessment

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Appendix I

City of Kitchener Doon South Community Area Transportation Study



City of Kitchener Doon South Community Area Transportation Study

Paradigm Transportation Solutions Limited

2024-02
230376



Project Summary

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City of Kitchener Doon South Community Area Transportation Study

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Executive Summary

Content

The Doon South area in Kitchener has undergone many long-range transportation studies over the past 20 years. In September 2016, BA Consulting Group Limited (BA Group) updated the analyses in the Doon South Community Plan which reconfirmed the transportation infrastructure plan for the area.¹ This analysis led to Municipal Class Environmental Assessments (EAs) being completed for the extensions of Robert Ferrie Drive and Strasburg Road, both of which are under construction.

The City has also begun work on the Municipal Class EA for the Biehn Drive extension. As part of that process, the City wishes to update the previous work completed for the Doon South Community to reflect the most current development plans and committed infrastructure. Most importantly the City is seeking confirmation on the need and justification for the Biehn Drive extension and the implications of not proceeding with this project.

Findings and Conclusions

Based on the analyses contained herein, the findings of this report are as follows:

Transportation Impact Assessment

- ▶ Under existing (2023) conditions, most study intersections are operating at acceptable levels of service and within capacity. In both the AM peak hour and PM peak hour, there are critical movements at Homer Watson Boulevard and Manitou Drive/Doon Village Road, and Homer Watson Boulevard and New Dundee Road/Highway 401 Off-Ramp;
- ▶ Under future background traffic conditions (2028 and 2033), most study intersections are forecast to continue to operate at acceptable levels of service and within capacity. In both the AM peak hour and PM peak hour, critical movements are forecast at:
 - Homer Watson Boulevard and Manitou Drive/Doon Village Road;

¹ BA Consulting Group Limited, *Update to Doon South Community and Broader Study Area Traffic Impact Study*, (Toronto: BA Group, 2016).



- Homer Watson Boulevard and Conestoga College Boulevard; and
 - Homer Watson Boulevard and New Dundee Road/Highway 401 Off-Ramp.
- ▶ Approximately 2,841 units remain outstanding in the Doon South and Brigadoon areas of the City. This comprises 1,652 units in Doon South and 1,189 units in Brigadoon.
 - ▶ Build-out of these remaining units is estimated to generate 1,593 trips in the weekday AM peak hour and 2,297 trips in the weekday PM peak hour.
 - ▶ Under future total traffic conditions (2028 and 2033), including several planned roadway and intersection improvements, traffic operations throughout the Homer Watson Boulevard corridor are forecast to further deteriorate.

Several critical movements are forecast at Homer Watson Boulevard and its intersections with Manitou Drive/Doon Village Road, Doon South Drive, Conestoga College Boulevard, and New Dundee Road/Highway 401 Off-Ramp. Critical movements are also forecast at New Dundee Road and its intersections with Pinnacle Drive, and Reidel Drive.

- ▶ Traffic control signals are not warranted at New Dundee Road and Reidel Drive, New Dundee Road and Pinnacle Drive, or Doon Mills Road and Apple Ridge Drive.

Biehn Drive Extension Need and Justification

- ▶ Within the existing road network (and without the extension of Robert Ferrie Drive) Caryndale Drive is functioning as a major neighborhood community collector (despite being classified as a minor neighbourhood collector street). It provides the only westerly connection between Biehn Drive and Robert Ferrie Drive;
- ▶ Caryndale Drive in combination with Biehn Drive and Robert Ferrie Drive provides the only continuous route through the western area of the Doon South neighbourhood between New Dundee Road and Huron Road;
- ▶ The future extension of Robert Ferrie Drive west to Strasburg Road, and the extension of Strasburg Road south to New Dundee Road is likely to redistribute traffic volumes on Caryndale Drive by providing a parallel north-south route to Caryndale Drive; and
- ▶ Without the Biehn Drive extension to Robert Ferrie Drive, Caryndale Drive is expected to continue functioning as a major



community collector street because Biehn Drive (which itself is classified as a major community collector street) will not connect to another major community collector street or higher order road; it will only connect to Huron Road.

Based on the findings of this report it is concluded that:

- ▶ The Homer Waston Boulevard and New Dundee Road corridors offer insufficient capacity to accommodate future traffic volumes associated with the remaining units in Doon South and Brigadoon; and
- ▶ Overall, an extension of Biehn Drive to Robert Ferrie Drive is justified to:
 - Provide a diversion route around the Caryndale Drive corridor for residents living on and adjacent to Biehn Drive; and
 - Ensure Caryndale Drive better serves its function as a minor neighbourhood collector street, as detailed in the City of Kitchener Official Plan, and based on existing design details (such as traffic calming and the presence of schools) in the corridor.

Recommendations

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

- ▶ The City of Kitchener coordinate with the Region of Waterloo to identify remedial measures in the Homer Watson Boulevard and New Dundee corridors; and
- ▶ The City of Kitchener proceed with an extension of Biehn Drive from Robert Ferrie Drive to its current terminus west of Caryndale Drive.



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1 Introduction

1.1 Overview

The City of Kitchener retained Paradigm Transportation Solutions Limited (Paradigm) to prepare this Area Transportation Study to evaluate the effects of the planned area development on the transportation system and recommend improvements, if necessary, to address potential impacts.

1.2 Background

The Doon South area in Kitchener has undergone many long-range transportation studies over the past 20 years. In September 2016, BA Consulting Group Limited (BA Group) updated the analyses in the Doon South Community Plan which reconfirmed the transportation infrastructure plan for the area.² This analysis led to Municipal Class Environmental Assessments (EAs) being completed for the extensions of Robert Ferrie Drive and Strasburg Road, both of which are under construction.

The City has also begun work on the Municipal Class EA for the Biehn Drive extension. As part of that process, the City wishes to update the previous work completed for the Doon South Community to reflect the most current development plans and committed infrastructure. Most importantly the City is seeking confirmation on the need and justification for the Biehn Drive extension and the implications of not proceeding with this project.

1.3 Purpose and Scope

This scope of this study includes:

- ▶ An analysis of current traffic conditions and operations at:
 - Huron Road and Strasburg Road
 - Doon Village Road and Homer Watson Boulevard
 - Doon Village Road and Pioneer Drive
 - Doon South Drive and Homer Watson Boulevard
 - Homer Watson Boulevard and Conestoga College Boulevard

² BA Consulting Group Limited, *Update to Doon South Community and Broader Study Area Traffic Impact Study*, (Toronto: BA Group, 2016).



- Homer Watson Boulevard and New Dundee Road/Highway 401 Off-Ramp
 - New Dundee Road and Thomas Slee Drive (Pinnacle Drive)
 - New Dundee Road and Robert Ferrie Drive
 - New Dundee Drive and Reidel Drive/Cameron Road
 - Doon Mills Road and Apple Ridge Drive
 - Robert Ferrie Drive and South Creek Drive
 - Biehn Drive and Caryndale Drive
- ▶ Estimates of the trip generation of outstanding development in the Doon South study area;
 - ▶ An analysis of future traffic operations at the study intersections for two horizon years (five- and ten-years from the date of this study) with and without the Biehn Drive extension; and
 - ▶ A review of the need and justification for the Biehn Drive extension from Robert Ferrie Drive to its current terminus west of Caryndale Drive.

Paradigm confirmed the scope of work with City staff via a meeting in September 2023. This study has been completed in general accordance with the Region's *Transportation Impact Study Guidelines*³ and comments received from the City during pre-study consultation. **Figure 1.1** illustrates the study area and intersections included in this study.

³ Region of Waterloo, *Transportation Impact Study Guidelines*, (Kitchener: Region of Waterloo, 2014).



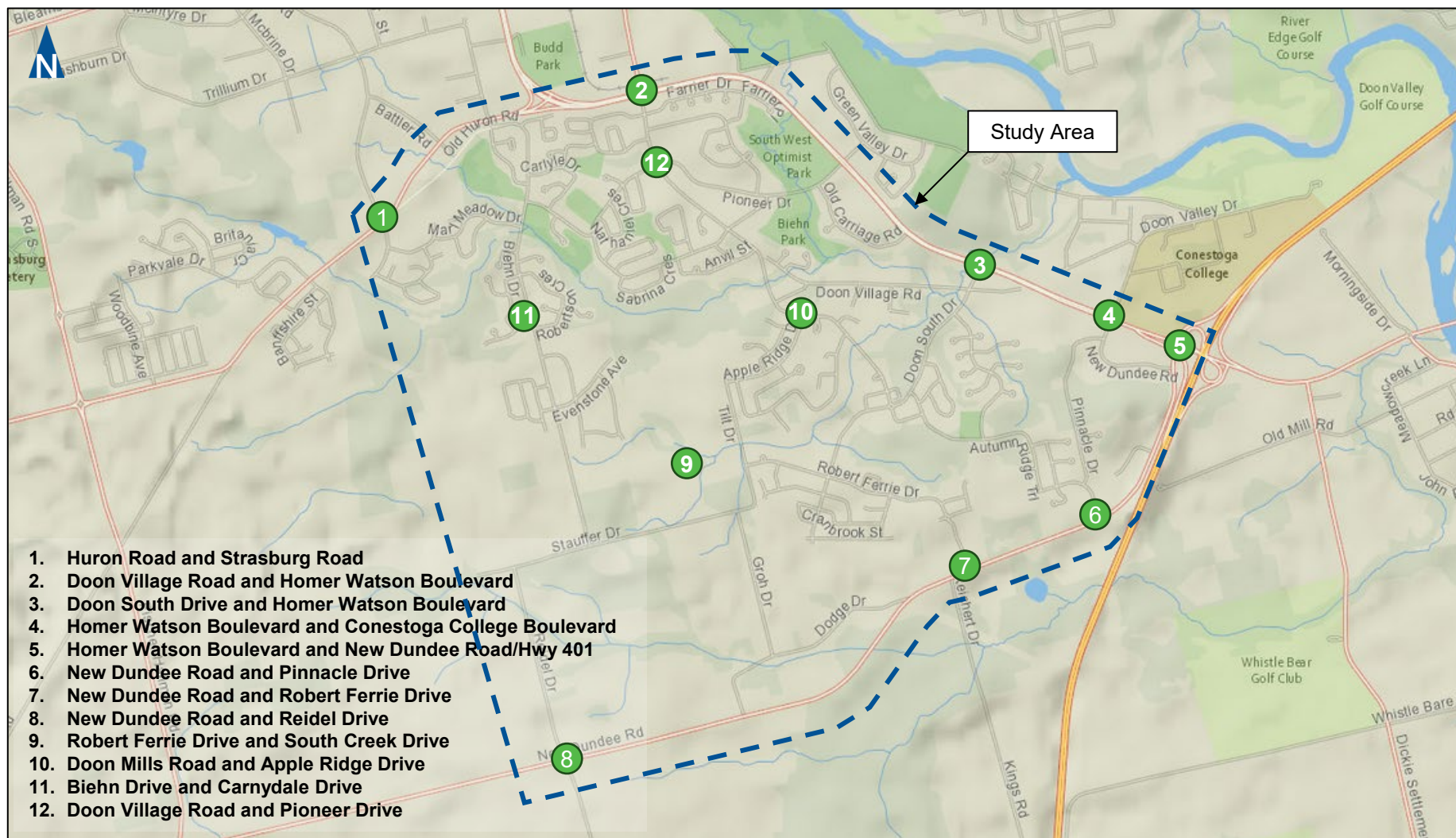


Image Source: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Study Area and Study Intersections

2 Existing Conditions

2.1 Road Network

The main roadways in the study area comprise the following:

- ▶ **Huron Road** is an east-west, city arterial street⁴ with a four-lane urban cross-section. At the east end, the road terminates at an interchange with Homer Watson Boulevard. The posted speed limit is 60 km/h east of Battler Road and 50 km/h west of Battler Road.
- ▶ **Homer Watson Boulevard** is a predominantly north-south regional road, with a four-lane urban cross-section. The road widens to a six-lane urban cross-section at Conestoga College Boulevard. The posted speed limit is 70 km/h.
- ▶ **New Dundee Road** is an east-west regional road with a two-lane rural cross-section, which operates as Regional Road 12. The posted speed limit is 50 km/h.
- ▶ **Conestoga College Boulevard** is an east-west road with a four-lane urban cross-section. The segment between New Dundee Road and Homer Watson Boulevard operates under Region jurisdiction as Regional Road 12. The segment east of Homer Watson Boulevard is major community collector street under City of Kitchener jurisdiction.
- ▶ **Strasburg Road** is a north-south city arterial street with a four-lane urban cross-section. At the time of writing Strasburg Road terminates at Rockcliffe Drive. The posted speed limit is 60 km/h.
- ▶ **Doon Village Road, Pioneer Drive, Doon South Drive, Thomas Slee Drive, Biehn Drive and Robert Ferrie Drive** are major community collector streets each with a two-lane urban cross-section. The maximum speed limit on each road varies, although several roads operate with a posted speed limit of 40 km/h through AREA signage at entrances to the Doon South Area.
- ▶ **Apple Ridge Road and Caryndale Drive** are minor neighbourhood collector streets. Each street operates with a two-lane urban cross-section and a posted speed limit of 30 km/h.

⁴ City of Kitchener, *Official Plan A Complete and Healthy Kitchener, Mapp 1 Integrated Transportation System*, (Kitchener: City of Kitchener, 2019).



- ▶ **Reidel Drive** is a north-south local street with a two-lane rural cross-section. The posted speed limit is 50 km/h.

Figure 2.1 and **Figure 2.2** illustrate the existing lane configurations and traffic control at the signalized and unsignalized study intersections, respectively.



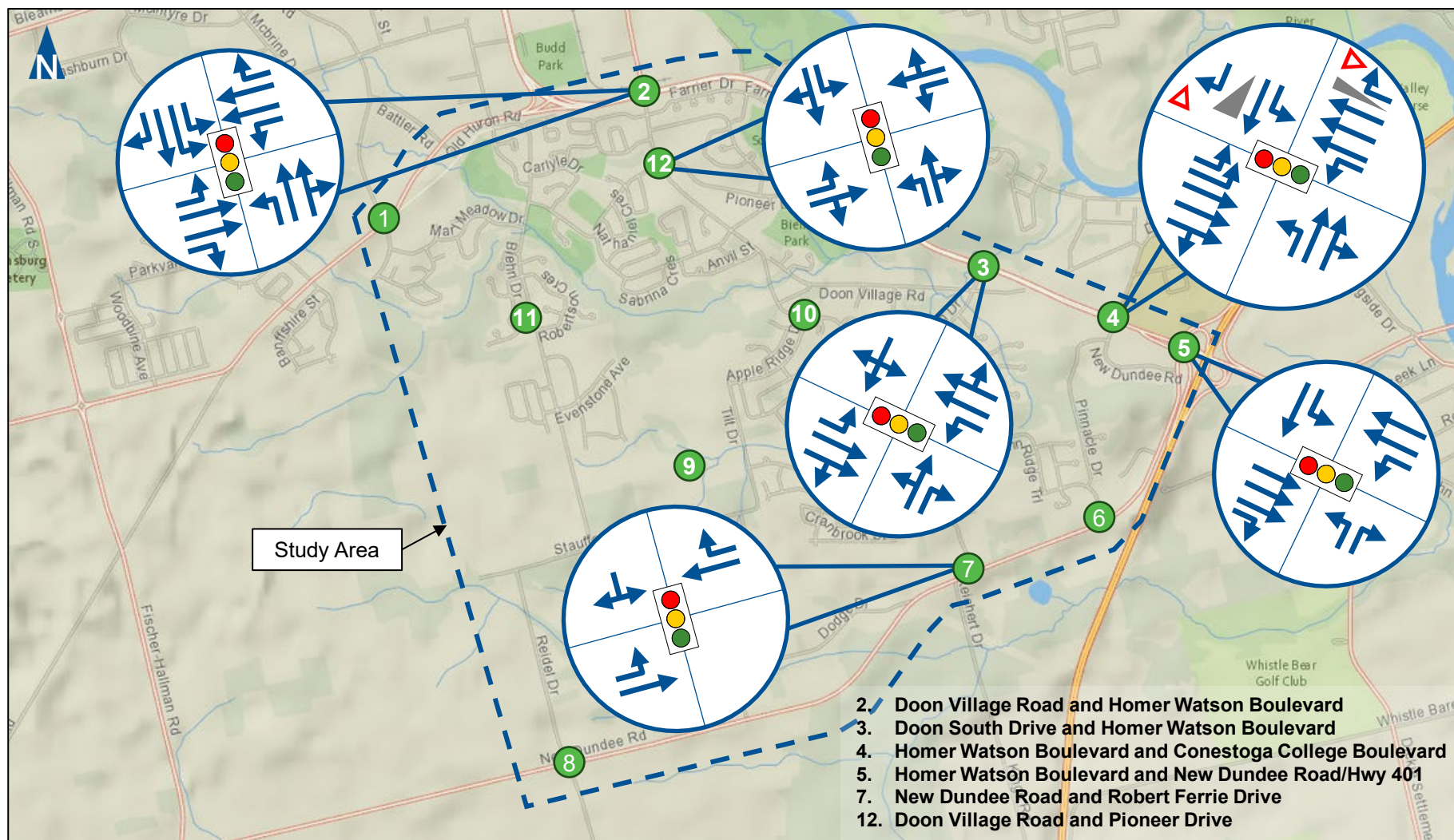


Image Source: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Existing Lane Configurations and Traffic Control Signalized Intersections

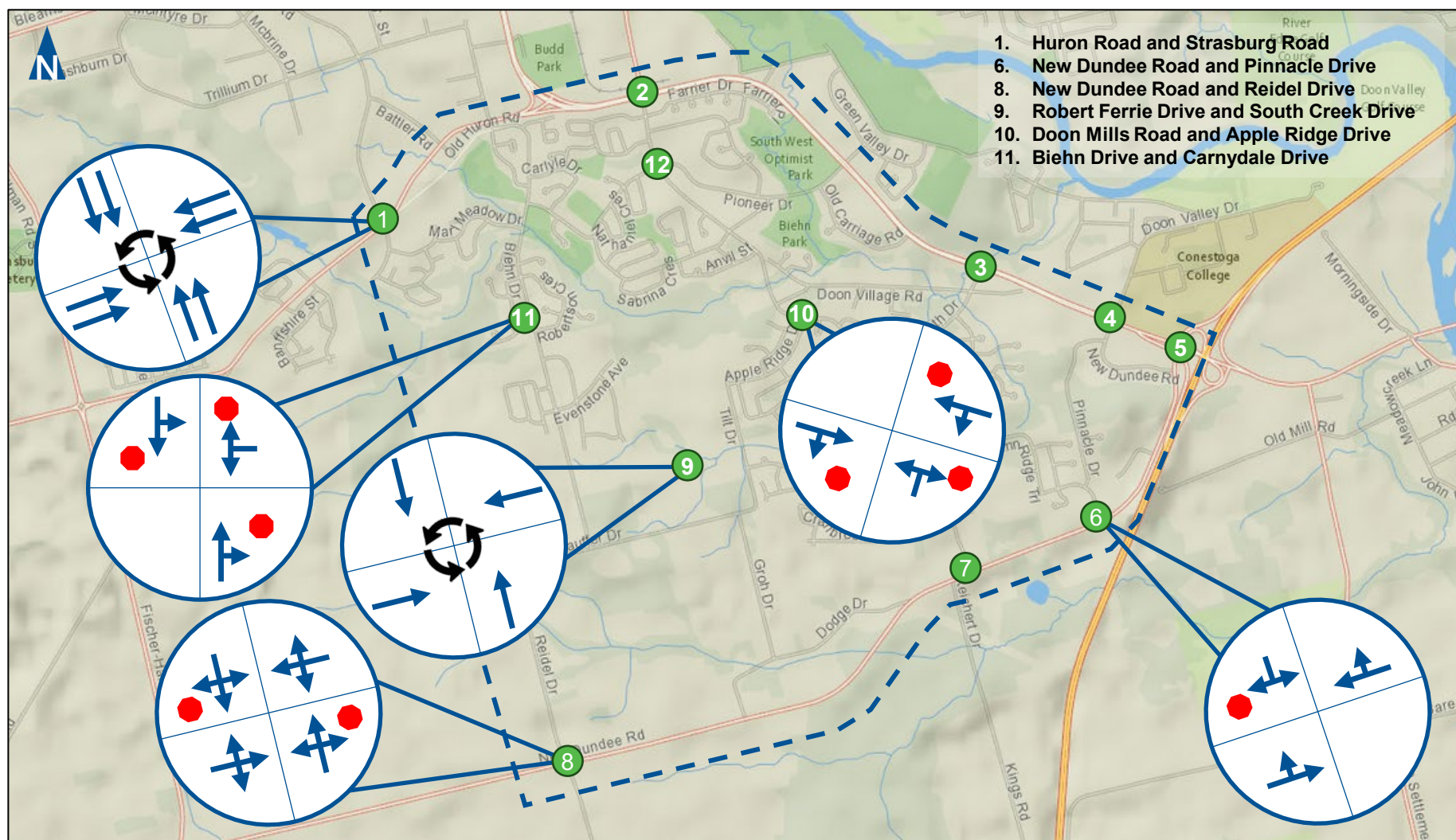


Image Source: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Existing Lane Configurations and Traffic Control Unsignalized Intersections

2.2 Transit Services

Grand River Transit (GRT) is the public transit operator in the Region of Waterloo and its constituent municipalities. GRT operates nine transit routes out of the Conestoga College Doon transit hub. Routes 16, 36, and 76 connect to transit stops in the Doon South neighbourhood, whereas the other routes primarily operate along Homer Watson Boulevard and Fountain Street (south of Highway 401).

Figure 2.3 illustrates the existing transit services in and surrounding the study area.



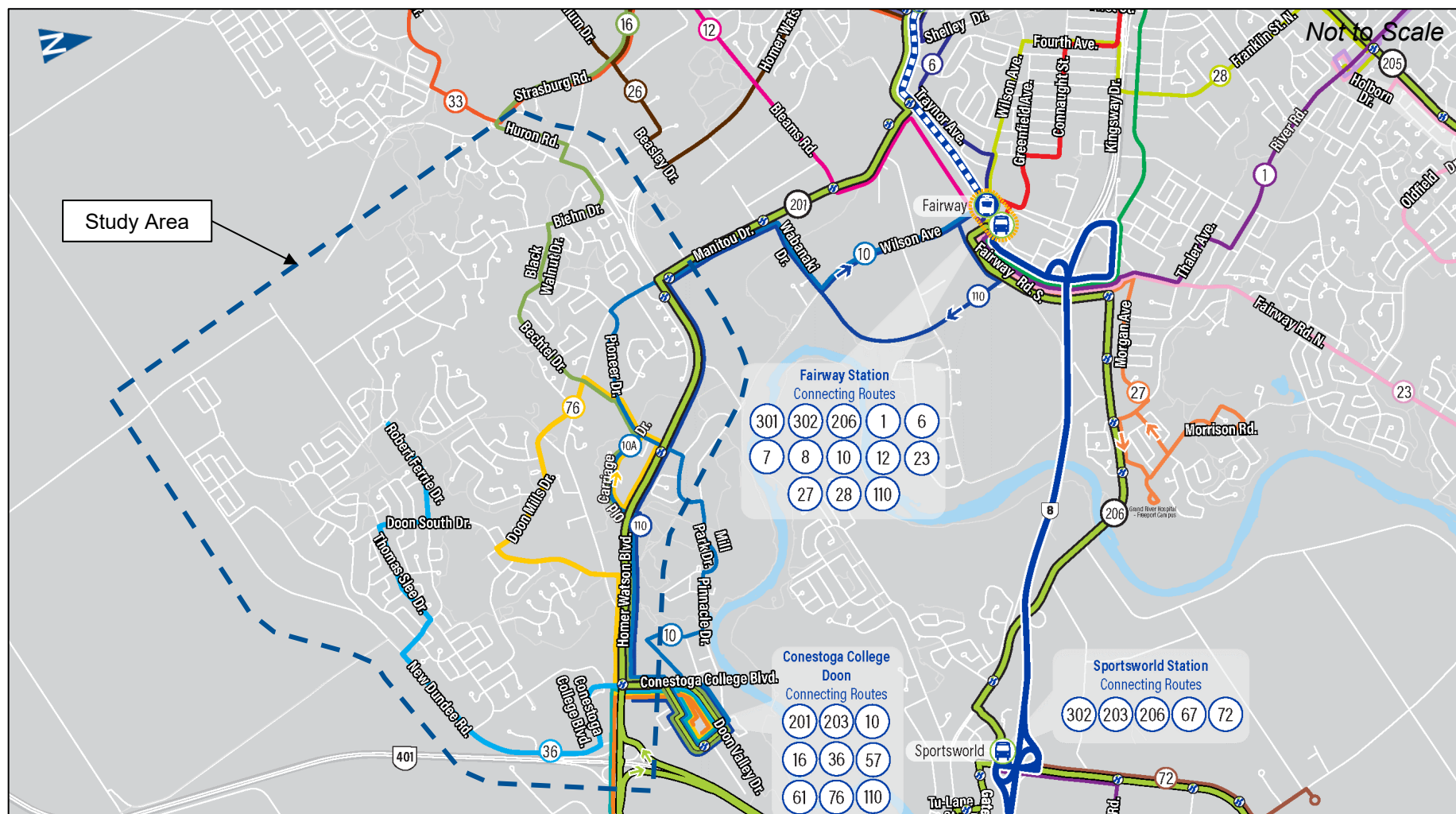


Image Source: Grand River Transit System Map (September 26, 2023) from https://www.grt.ca/en/schedules-maps/resources/2023-09-26-2023-system-map_09262023-web.pdf

3 Traffic Conditions

3.1 Existing Traffic Volumes

Due to the extent of the study area, Paradigm relied on a combination of historical turning movement count (TMC) data and more recent TMC data collected on Wednesday October 11, 2023. Table 3.1 summarizes the date and source of each TMC. All TMCs were conducted on a typical weekday from 7:30 AM to 10:30 AM, noon to 2:00 PM, and 3:00 PM to 6:00 PM.

Because the AM peak hour and PM peak hour varied by intersection, traffic volumes were not balanced between all intersections in the study area. Volume balancing was also not applied where there were a significant number of intersecting streets or businesses between two intersections. Traffic volumes were only balanced on Homer Watson Boulevard between Doon South Drive and New Dundee Road/Westbound Highway 401 Off-Ramp.

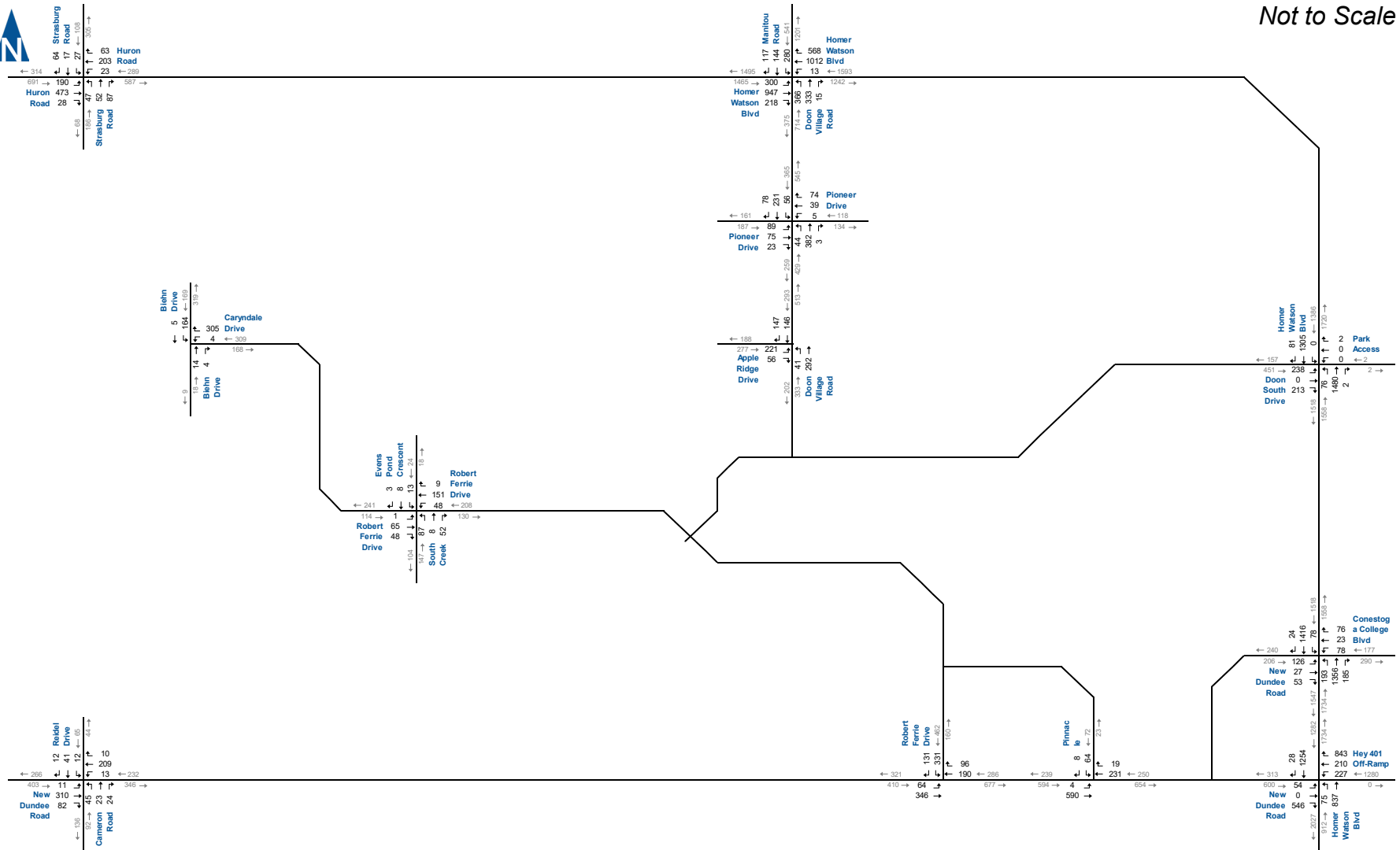
Figure 3.1 and **Figure 3.2** illustrate the existing AM peak hour and PM peak hour traffic volumes, respectively. **Appendix A** contains the detailed turning movement count data.



TABLE 3.1: DATE AND SOURCE OF TRAFFIC DATA

Intersection	Count Date	Source
Huron Rd. and Strasburg Rd.	Wed. Apr. 20, 2022	Paradigm
Doon Village Rd. and Homer Watson Blvd.	Wed. Oct. 11, 2023	Paradigm
Doon South Dr. and Homer Watson Blvd.	Wed. Oct. 11, 2023	Paradigm
Homer Watson Blvd. and Conestoga College Blvd.	Thurs. 4 Nov. 2021	Region
Homer Watson Blvd. and New Dundee Rd./Hwy. 401	Wed. Mar. 29, 2023	Region
New Dundee Rd. and Pinnacle Dr.	Tues. Jun. 7, 2022	Region
New Dundee Rd. and Robert Ferrie Dr.	Wed. Mar. 29, 2023	Region
New Dundee Rd. and Reidel Dr./Cameron Rd.	Wed. May 31, 2023	Paradigm
Robert Ferrie Dr. and South Creek Dr.	Wed. Oct. 11, 2023	Paradigm
Doon Mills Rd. and Apple Ridge Dr.	Wed. Oct. 11, 2023	Paradigm
Biehn Dr. and Caryndale Dr.	Wed. Oct. 11, 2023	Paradigm
Doon Village Rd. and Pioneer Dr.	Tues. Oct. 18, 2022	Region

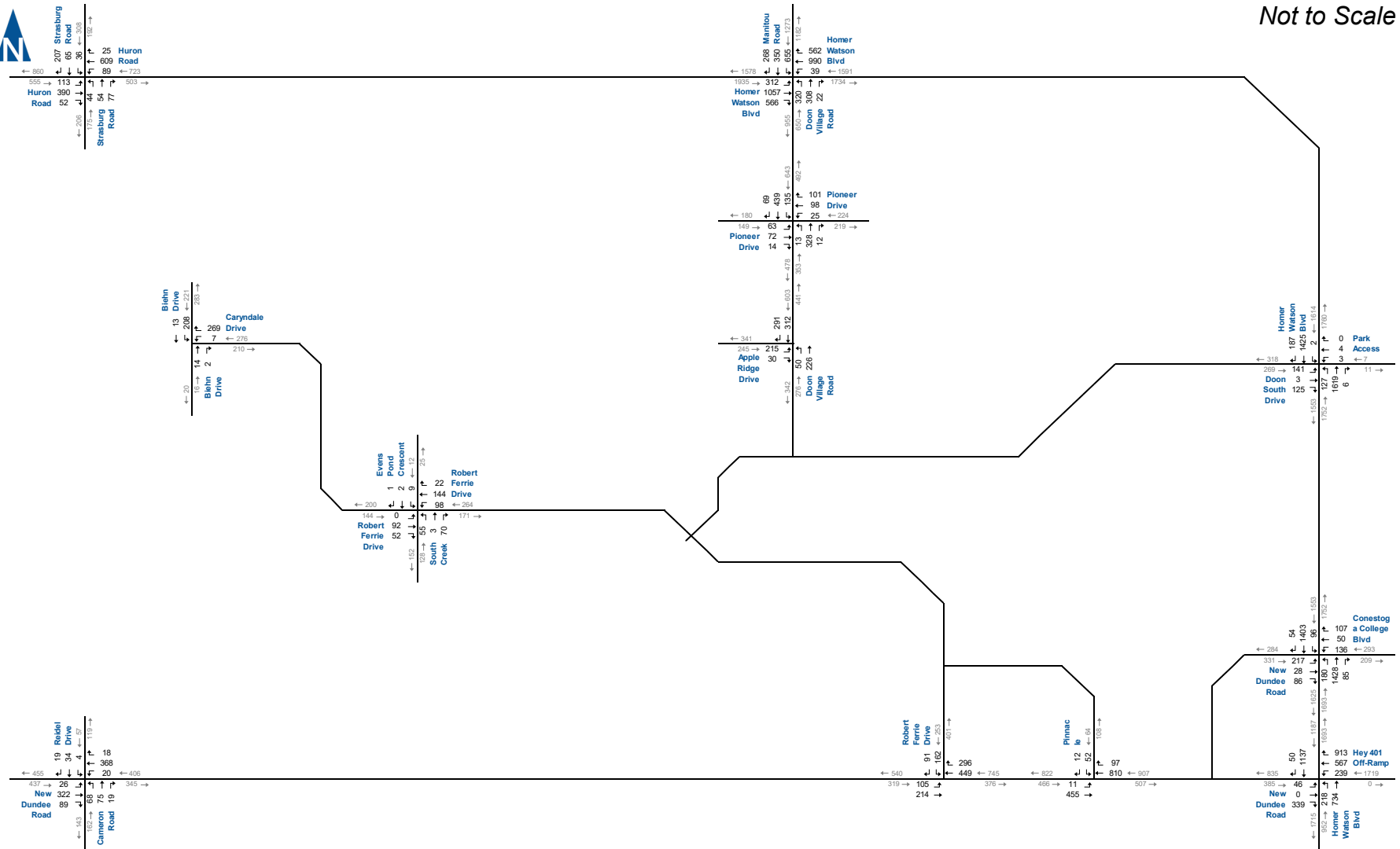




Not to Scale



Existing Traffic Volumes AM Peak Hour



Existing Traffic Volumes PM Peak Hour

3.2 Daily Traffic Count Volumes

Alongside the TMC data described in **Section 3.1** Paradigm conducted 24-hour traffic volume counts and vehicle classification surveys across 25 road segments. Due to equipment malfunctions, the data collection equipment only recorded vehicle classification data from 7 AM to 6 PM. **Appendix B** contains the raw ATR data.

To estimate daily 24-hour volumes from the subset collected, Paradigm reviewed historical ATR data for four study roads provided by the City. The historical data were collected in Fall 2022 at four locations in the study area. The data review indicates 11-hour volumes from 7 AM to 6 PM represent, on average, 70% of the 24-hour volume across the four different ATR locations in the study area. Therefore, the 11-hour ATR data was factored to a 24-hour condition, by assuming the observed volumes represented 70% of the 24-hour volume. The subsequent value was then rounded to the nearest 100.

Table 3.2 summarizes the 24-hour data collected as part of the 2016 TIS, the factored 11-hour data collected in 2023, and the net change in daily two-way traffic volumes. **Figure 3.3** illustrates the 2023 volume data presented in **Table 3.2**.



TABLE 3.2: 24-HOUR TRAFFIC VOLUME REVIEW

Road	Limits	Daily Volume		Change
		2015	2023 ¹	
Apple Ridge Dr.	Forest Creek Dr. to Doon Mills Rd.	5,300	5,100	-200
Biehn Dr.	Caryndale Dr. to Black Walnut Dr.	4,500	6,500	2,000
Caryndale Dr.	Robert Ferrie Drive to Stauffer Dr.	1,650	1,500	-150
Caryndale Dr.	Evenstone Avenue to Chapel Hill Dr.	2,350	3,800	1,450
Doon Mills Dr.	Pine Valley Dr. to Doon South Dr.	4,700	6,000	1,300
Doon Mills Dr.	Tilt Dr. to Apple Ridge Dr.	8,200	10,400	2,200
Doon Mills Dr.	Anvil Street to Tilt Dr.	-	10,900	10,900
Doon South Dr.	Homer Watson Blvd. to Doon Village Rd.	6,450	7,300	850
Doon South Dr.	Robert Ferrie Dr. to Thomas Slee Dr.	-	3,200	3,200
Doon South Dr.	Doon Mills Dr. to Forest Edge Tr.	-	4,400	4,400
Doon South Dr.	Doon South Dr. to Robert Ferrie Dr.	-	6,400	6,400
Doon Village Rd.	Pioneer Dr. to Bechtel Dr.	8,150	10,100	1,950
Doon Village Rd.	Pioneer Dr. to Homer Watson Blvd.	12,400	14,500	2,100
Forest Creek Dr.	Robert Ferrie Dr. to Apple Ridge Dr.	2,100	2,600	500
Forest Edge Tr.	Doon South Dr. to Windrush Tr.	-	700	700
Forest Edge Tr.	Windrush Tr. to Thomas Slee Dr.	-	1,500	1,500
Reidel Dr.	Stauffer Dr. to New Dundee Rd.	1,300	1,600	300
Robert Ferrie Dr.	Doon South Dr. to Thomas Slee Dr.	2,400	3,500	1,100
Robert Ferrie Dr.	Forest Creek Dr. to Doon South Dr.	1,650	2,900	1,250
Robert Ferrie Dr.	South Creek Dr. to Forest Creek Dr.	1,550	3,700	2,150
Robert Ferrie Dr.	Blair Creek Dr. to New Dundee Rd.	3,550	7,000	3,450
South Creek Dr.	Robert Ferrie Dr. to Doon South Dr.	550	2,600	2,050
Thomas Slee Dr.	Doon South Dr. to Robert Ferrie Dr.	-	2,300	2,300
Thomas Slee Dr.	South Creek Dr. to Doon South Dr.	-	2,500	2,500
Windrush Tr.	Doon South Dr. to Forest Edge Tr.	-	1,500	1,500

Notes:

- 2023 volumes represent an estimate of daily volumes based on consecutive 11-hour observations conducted from 7 AM to 6 PM, factored to a 24-hour condition. Based on a review of Fall 2022 ATR data at four locations in the study area it is assumed the 11-hour period from 7 AM to 6 PM captures 70% of the daily traffic volume.



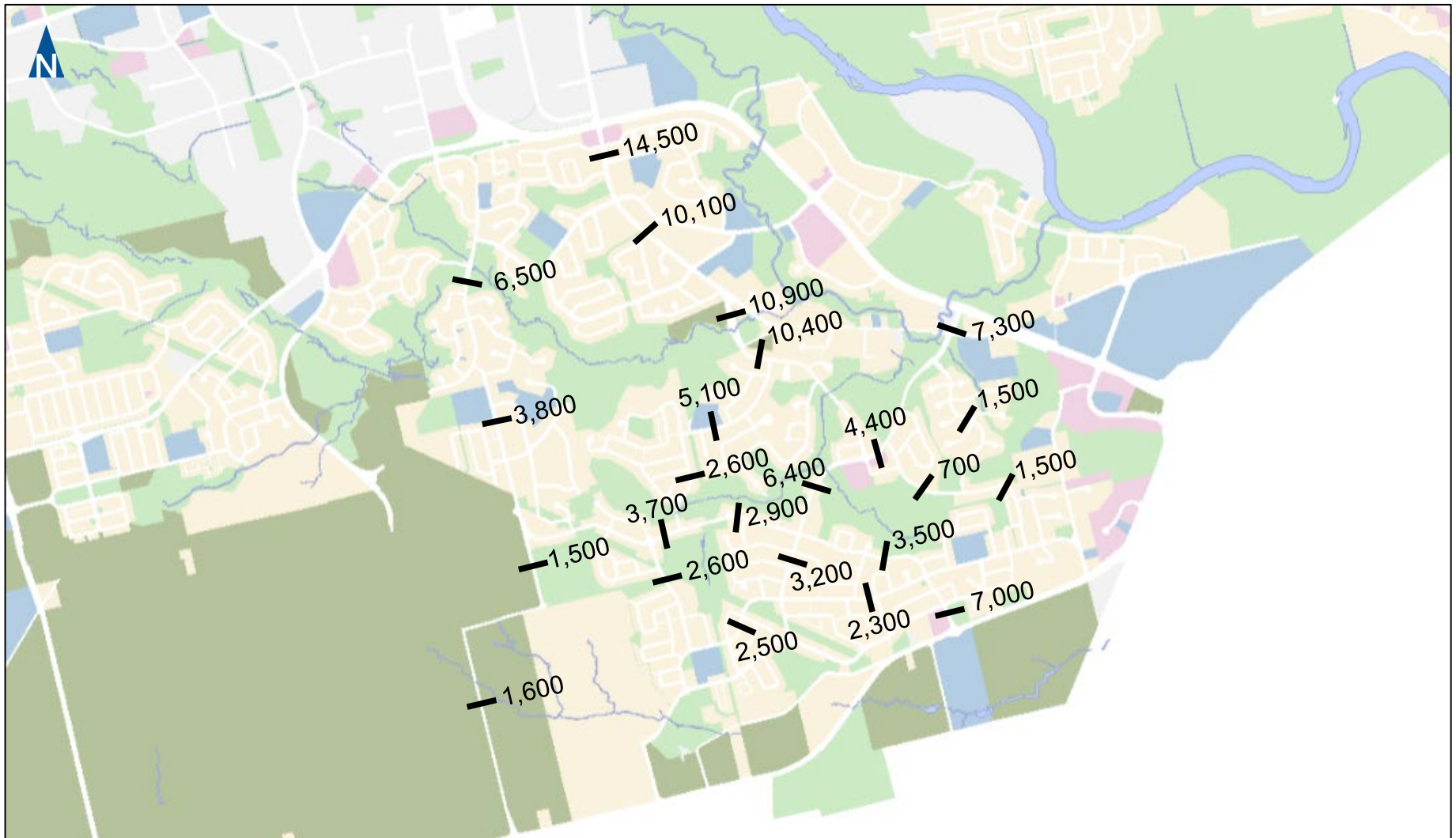


Image Source: City of Kitchener Online Interactive Mapping Tool (<https://maps.kitchener.ca/OnPointExternal/RMap/Default.aspx#>)



24-Hour Traffic Volume Observations

3.3 Traffic Operations

The quality of intersection operations at signalized and unsignalized intersections is evaluated in terms of level of service (LOS) and volume-to-capacity (v/c) as defined by the Highway Capacity Manual (HCM). LOS is evaluated based on the average control delay per vehicle and includes deceleration delay, queue move-up delay, stopped delay, and final acceleration delay. Volume-to-capacity is calculated as the ratio of the total vehicular demand for each movement as compared to the theoretical capacity for each movement.

For signalized intersections, LOS ranges from LOS A (less than 10 seconds of average delay) to LOS F (greater than 80 seconds of average delay). For unsignalized intersections, LOS ranges from LOS A (less than 10 seconds of average delay) to LOS F (greater than 50 seconds of average delay). Capacity is evaluated in terms of the ratio of demand flow to theoretical capacity, with an at capacity condition represented by a v/c ratio of 1.00 (that is, volume demand equals capacity).

The Region of Waterloo *Transportation Impact Study Guidelines*⁵ define critical intersections as those where the average control delay per vehicle is greater than 55 seconds (for signalized intersections) or 35 seconds (for unsignalized intersections). Both delays correspond to LOS E. Critical movements, regardless of intersection control type, are defined as those where:

- ▶ The average control delay for individual movements is greater than 55 seconds;
- ▶ The estimated 95th percentile queue length for an exclusive movement exceeds the available lane storage;
- ▶ The estimated 95th percentile queue length for an individual movement blocks 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.

The operations of the study intersections (except those operating as roundabouts) have been modelled and analyzed using Synchro 11, which implements the methodology of the Highway Capacity Manual (HCM), with the following parameters:

⁵ Region of Waterloo, *Transportation Impact Study Guidelines*, (Kitchener, Region of Waterloo, 2014), 12.



- ▶ Existing lane geometry and traffic control;
- ▶ Saturation flow rates and peak hour factors as defined in the Region of Waterloo *Transportation Impact Study Requirements for Capacity Analysis, Roundabouts, and Signal Warrants*⁶;
- ▶ Heavy vehicle percentages and pedestrian volumes as extracted from the turning movement counts; and
- ▶ Synchro default values for all other inputs.

For intersections operating as a roundabout, traffic operations have been analyzed using ARCADY. The analysis considers three separate measures of performance:

- ▶ The level of service (LOS) and average delay for each turning movement, measured in seconds (s);
- ▶ The volume to capacity (v/c) ratio for each movement; and
- ▶ The 95th percentile queue length, in metres (m).

Table 3.3 and **Table 3.4** summarize the estimated base year conditions. The analyses indicate the study intersections are generally operating at acceptable levels of service and within capacity. The following critical movements are noted:

- ▶ **Homer Watson Boulevard and Manitou Drive/Doon Village Road:**
 - In the AM peak hour, the eastbound left-turn, southbound left-turn, and westbound through movements are operating with delays greater than 55 seconds. The northbound left-turn movement is also operating with queues that exceed available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, westbound through, northbound left-turn and through, and southbound left-turn and through movements are operating with delays greater than 55 seconds. The northbound and southbound left-turn movements are also operating with queues that exceed available lane capacity.
- ▶ **Homer Watson Boulevard and Doon South Drive:** In the PM peak hour, the southbound through movement is operating with delays greater than 55 seconds.

⁶ Region of Waterloo, *Transportation Impact Studies (TIS), Requirements for Capacity Analysis, Roundabouts, Signal Warrants*, (Kitchener: Region of Waterloo, n.d.).



- ▶ **Homer Watson Boulevard and Conestoga College Boulevard:** In the PM peak hour, the eastbound left-turn movement is operating with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and New Dundee Road/Highway 401 Ramp:**
 - In the AM peak hour, the eastbound right-turn movement is operating with delays greater than 55 seconds; and
 - In the PM peak hour, the northbound left-turn movement is operating with delays greater than 55 seconds.

Appendix C contains the detailed Synchro 11 reports.



TABLE 3.3: EXISTING TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																		Overall
				Eastbound				Westbound				Northbound				Southbound						
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach			
AM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.36 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.16 2 -	> > > > >	A 3 - - -	< < < < <	A 3 0.12 7 -	> > > > >	A 3 - - -	< < < < <	A 2 0.06 7 -	> > > > >	A 2 - - -	A 3		
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 86 0.96 137 275 138	D 31 0.62 148 -	C 24 0.18 22 80 58	E 41 - - -	D 35 0.08 6 120 114	F 80 1.00 220 -	E 67 0.63 93 200 107	F 68 - - -	E 40 0.73 109 25 -84	F 51 0.48 67 -	> > > > >	E 45 - - -	F 64 0.67 55 105 50	F 53 0.40 59 -	E 47 0.08 17 65 48	F 58 - - -	D 54 0.91		
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 48 0.80 76 -	C 29 0.15 17 -	D 39 - -	< < < < <	C 27 0.00 0 -	> > > > >	C 27 - -	D 45 0.51 31 110 79	B 16 0.77 174 -	> > > > >	B 17 - -	A 0 0.00 0 55 55	D 36 0.93 240 -	> > > > >	D 36 - -	C 28 0.90		
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 39 0.60 35 50 15	D 39 0.16 10 -	> > > > >	D 39 - -	D 37 0.47 24 50 26	D 41 0.19 12 -	D 40 0.06 2 -	D 39 - -	C 26 0.65 49 205 156	B 16 0.54 85 -	B 12 0.14 14 -	B 16 - -	D 40 0.33 14 175 161	C 35 0.93 194 -	C 13 0.02 0 190 190	C 35 - -	C 26 0.85		
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	C 33 0.19 24 75 51	C - - -	E 79 0.97 181 -	E 75 - -	C 26 0.40 68 -	C 25 0.30 63 0	A 2 0.62 0 -	A 10 - -	C 22 0.41 16 180 164	C 21 0.51 84 -	> > > > >	C 21 - -	C - -	C 31 0.69 107 -	C 22 0.02 0 65 65	C 31 - -	C 29 0.84		
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 -	> > > > >	A 0 - -	< < < < <	A 0 0.15 0 -	> > > > >	A 0 - -					C 17 0.20 6 -	> > > > >	> > > > >	C 17 - -			
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	B 13 0.17 10 30 20	B 15 0.51 49 -	> > > > >	B 15 - -	< < < < <	C 22 0.55 40 -	B 18 0.07 10 15	C 21 - -					< < < < <	B 19 0.66 99 -	> > > > >	B 19 - -	B 18 0.64		
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	< < < < <	A 1 0.01 0 -	> > > > >	A 1 - -	< < < < <	C 17 0.23 7 -	> > > > >	C 17 - -	< < < < <	C 15 0.16 4 -	> > > > >	C 15 - -			
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.11 7 -	> > > > >	A 3 - -	< < < < <	A 4 0.20 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.03 7 -	> > > > >	A 4 - -	A 4		
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 13 0.43 -	B - -	> > >	B 13 - -					< < < < <	B 13 0.48 -	> > > > >	B 13 - -	< < < < <	B 11 0.41 -	> > > > >	B 11 - -			
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.29 10 -	> > > > >	A 10 - -	A 10 - -	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	< < < < <	A 7 0.10 3 -	> > > > >	A 7 - -			
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.23 18 20 3	B 16 0.17 16 -	> > > > >	B 16 - -	< < < < <	B 15 0.09 10 -	B 15 0.06 8 22	B 15 - -	A 9 0.10 8 20 12	B 13 0.49 51 -	> > > > >	B 13 - -	A 10 0.15 10 30 21	B 12 0.41 37 -	> > > > >	B 12 - -	B 13 0.39		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



TABLE 3.4: EXISTING TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.30 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.39 5 -	> > > > >	A 3 - - -	< < < < <	A 2 0.11 7 -	> > > > >	A 2 - - -	< < < < <	A 3 0.21 7 -	> > > > >	A 3 - - -	A 3
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 86 0.96 141 275 134	E 40 0.74 176 - -	C 34 0.51 70 80 10	E 45 - - -	E 38 0.27 13 120 107	F 99 1.05 222 200 115	E 50 0.60 85 - -	F 80 - - -	F 57 0.85 94 25 -69	F 57 0.51 65 - -	> > > > >	F 57 - - -	F 105 1.04 152 105 -47	F 61 0.74 141 65 25	E 47 0.28 40 - -	F 81 - - -	E 65 0.98
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 45 0.69 49 -	C 32 0.09 15 -	D 39 - -	< < < < <	C 31 0.03 5 -	> > > > >	C 31 - -	D 40 0.55 45 110 65	B 12 0.75 164 - -	> > > > >	B 14 - -	B 13 0.02 2 55 53	E 57 1.04 277 - -	> > > > >	E 57 - -	D 35 0.93
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	F 90 0.97 75 50 -25	D 39 0.17 11 ->	> > > > >	E 73 - -	C 33 0.55 37 50 13	D 38 0.26 20 ->	D 37 0.08 9 -	D 36 - -	C 25 0.66 42 205 163	B 18 0.60 99 ->	B 13 0.06 0 ->	B 19 - -	D 40 0.38 17 175 158	C 30 0.88 198 190 190	B 14 0.04 0 190 -	C 30 - -	C 29 0.86
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	D 37 0.31 22 75 53	> > > > >	D 36 0.43 57 ->	D 36 - -	C 24 0.36 65 ->	C 35 0.75 188 ->	A 2 0.66 0 ->	B 16 - -	E 64 0.94 75 180 105	C 20 0.46 72 ->	> > > > >	C 30 - -	C 32 0.66 94 ->	C 24 0.03 0 65 65	C 32 - -	C 25 0.92	
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	A 0 0.53 0 ->	> > > > >	A 0 - -	A 0 - -					D 34 0.34 11 -	> > > > >	D 34 - -		
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	B 13 0.31 14 30 16	B 11 0.24 28 ->	> > > > >	B 12 - -	< < < < <	C 32 0.81 97 ->	B 19 0.36 31 -6	C 27 - -					< < < < <	C 21 0.42 60 ->	> > > > >	C 21 0.58	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.02 1 ->	> > > > >	A 1 - -	< < < < <	A 1 0.02 0 ->	> > > > >	A 1 - -	< < < < <	D 34 0.58 27 ->	> > > > >	D 34 - -	< < < < <	C 18 0.17 5 ->	> > > > >	C 18 - -	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.14 7 ->	> > > > >	A 4 - -	< < < < <	A 4 0.25 7 ->	> > > > >	A 4 - -	< < < < <	A 4 0.12 7 ->	> > > > >	A 4 - -	< < < < <	A 4 0.01 7 ->	> > > > >	A 4 - -	A 4
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 14 0.42 - ->	> > > > >	B 14 - -						< < < < <	B 13 0.43 - ->	> > > > >	B 13 - -	D 26 0.82 - ->	> > > > >	D 26 - -		
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.27 9 ->	> > > > >	A 10 - -	A 10 - -	A 0 0.01 0 ->	> > > > >	A 0 - -	A 0 - -	< < < < <	A 7 0.13 4 ->	> > > > >	A 7 - -	
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.17 13 20 7	B 16 0.15 15 ->	> > > > >	B 16 - -	< < < < <	B 17 0.25 22 ->	B 15 0.07 9 30 21	B 16 - -	A 9 0.04 3 20 17	B 12 0.44 44 ->	> > > > >	B 12 - -	B 12 0.31 20 30 10	B 17 0.66 73 ->	> > > > >	B 15 - -	B 15 0.49

MOE - Measure of Effectiveness

LOS - Level of Service

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Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



4 Community Development and Status of Build-out

The 2016 *Update to Doon South Community and Broader Study Area Traffic Impact Study* (the 2016 TIS) estimated a total yield of the planned, registered, and remaining units in the Doon South Phase 1, Doon South Phase 2, and Brigadoon areas. **Table 4.1** summarizes the estimated unit allocation in the 2016 study and the remaining units assumed in that report.

TABLE 4.1: ESTIMATED UNIT ALLOCATION (2016)

Location	Planned Units	Remaining Units
Doon South Phase 1	1,172 – 1,384	607-819
Doon South Phase 2	2,471 – 2,952	2,278 – 2,759
Brigadoon	887-1,566	887 – 1,566
Total	4,530 – 5,902	3,772 – 5,144

Table 4.2 summarizes the updated unit allocation estimates based on a field review of completed units as compared to those included in the 2016 TIS. The updated unit allocation indicates between 2,115 and 3,082 units remain outstanding in the study area.

TABLE 4.2: UPDATED UNIT ALLOCATION ESTIMATES (2023)

Location	Remaining Units
Doon South Phase 1	0
Doon South Phase 2	1,228 – 1,516
Brigadoon	887 – 1,566
Total	2,115 – 3,082

To supplement the estimates above Paradigm reviewed the Growth Area Subplans included as Appendix A to the *Kitchener Growth Management Plan (Fall 2019 to Fall 2021)*⁷ alongside information provided by the City of Kitchener Planning Department. **Table 4.3** summarizes the estimated remaining units based on known site plan approvals, with a total of 2,841 units outstanding.

⁷ City of Kitchener Development Services Department – Planning Division, *Kitchener Growth Management Plan (KGMP)*, (City of Kitchener: Kitchener, 2019).



TABLE 4.3: ESTIMATED REMAINING UNITS BY STUDY ZONE

Location	Remaining Units
Doon South Phase 1	52
Doon South Phase 2	1,600
Brigadoon	1,189
Total	2,841



5 Future Traffic Volumes

5.1 Horizon Years

Consistent with the Region of Waterloo *Transportation Impact Study Guidelines* and pre-study discussions with City of Kitchener staff, future traffic forecasts and analyses correspond to five- and ten-years from the date of study, representative of 2028 and 2033.

5.2 Planned Roadway Improvements

Given the ongoing development in the study area, several new road construction projects and intersection improvements are planned over the analysis periods assumed in this study. **Table 5.1** summarizes the assumed road and intersection improvements and their estimated completion. Except for future widenings of Homer Watson Boulevard and New Dundee Road, all improvements are scheduled to occur before the 2028 horizon year. Therefore, the analysis of 2028 and 2033 conditions assumes all improvements except the widenings of Homer Watson Boulevard and New Dundee Road.

The future traffic analyses do not assume a future extension of Biehn Drive, because the ultimate alignment and timing of this extension remains unknown

5.3 Forecast Background Traffic

The future background traffic volumes in the study area (that is, traffic growth unrelated to the remaining units to be development in the Doon South area) is expected to comprise general background traffic growth from development outside the study area.

Future traffic growth estimates are based on a general background growth rate of 1% compounded per annum, applied only to movements on Huron Road, Homer Watson Boulevard, and New Dundee Road. This growth rate was recommended by City staff during pre-study consultation and accounts for future development outside of the Doon South and Brigadoon neighbourhoods.

Figure 5.1, and **Figure 5.2** illustrate the future background traffic volumes at the 2028 horizon year. **Figure 5.3** and **Figure 5.4** illustrate the future background traffic volumes at the 2033 horizon year.



TABLE 5.1: PLANNED ROADWAY AND INTERSECTION IMPROVEMENTS

Roadway or Intersection	Limits	Description	Estimated Completion	Source
Robert Ferrie Drive	Caryndale Drive to Strasburg Road	Two-lane extension	2023-2025	[2]
Strasburg Road	Robert Ferrie Drive to New Dundee Road	Four-lane extension.	2025	[2]
Blair Creek Drive Extension	Reidel Drive to Strasburg Road	Two-lane extension	2026	[2]
Strasburg Road and Robert Ferrie Drive		New Roundabout	2025	[3]
Strasburg Road and Blair Creek Drive Extension		New Roundabout	2025	[3]
Strasburg Road and New Dundee Road		New Roundabout	2025	[3]
New Dundee Road and Robert Ferrie Drive		New Roundabout	2024-2025	[1]
Caryndale Drive and Robert Ferrie Drive		New Traffic Control Signal	2025	[3]
Homer Watson Boulevard	Conestoga College Boulevard to Manitou Drive	Widening for new transit lanes	2031-2041	[4]
New Dundee Road	Fisher Hallman Road to Homer Watson Boulevard	Widening	Beyond 2041	[4]

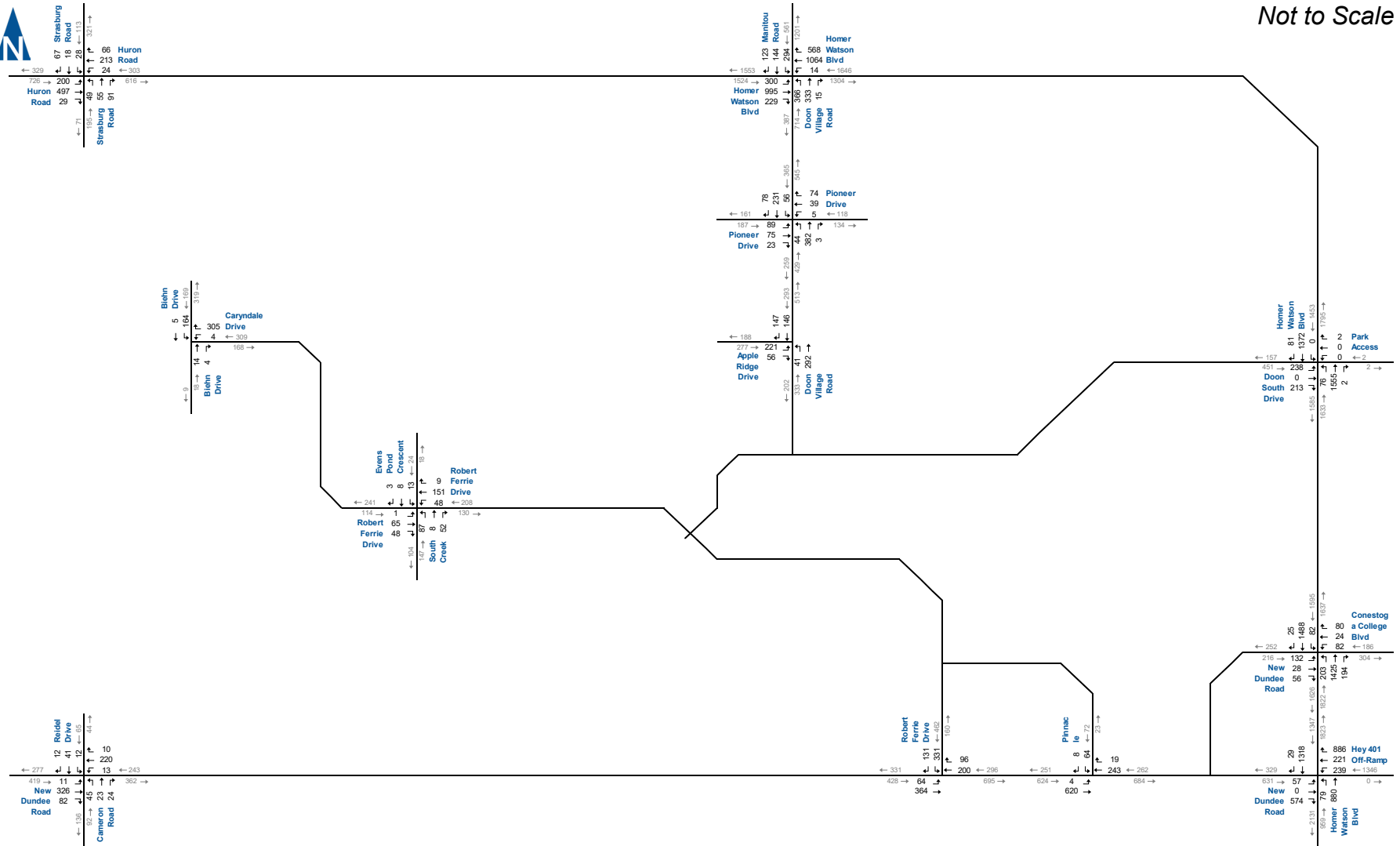
Source:

1. Region of Waterloo, *(RR12) New Dundee Road Roundabout at Robert Ferrie Drive*, Accessed 13 November 2023 from https://www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_07284_InfoSheet.pdf
2. City of Kitchener, *Approved Budget Summary 2023, Appendix B Capital Budget Details*, Accessed 13 November 2023 from https://www.kitchener.ca/en/resourcesGeneral/Documents/FIN_FP_2023_Budget_Appendix_B.pdf
3. BA Consulting Group Limited, *Update to Doon South Community and Broader Study Area Traffic Impact Study*, (Toronto: BA Group, 2016).
4. Region of Waterloo, *2018 Transportation Master Plan*, Accessed 13 November 2023 from https://www.regionofwaterloo.ca/en/living-here/resources/Transportation-Master-Plan/DOCS_ADMIN-3030800-v3-TMP_Report_Moving_Forward_Main_Report_FINAL_2019-06-12.pdf



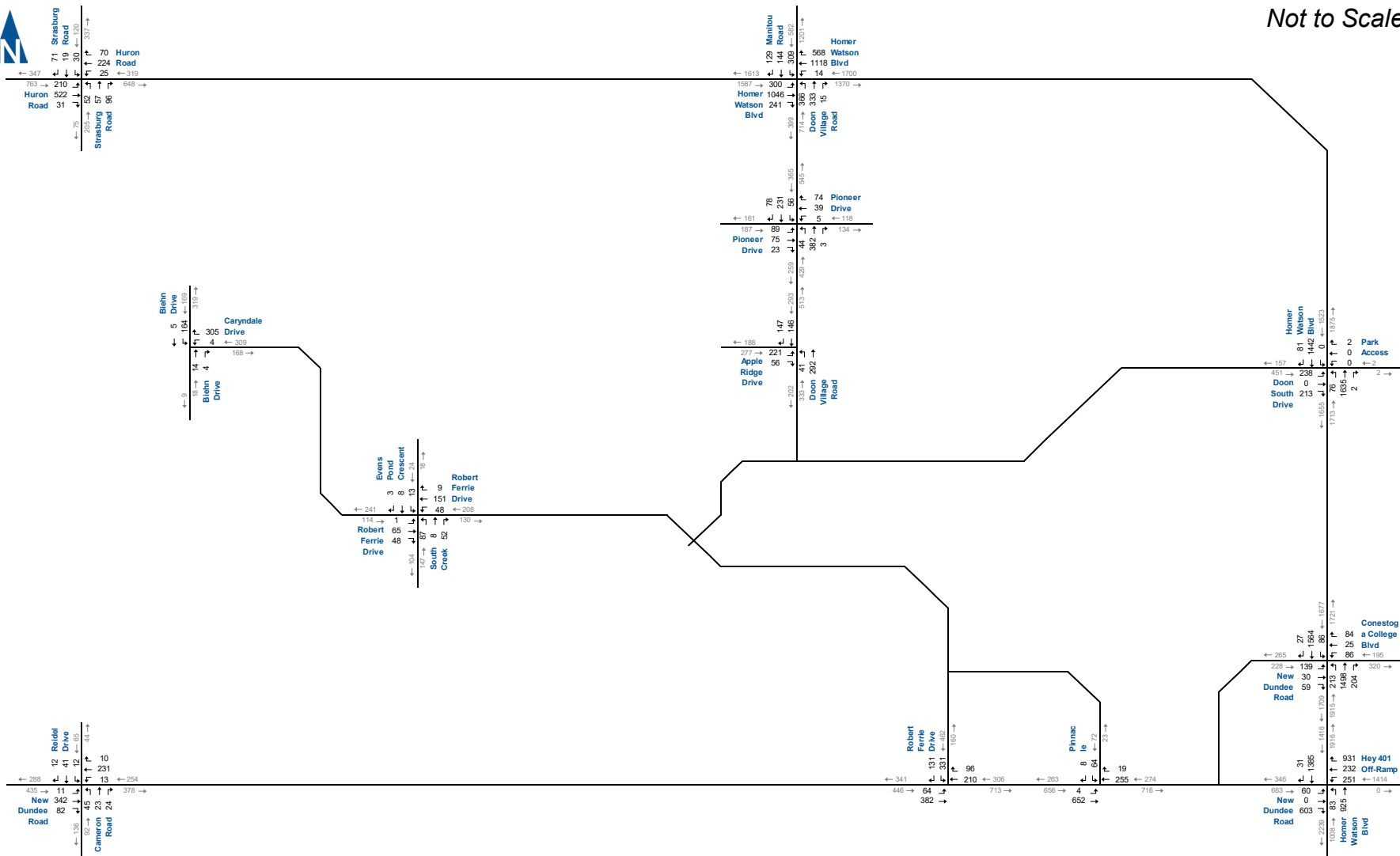


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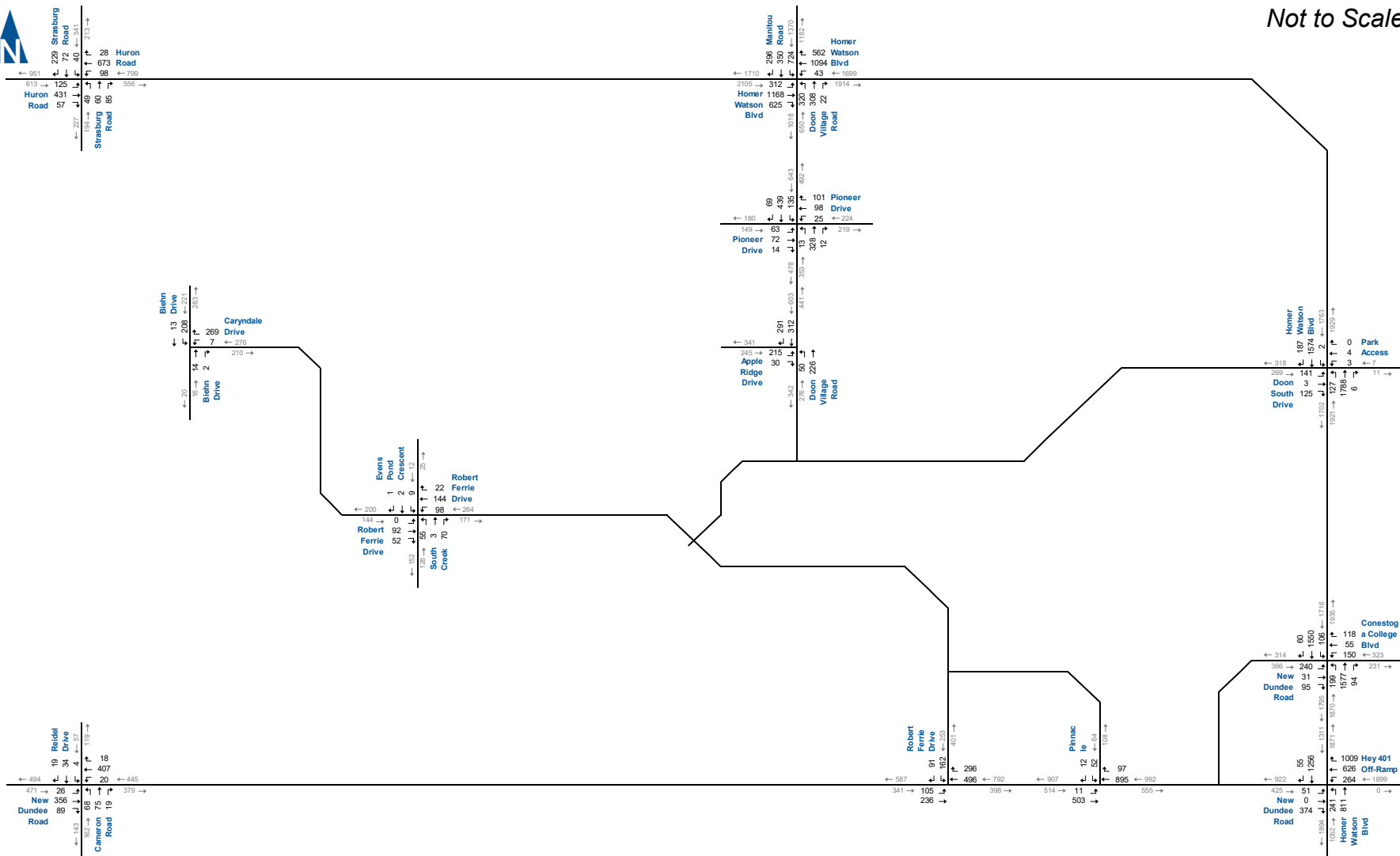


2028 Background Traffic Forecast AM Peak Hour

Figure 5.1



2033 Background Traffic Forecast AM Peak Hour



Not to Scale



2033 Background Traffic Forecast PM Peak Hour

5.4 Forecast Site Traffic

5.4.1 Trip Generation

Traffic activity related to the undeveloped portions of the Doon South and Brigadoon neighbourhoods reflects trip generation information in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*⁸ for land use code (LUC) 210 (Multifamily Housing (Low-Rise)). LUC 210 is described as “any single family detached home on an individual lot; a typical site is a suburban subdivision.” Although the specific unit type for each residential parcel remains unknown, this presents a conservative estimate of trip generation activity.

Table 5.2 summarizes the estimated trip generation based on the number of remaining units estimated in each study area zone. The estimates are based on the regression equations published by ITE for LUC 210 and include a 5% modal split reduction to account for potential trips completed by public transit, walking, or cycling. This mode split reduction is consistent with that used in the 2016 TIS and was confirmed with City staff during pre-study consultation.

Development of the remaining units is estimated to generate 1,593 trips in the weekday AM peak hour and 2,297 trips in the weekday PM peak hour.

5.4.2 Trip Distribution and Assignment

The trip distribution developed for this study is based on existing travel patterns. Given the similar nature of the existing development pattern and future development land uses, it is assumed existing travel patterns provide a reasonable estimate of trip patterns to and from the study area. **Table 5.3** summarizes the estimated trip distribution.

For trips associated with Doon South Phase 2 and the Brigadoon areas, the trip assignment also reflects the variety of routes traffic could take to the arterial road network. This includes the planned extensions of Strasburg Road south to New Dundee Road, Robert Ferrie Drive west to Strasburg Road, and Blair Creek Drive west to Strasburg Road, all of which are assumed to be in place at the 2028 horizon year. The trip assignments do not assume a future extension of Biehn Drive, because the ultimate alignment and timing of this extension remains unknown. **Table 5.4** summarizes the assumed routing of vehicle trips for the Doon South Phase 2 and Brigadoon

⁸ Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).



areas. **Figure 5.5** and **Figure 5.6** illustrate the site-generated traffic assignments.



TABLE 5.2: ESTIMATED TRIP GENERATION

Zone	LUC	Units	AM Peak Hour				PM Peak Hour			
			Rate ¹	In	Out	Total	Rate ²	In	Out	Total
Phase 1	220	52	Eqn.	10	31	41	Eqn.	34	20	54
Phase 2	220	1,600	Eqn.	232	697	929	Eqn.	848	498	1,346
Brigadoon	220	1,189	Eqn.	177	532	709	Eqn.	641	377	1,018
Total Trip Generation				419	1,260	1,679		1,524	894	2,418
Modal Split Reduction			5%	-22	-64	-86	5%	-76	-45	-121
Net Trip Generation				397	1,196	1,593		1,447	850	2,297

Source Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).

Notes:

1. LUC 210 (AM): $\text{Ln}(T) = 0.91\text{Ln}(X) + 0.12$, 25% entering, 75% exiting
2. LUC 210 (PM): $\text{Ln}(T) = 0.94\text{Ln}(X) + 0.27$, 63% entering, 37% exiting



TABLE 5.3: ESTIMATED TRIP DISTRIBUTION

Origin/Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Manitou Dr.	10%	20%	20%	20%
North via Homer Watson Blvd.	20%	25%	20%	15%
East via Highway 401	25%	(see note 1)	25%	(see note 1)
South via Homer Watson Blvd.	20% ²	40% ¹	15% ²	30% ¹
West via Huron Rd.	15%	5%	10%	15%
West via Hew Dundee Rd.	10%	5%	10%	10%
West via Highway 401	0% ²	5% ³	0% ²	10% ³
Total	100%	100%	100%	100%

Notes:

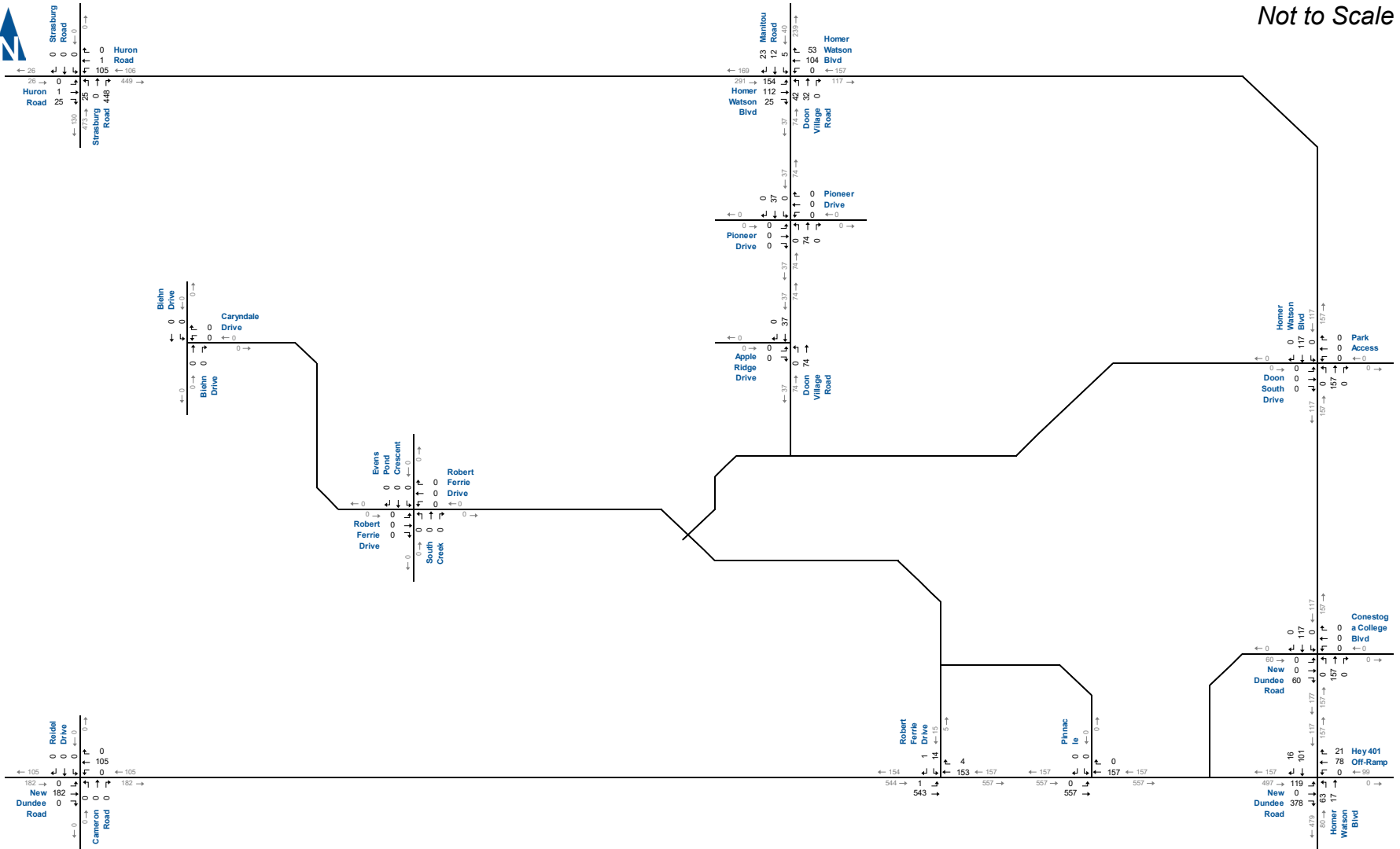
1. Outbound trips to eastbound Highway 401 are included in the percentage for outbound trips to the south via Homer Watson Boulevard.
2. Inbound trips from the south via Homer Watson Boulevard include those trips entering from the west via eastbound Highway 401.
3. Outbound trips on New Dundee Road destined to the west via Highway 401 are assumed to travel east on New Dundee Road, north via Conestoga College Boulevard, and then south via Homer Watson Boulevard.



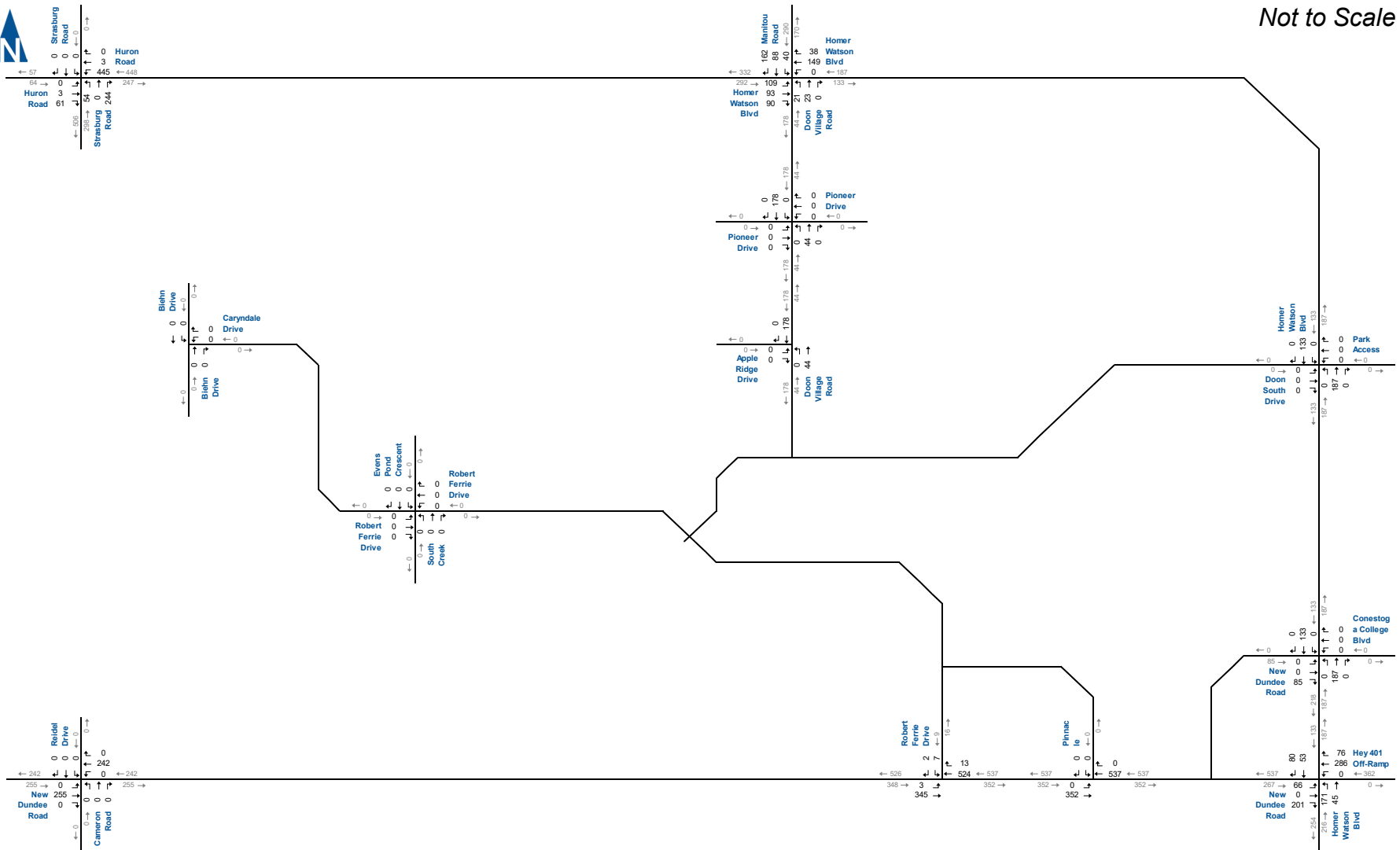
TABLE 5.4: ESTIMATED TRIP ASSIGNMENT – DOON SOUTH PHASE 2 AND BRIGADOON

Origin/Destination	Doon South Phase 2		Brigadoon	
	In	Out	In	Out
North via Manitou Dr.				
via Doon Village Rd.	50%	20%		
via Homer Watson Blvd. and Doon South Dr.	0%	0%		
via New Dundee Rd.	25%	40%		
via Strasburg Rd. extension	25%	40%		
North via Homer Watson Blvd.				
via Doon Village Rd.	50%	20%		
via Homer Watson Blvd. and Doon South Dr.	0%	0%		
via New Dundee Rd.	25%	40%		
via Strasburg Rd. extension	25%	40%		
East via Highway 401				
via Huron Rd. and Homer Watson Blvd.	0%	0%	50%	50%
via Strasburg Rd. extension and New Dundee Road	50%	50%	50%	50%
via Blair Valley St./Staulter Woods St.	50%	50%	0%	0%
South via Homer Watson Blvd.				
via Huron Rd. and Homer Watson Blvd.	0%	0%	50%	50%
via Strasburg Rd. extension and New Dundee Road	50%	50%	50%	50%
via Blair Valley St./Staulter Woods St.	50%	50%	0%	0%





Estimated Site Generated Traffic AM Peak Hour



Estimated Site Generated Traffic PM Peak Hour

5.5 Future Total Traffic

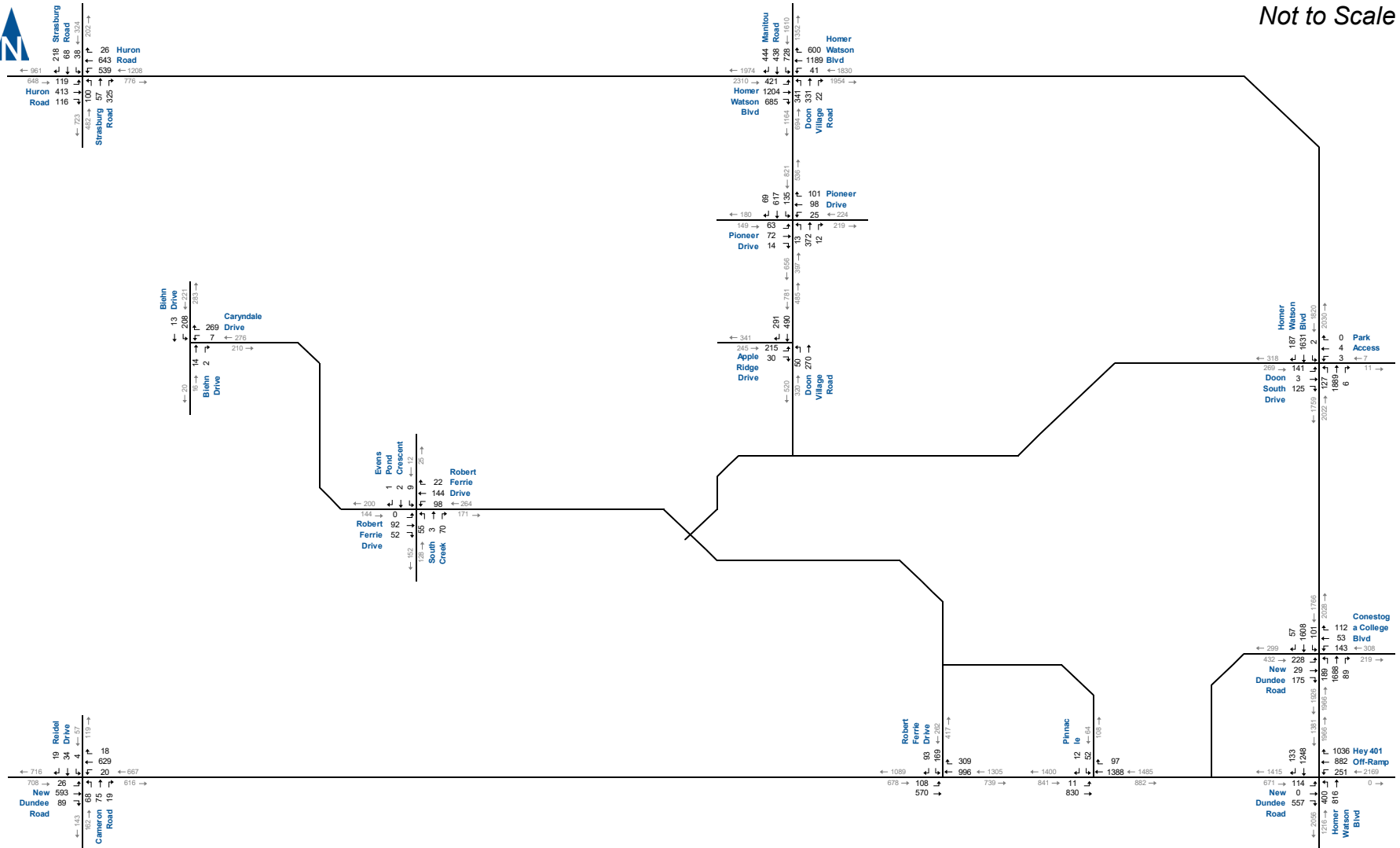
The future total traffic volumes at each horizon year represent the summation of the site generated traffic volumes (see **Figure 5.5** and **Figure 5.6**) and the background traffic volumes from each respective horizon year.

Figure 5.7 and **Figure 5.8** illustrate the future total traffic volumes at the 2028 horizon. **Figure 5.9** and **Figure 5.10** illustrate the future total traffic volumes at the 2033 horizon.





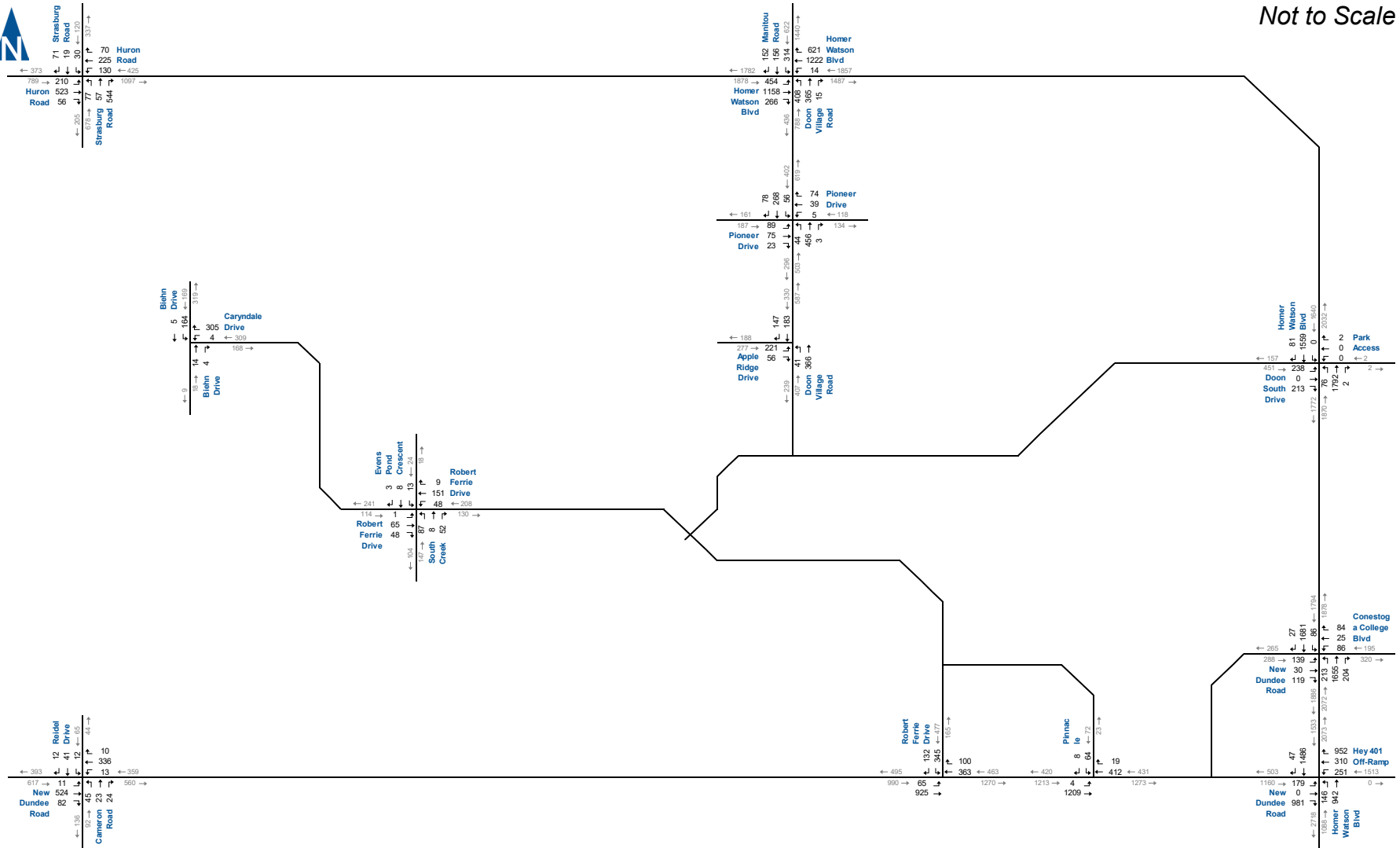
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2028 Total Traffic Forecast PM Peak Hour



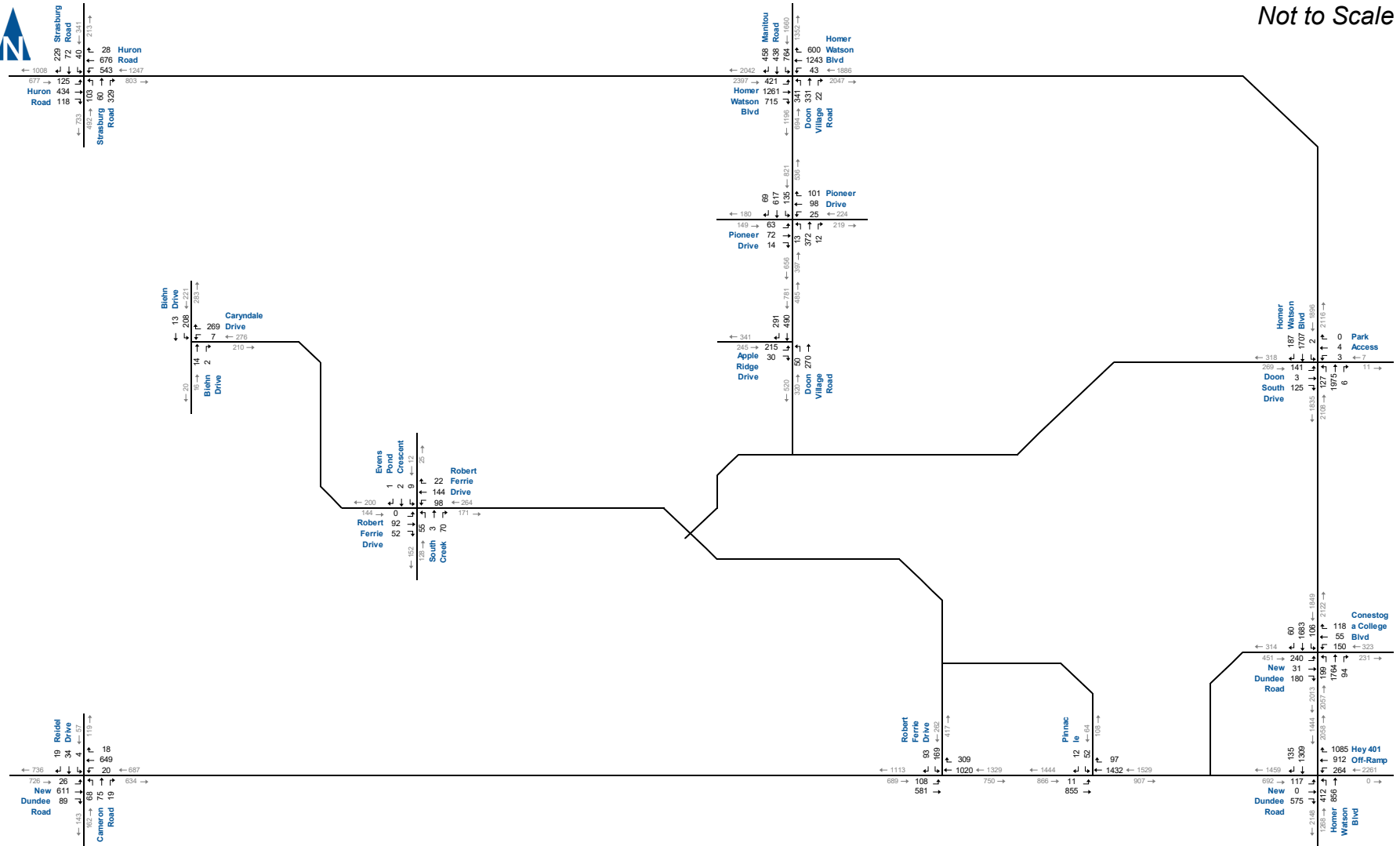
Not to Scale



2033 Total Traffic Forecast AM Peak Hour



Not to Scale



2033 Total Traffic Forecast PM Peak Hour

Figure 5.10

6 Traffic Operations Assessment

6.1 Background Traffic Operations

Analysis of background traffic conditions uses the same methodology as existing traffic conditions. Signal timing splits and cycle lengths have not been modified to determine the net impacts of traffic related to and not related the outstanding development activity. Lane configurations at the existing study intersections are unchanged, except for the new two-lane roundabout proposed at Robert Ferrie Drive and New Dundee Road.

6.1.1 2028 Background Traffic Operations

Table 6.1 and **Table 6.2** summarize the background traffic level of service conditions at the 2028 horizon year. Critical movements are highlighted in yellow. The results indicate the study intersections are forecast to operate at similar levels of service as existing conditions. The following critical movements are noted:

- ▶ **Homer Watson Boulevard and Manitou Drive/Doon Village Road:**
 - In the AM peak hour, the eastbound left-turn, southbound left-turn, and westbound through movements are forecast to operate with delays greater than 55 seconds. The northbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, westbound through, northbound left-turn and through, and southbound left-turn and through movement are forecast to operate with delays greater than 55 seconds. The northbound and southbound left-turn movements and eastbound right-turn movement are forecast to operate with queues exceeding available lane capacity.
- ▶ **Homer Watson Boulevard and Doon South Drive:** In the PM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and Conestoga College Boulevard:** In the PM peak hour, the eastbound left-turn movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and New Dundee Road/Highway 401 Ramp:**



- In the AM peak hour, the eastbound right-turn movement is forecast to operate with delays greater than 55 seconds; and
- In the PM peak hour, the northbound left-turn movement is forecast to operate with delays greater than 55 seconds.

Appendix D contains the detailed Synchro reports.



TABLE 6.1: 2028 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	Overall
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.37 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.17 2 -	> > > > >	A 3 - - -	< < < < <	A 3 0.13 7 -	> > > > >	A 3 - - -	< < < < <	A 2 0.06 7 -	> > > > >	A 2 - - -	A 3	
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 84 0.96 138 275 137	D 32 0.65 159 80 -	C 24 0.20 26 -	E 41 - -	D 35 0.09 6 120 114	F 92 1.05 240 -	E 47 0.62 94 200 106	F 76 - -	E 42 0.74 109 25 -84	F 53 0.50 67 -	> > > > >	E 47 - -	F 64 0.69 58 105 47	F 52 0.39 59 -	E 47 0.09 17 65 48	F 57 - -	E 57 0.91	
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 49 0.80 76 -	C 29 0.15 17 -	D 39 - -	< < < < <	C 28 0.00 0 -	> > > > >	C 28 - -	D 45 0.51 31 110 79	B 17 0.80 192 -	> > > > >	B 18 - -	A 0 0.00 0 55 55	D 43 0.98 257 -	> > > > >	D 43 - -	C 31 0.93	
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 40 0.63 37 50 13	D 39 0.17 10 -	> > > > >	D 40 - -	D 37 0.48 25 25	D 41 0.20 12 -	D 40 0.07 3 -	D 39 - -	C 28 0.67 55 205 150	B 12 0.57 92 -	B 12 0.16 15 -	B 17 - -	D 40 0.35 15 175 160	D 44 0.99 211 -	B 14 0.02 0 190 190	D 44 - -	C 31 0.89	
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	C 35 0.21 25 75 50	F 107 1.07 200 -	F 101 - -	F 101 - -	C 27 0.43 72 -	C 26 0.32 66 -	A 2 0.65 0 -	B 11 - -	C 23 0.45 17 180 163	C 21 0.53 89 -	> > > > >	C 21 - -	C 31 0.70 114 -	C 22 0.02 0 65 65	C 31 - -	C 33 0.89		
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 -	> > > > >	A 0 - -	A 0 0.15 0 -	> > > > >	A 0 - -	A 0 - -	> > > > >	> > > > >	> > > > >	> > > > >	C 18 0.21 6 -	> > > > >	> > > > >	C 18 - -		
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.26 7 -	> > > > >	A 3 - -	A 2 0.16 7 -	> > > > >	A 2 - -	A 2 - -	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	A 3 0.32 7 -	> > > > >	A 3 - -	A 3	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	A 1 0.01 0 -	> > > > >	A 1 - -	A 1 - -	< < < < <	C 17 0.24 7 -	> > > > >	C 17 - -	< < < < <	C 16 0.16 5 -	> > > > >	C 16 - -	C 16	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.11 7 -	> > > > >	A 3 - -	A 4 0.20 7 -	> > > > >	A 4 - -	A 4 - -	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.03 7 -	> > > > >	A 4 - -	A 4	
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 13 0.43 - -	> > > > >	B 13 - -	B 13 - -	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	B 13 0.48 - -	> > > > >	B 13 - -	> > > > >	B 11 0.41 - -	> > > > >	B 11 - -	B 11	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	> > > > >	> > > > >	> > > > >	A 10 0.29 10 -	> > > > >	A 10 - -	A 10 - -	> > > > >	A 0 0.01 0 -	> > > > >	A 0 - -	> > > > >	< < < < <	A 7 0.10 3 -	> > > > >	A 7 - -	A 7
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.23 18 20 3	B 16 0.17 16 -	> > > > >	B 16 - -	< < < < <	B 15 0.09 10 -	B 15 0.06 8 30 22	B 15 - -	A 9 0.10 8 20 12	B 13 0.49 51 -	> > > > >	B 13 - -	A 10 0.15 10 30 21	B 12 0.41 37 -	> > > > >	B 12 - -	B 13 0.39	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



TABLE 6.2: 2028 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.32 7 -	> > > > >	A 3	< < < < <	A 3 0.42 5 -	> > > > >	A 3	< < < < <	A 2 0.12 7 -	> > > > >	A 2	< < < < <	A 3 0.23 7 -	> > > > >	A 3	A 3	
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 86 0.96 141 275 134	E 41 0.78 189 - -	C 35 0.56 84 80 -4	E 46	E 39 0.31 14 120 106	F 117 1.11 239 - -	E 50 0.60 85 200 115	F 92	F 57 0.85 94 25 -69	F 57 0.51 65 - -	> > > > >	F 57	F 122 1.09 163 105 -58	F 61 0.74 141 65 24	E 47 0.30 41 - -	F 90	E 71 1.01	
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 45 0.69 49 -	C 32 0.09 15 -	D 39	< < < < <	C 31 0.03 5 -	> > > > >	C 31	D 40 0.55 45 110 65	B 13 0.79 183 - -	> > > > >	B 15	B 13 0.02 2 55 53	E 74 1.09 295 - -	> > > > >	E 74	D 43 0.97	
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	F 107 1.03 81 50 -31	D 40 0.18 12 -> -	> > > > >	F 84	C 33 0.57 39 50 11	D 38 0.27 21 -> -	D 37 0.09 10 -> -	D 35	C 25 0.66 44 205 161	C 21 0.67 108 -> -	B 14 0.07 -> ->	C 21	D 38 0.32 18 175 157	D 38 0.95 216 190 190	B 14 0.04 0 190 190	D 37	C 34 0.91	
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	D 45 0.41 25 75 50	> > > > >	D 39 0.49 67 -> -	D 40	C 25 0.39 72 -> -	D 40 0.81 215 -> -	A 3 0.69 0 -> -	B 18	F 86 1.01 86 180 94	B 20 0.46 76 -> -	> > > > >	D 35	> > > > >	C 32 0.66 99 -> 65	C 24 0.04 0 65 65	C 31	C 28 0.99	
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.02 0 -	> > > > >	A 0	A 0 0.56 0 -	> > > > >	> > > > >	A 0	> > > > >	> > > > >	> > > > >	> > > > >	E 38 0.37 13 -> ->	> > > > >	> > > > >	E 38	>	
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 2 0.19 7 -	> > > > >	A 2	A 3 0.42 7 -	> > > > >	> > > > >	A 3	> > > > >	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	A 3 0.20 7 -> ->	A 3	A 3	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.02 1 -	> > > > >	A 1	A 1 0.02 0 -	> > > > >	> > > > >	A 1	< < < < <	E 38 0.61 30 -> ->	> > > > >	E 38	< < < < <	C 19 0.18 5 -> ->	> > > > >	C 19	>	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.14 7 -	> > > > >	A 4	A 4 0.25 7 -	> > > > >	> > > > >	A 4	< < < < <	A 4 0.12 7 -	> > > > >	A 4	< < < < <	A 4 0.01 7 -> ->	> > > > >	A 4	A 4	
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 14 0.42 -> ->	B 16 0.15 15 -> ->	> > > > >	B 14	> > > > >	> > > > >	> > > > >	> > > > >	< < < < <	B 13 0.43 -> ->	> > > > >	B 13	> > > > >	D 26 0.82 -> ->	> > > > >	D 26	>	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.	> > > > >	> > > > >	> > > > >	> > > > >	A 10 0.27 9 -> ->	> > > > >	> > > > >	A 10	> > > > >	A 0 0.01 0 -> ->	> > > > >	A 0	< < < < <	A 7 0.13 4 -> ->	> > > > >	A 7	>	
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.17 13 20 7	B 16 0.15 15 -> ->	> > > > >	B 16	< < < < <	B 17 0.25 22 30 21	B 15 0.07 9 -> ->	B 16	A 9 0.04 3 20 17	B 12 0.44 44 -> ->	> > > > >	B 12	B 12 0.31 20 30 10	B 17 0.66 73 -> ->	> > > > >	B 15	B 15 0.49	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



6.1.2 2033 Background Traffic Operations

Table 6.3 and **Table 6.4** summarize the background traffic level of service conditions at the 2033 horizon year. Critical movements are highlighted in yellow. The results indicate the study intersections are forecast to operate at similar levels of service as existing conditions. The following critical movements are noted:

- ▶ **Homer Watson Boulevard and Manitou Drive/Doon Village Road:**
 - In the AM peak hour, the eastbound left-turn, southbound left-turn, and westbound through movements are forecast to operate with delays greater than 55 seconds. The northbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, westbound through, northbound left-turn and through, and southbound left-turn and through movement are forecast to operate with delays greater than 55 seconds. The northbound and southbound left-turn movements and eastbound right-turn movement are forecast to operate with queues exceeding available lane capacity.
- ▶ **Homer Watson Boulevard and Doon South Drive:** In the PM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and Conestoga College Boulevard:**
 - In the AM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds; and
 - In the PM peak hour, the eastbound left-turn movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and New Dundee Road/Highway 401 Ramp:**
 - In the AM peak hour, the eastbound right-turn movement is forecast to operate with a delay greater than 55 seconds; and
 - In the PM peak hour, the northbound and eastbound left-turn movements are forecast to operate with a delay greater than 55 seconds.

Appendix E contains the detailed Synchro reports.



TABLE 6.3: 2033 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	Overall
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.39 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.18 2 -	> > > > >	A 3 - - -	< < < < <	A 3 0.14 7 -	> > > > >	A 3 - - -	< < < < <	A 2 0.07 7 -	> > > > >	A 2 - - -	A 3	
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 85 0.96 140 275 135	D 33 0.69 173 -	C 24 0.22 30 80 50	E 41 - - -	D 35 0.10 6 120 114	F 111 1.10 261 200 -	E 67 0.63 94 106 -	F 89 - - -	E 42 0.74 108 25 -	F 53 0.51 68 -	> > > > >	E 48 - - -	F 64 0.70 61 105 44	F 52 0.39 59 -	E 47 0.09 18 65 47	F 57 - - -	E 62 0.93	
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 49 0.80 76 -	C 29 0.15 17 -	D 39 - -	< < < < <	C 28 0.00 0 -	> > > > >	C 28 - -	D 45 0.51 31 110 79	B 19 0.85 222 -	> > > > >	C 20 - -	A 0 0.00 0 55 55	D 55 1.03 275 -	> > > > >	D 55 - -	D 37 0.97	
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 42 0.66 38 50 12	D 39 0.18 11 -	> > > > >	D 41 - -	D 37 0.49 26 50 24	D 41 0.20 12 -	A 40 0.07 4 -	D 39 - -	C 31 0.71 61 205 144	B 17 0.60 100 -	B 12 0.17 17 -	B 18 - -	D 40 0.37 16 175 160	E 59 1.04 229 -	B 14 0.02 0 190 190	E 57 - -	D 36 0.93	
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	D 36 0.23 26 75 49	D -	F 146 1.17 219 -	F 136 - -	C 29 0.46 76 -	C 27 0.34 69 -	A 3 0.68 0 -	B 11 - -	C 24 0.50 18 180 162	C 21 0.54 95 -	> > > > >	C 21 - -	C 31 0.72 122 -	C 21 0.02 0 65 65	C 31 - -	D 38 0.94		
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 -	> > > > >	A 0 - -	A 0 0.16 0 -	> > > > >	A 0 - -	A 0 - -					C 19 0.22 7 -	> > > > >	C 19 - -			
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.27 7 -	> > > > >	A 3 - -	A 2 0.17 7 -	> > > > >	A 2 - -	A 2 - -					< < < < <	A 3 0.32 7 -	> > > > >	A 3 - -	A 3	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	A 1 0.01 0 -	> > > > >	A 1 - -	A 1 - -	C 18 0.25 8 -	C 18 -	C 18 -	C 18 -	< < < < <	C 16 0.17 5 -	> > > > >	C 16 - -		
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.11 7 -	> > > > >	A 3 - -	A 4 0.20 7 -	> > > > >	A 4 - -	A 4 - -	C 4 0.14 7 -	C 4 -	C 4 -	C 4 -	< < < < <	A 4 0.03 7 -	> > > > >	A 4 - -	A 4	
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 13 0.43 -	B -	> > > > >	B 13 - -						C 13 0.48 -	C 13 -	C 13 -	C 13 -		B 11 0.41 -	> > > > >	B 11 - -	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.29 10 -	> > > > >	A 10 -	A 10 -		A 0 0.01 0 -	A 0 -	A 0 -	< < < < <	A 7 0.10 3 -	> > > > >	A 7 - -	A 7	
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.23 18 20 3	B 16 0.17 16 -	> > > > >	B 16 - -	C 15 0.09 10 -	B 15 0.06 8 30 22	B 15 -	B 15 -	A 9 0.10 8 20 12	B 13 0.49 51 -	> > > > >	B 13 -	A 10 0.15 10 30 21	B 12 0.41 37 -	> > > > >	B 12 - -	B 13 0.39	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



TABLE 6.4: 2033 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.33 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.44 6 -	> > > > >	A 3 - - -	< < < < <	A 2 0.12 7 -	> > > > >	A 2 - - -	< < < < <	A 3 0.24 7 -	> > > > >	A 3 - - -	A 3
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 86 0.96 141 275 134	E 43 0.82 203 - -	D 37 0.61 100 80 -20	E 48 - - -	E 40 0.36 14 120 106	F 140 1.16 258 - -	E 50 0.60 85 200 115	F 107 - - -	F 57 0.85 94 25 -69	F 57 0.51 65 - -	> > > > >	F 57 - - -	F 143 1.15 175 105 -70	F 61 0.74 141 65 -	E 47 0.31 43 65 22	F 101 - - -	E 79 1.05 - -
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 45 0.69 49 -	C 32 0.09 15 -	D 39 - -	< < < < <	C 31 0.03 5 -	> > > > >	C 31 - -	D 40 0.55 45 110 65	B 15 0.83 206 -	> > > > >	B 17 - -	B 13 0.02 2 55 53	F 93 1.13 314 -	> > > > >	F 93 - -	D 52 1.01 -
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	F 127 1.10 88 50 -38	D 40 0.19 12 -	> > > > >	F 97 - -	C 33 0.59 41 50 9	D 38 0.27 21 -	D 37 0.09 12 -	D 36 - -	C 27 0.66 48 205 157	C 22 0.70 118 -	B 14 0.07 0 -	C 22 - -	D 38 0.33 19 175 156	D 54 1.02 236 190 190	B 15 0.04 0 190 190	D 51 - -	D 41 0.96 -
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	E 64 0.59 35 75 40	D 42 0.56 78 -	D 45 - -	D 45 - -	C 27 0.42 77 -	D 46 0.87 238 -	A 3 0.73 0 -	C 21 - -	F 114 1.10 100 180 80	B 20 0.48 81 -	> > > > >	D 41 - -	C 32 0.67 105 -	D 23 0.04 1 65 65	C 31 - -	C 31 1.07 -	
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.02 0 -	> > > > >	A 0 - -	A 0 0.58 0 -	> > > > >	A 0 - -	A 0 - -					E 43 0.41 14 -	> > > > >	E 43 - -		
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 2 0.19 7 -	> > > > >	A 2 - -	A 3 0.44 7 -	> > > > >	A 3 - -	A 3 - -					< < < < <	A 3 0.20 7 -	> > > > >	A 3 - -	A 3
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.02 1 -	> > > > >	A 1 - -	A 1 0.02 1 -	> > > > >	A 1 - -	A 1 - -	< < < < <	E 43 0.65 33 -	> > > > >	E 43 - -	< < < < <	C 20 0.19 6 -	> > > > >	C 20 - -	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.25 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.12 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.01 7 -	> > > > >	A 4 - -	A 4
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 14 0.42 - -	B 16 0.15 -	> > > > >	B 14 - -					< < < < <	B 13 0.43 -	> > > > >	B 13 - -		D 26 0.82 -	> > > > >	D 26 - -	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.27 9 -	> > > > >	A 10 - -	A 10 - -	A 0 0.01 0 -	> > > > >	A 0 - -	A 0 - -	< < < < <	A 7 0.13 4 -	> > > > >	A 7 - -	
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.17 13 20 7	B 16 0.15 15 -	> > > > >	B 16 - -	< < < < <	B 17 0.25 22 30 21	B 15 0.07 9 -	B 16 - -	A 9 0.04 3 20 17	B 12 0.44 44 -	> > > > >	B 12 - -	B 12 0.31 20 30 10	B 17 0.66 73 -	> > > > >	B 15 - -	B 15 0.49 -

MOE - Measure of Effectiveness

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AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



6.2 Total Traffic Operations

Analysis of total traffic conditions uses the same methodology as existing and future background traffic conditions. Signal timing splits and cycle lengths have not been modified to determine the net impacts of traffic related to and not related the outstanding development activity. Lane configurations at the existing study intersections are unchanged, except for the new two-lane roundabout proposed at Robert Ferrie Drive and New Dundee Road.

6.2.1 2028 Total Traffic Operations

Table 6.5 and **Table 6.6** summarize the total traffic level of service conditions at the 2028 horizon year. Critical movements are highlighted in yellow. The results indicate the study intersections are forecast to operate at similar levels of service as existing conditions. The following critical movements are noted:

- ▶ **Homer Watson Boulevard and Manitou Drive/Doon Village Road:**
 - In the AM peak hour, the eastbound left-turn, southbound left-turn, westbound right-turn and westbound through movements are forecast to operate with delays greater than 55 seconds. The northbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, westbound through, westbound right-turn, northbound left-turn and through, and southbound left-turn, through and right-turn movements are forecast to operate with delays greater than 55 seconds. The northbound and southbound left-turn movements and eastbound and southbound right-turn movements are forecast to operate with queues exceeding available lane capacity.
- ▶ **Homer Watson Boulevard and Doon South Drive:** In the AM peak hour and PM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and Conestoga College Boulevard:**
 - In the AM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds; and



- In the PM peak hour, the eastbound left-turn and southbound through movements are forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and New Dundee Road/Highway 401 Ramp:**
 - In the AM peak hour, the eastbound left-turn and right-turn movements are forecast to operate with delays greater than 55 seconds. The eastbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, eastbound right-turn, westbound through, and northbound left-turn movements are forecast to operate with delays greater than 55 seconds. The eastbound and northbound left-turn movements are forecast to operate with queues exceeding available lane capacity.
- ▶ **New Dundee Road and Pinnacle Drive:** In the PM peak hour, the southbound approach is forecast to operate with delays greater than 55 seconds.
- ▶ **New Dundee Road and Reidel Drive/Cameron Road:** In the PM peak hour, the northbound approach is forecast to operate with delays greater than 55 seconds.
- ▶ **Doons Mills Road and Apple Ridge Drive:** In the PM peak hour, the southbound approach is forecast to operate with delays greater than 55 seconds.

Appendix F contains the detailed Synchro 11 reports.



TABLE 6.5: 2028 TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR

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	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.40 7 -	> > > > >	A 3 - - -	< < < < <	A 3 0.23 2 -	> > > > >	A 3 - - -	< < < < <	A 4 0.46 7 -	> > > > >	A 4 - - -	< < < < <	A 3 0.07 7 -	> > > > >	A 3 - - -	A 3 - - -
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 269 1.46 246 275 29	D 34 0.73 185 80 -	C 25 0.25 34 47 -	F 92 - - -	E 35 0.11 6 120 114	F 132 1.16 275 200 -	F 60 0.82 158 200 42	F 107 - - -	E 49 0.83 131 25 -106	F 54 0.54 73 -	> > > > >	F 51 - - -	F 64 0.69 59 105 46	F 53 0.43 63 65 46	E 47 0.11 19 65 46	F 57 - - -	F 87 1.23 - - -
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 49 0.80 76 -	C 29 0.15 17 -	D 39 - -	< < < < <	C 28 0.00 0 -	> > > > >	C 28 - -	D 45 0.51 31 110 79	C 21 0.89 253 -	> > > > >	C 22 - -	A 0 0.00 0 55 55	E 65 1.06 288 -	> > > > >	E 65 - -	D 42 0.99 - -
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 40 0.62 37 50 13	D 39 0.20 12 -	> > > > >	D 39 - -	D 37 0.48 25 50 25	D 41 0.19 12 -	D 40 0.07 3 -	D 39 - -	C 29 0.67 56 205 149	C 17 0.64 109 -	B 12 0.16 15 -	B 18 - -	D 40 0.35 15 175 160	E 68 1.07 241 190 190	B 14 0.02 0 190 190	E 66 - -	D 40 0.93 - -
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	E 61 0.74 81 75 -6	> > > > >	F 590 2.19 421 -	F 507 - -	C 31 0.46 72 -	C 32 0.47 90 -	A 3 0.66 0 -	B 13 - -	D 38 0.74 48 180 133	B 19 0.50 92 -	> > > > >	C 22 - -	C 32 0.73 126 -	C 22 0.04 0 65 65	C 32 - -	F 130 1.23 - -	
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 -	> > > > >	A 0 - -	A 0 0.25 0 -	> > > > >	A 0 - -	A 0 - -					F 62 0.55 22 -	> > > > >	F 62 - -		
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 5 0.58 7 -	> > > > >	A 5 - -	A 3 0.25 7 -	> > > > >	A 3 - -	A 3 - -					< < < < <	A 4 0.35 7 -	> > > > >	A 4 - -	A 4 - -
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0 - -	A 1 0.01 0 -	> > > > >	A 1 - -	A 1 - -	< < < < <	D 27 0.36 13 -	> > > > >	D 27 - -	< < < < <	C 22 0.24 7 -	> > > > >	C 22 - -	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.11 7 -	> > > > >	A 3 - -	< < < < <	A 4 0.20 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.03 7 -	> > > > >	A 4 - -	A 4 - -
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 14 0.45 -	> > > > >	B 14 -	B 14 - -					< < < < <	C 16 0.61 -	> > > > >	C 16 - -		B 13 0.48 -	> > > > >	B 13 - -	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.29 10 -	> > > > >	A 10 -	A 10 -	A 0 0.01 0 -	> > > > >	A 0 -	A 0 -	< < < < <	A 7 0.10 3 -	> > > > >	A 7 -	B 14 0.44 -
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.23 18 20 3	B 16 0.17 16 -	> > > > >	B 16 -	< < < < <	B 15 0.09 10 -	B 15 0.06 8 30 22	B 15 -	A 9 0.11 8 20 12	B 15 0.59 64 -	> > > > >	B 14 -	B 10 0.17 10 30 20	B 13 0.47 43 -	> > > > >	B 13 - -	B 14 0.44 -

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



TABLE 6.6: 2028 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.42 7 -	> > > > >	A 4 - - -	< < < < <	A 6 0.67 15 -	> > > > >	A 6 - - -	< < < < <	A 3 0.31 7 -	> > > > >	A 3 - - -	< < < < <	A 5 0.30 7 -	> > > > >	A 5 - - -	A 5 - - -	
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 201 1.29 218 275 57	E 45 0.85 212 -	D 39 0.68 123 80 -43	F 72 - -	E 41 0.37 14 120 106	F 182 1.26 290 200 65	F 58 0.75 135 -	F 138 - -	F 118 1.08 158 25 -133	F 58 0.54 69 -	> > > > >	F 87 - -	F 145 1.15 177 105 -72	F 85 0.94 206 65 -	F 58 0.63 94 65 -29	F 105 - -	F 100 1.23 -	
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 45 0.69 49 -	C 32 0.09 15 -	D 39 - -	< < < < <	C 31 0.03 5 -	> > > > >	C 31 - -	D 40 0.55 45 110 65	B 17 0.88 260 -	> > > > >	B 19 - -	B 13 0.03 2 55 53	F 108 1.17 328 -	> > > > >	F 108 - -	E 59 1.04 -	
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	F 100 1.01 78 50 -28	D 40 0.21 14 -	> > > > >	E 72 - -	C 33 0.57 39 50 11	D 38 0.26 21 -	D 37 0.09 10 -	D 35 - -	C 26 0.66 45 205 161	C 23 0.76 131 -	B 14 0.07 0 -	C 23 - -	D 38 0.31 18 175 157	E 58 1.04 251 -	B 14 0.04 0 190 190	E 56 - -	D 42 0.96 -	
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	F 533 1.97 87 75 -12	F - 1.04 190 -	F 99 -	F 173 - -	C 27 0.40 74 -	F 151 1.23 385 -	A 4 0.75 0 -	E 67 - -	F 403 1.80 197 180 -17	B 20 0.48 81 -	> > > > >	F 146 - -	C 31 0.66 104 -	C 24 0.12 17 65 48	C 30 - -	F 88 1.85 -		
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.02 1 -	> > > > >	A 1 - -	A 0 0.87 0 -	> > > > >	A 0 - -	A 0 - -					F 357 1.29 47 -	> > > > >	F 357 - -			
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.38 7 -	> > > > >	A 3 - -	A 7 0.72 28 -	> > > > >	A 7 - -	A 7 - -					< < < < <	A 4 0.26 7 -	> > > > >	A 4 - -	A 5 - -	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.03 1 -	> > > > >	A 1 - -	A 1 0.02 1 -	> > > > >	A 1 - -	A 1 - -	< < < < <	F 278 1.37 88 -	> > > > >	F 278 - -	< < < < <	E 41 0.37 12 -	> > > > >	E 41 - -		
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	A 4 0.25 7 -	> > > > >	A 4 - -	A 4 - -	< < < < <	A 4 0.12 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.01 7 -	> > > > >	A 4 - -	A 4 - -	
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 15 0.44 - -	B 16 0.15 15 -	> > > > >	B 15 - -					< < < < <	B 15 0.51 - -	> > > > >	B 15 - -	F 87 1.11 -	> > > > >	F 87 - -			
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.27 9 -	> > > > >	A 10 - -	A 10 - -	A 0 0.01 0 -	> > > > >	A 0 - -	A 0 - -	< < < < <	A 7 0.13 4 -	> > > > >	A 7 - -		
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.17 13 20 7	B 16 0.15 15 -	> > > > >	B 16 - -	< < < < <	B 17 0.25 22 30 21	B 15 0.07 9 -	B 16 - -	A 9 0.07 4 20 17	B 13 0.50 51 -	> > > > >	B 13 - -	B 12 0.34 21 30 9	C 29 0.89 136 -	> > > > >	C 26 - -	C 20 0.63 -	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



6.2.2 2033 Total Traffic Operations

Table 6.7 and **Table 6.8** summarize the total traffic level of service conditions at the 2033 horizon year. Critical movements are highlighted in yellow. The results indicate the study intersections are forecast to operate at similar levels of service as existing conditions. The following critical movements are noted:

- ▶ **Homer Watson Boulevard and Manitou Drive/Doon Village Road:**
 - In the AM peak hour, the eastbound left-turn, southbound left-turn, westbound right-turn and westbound through movements are forecast to operate with delays greater than 55 seconds. The northbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and
 - In the PM peak hour, the eastbound left-turn, westbound through, westbound right-turn, northbound left-turn and through, and southbound left-turn, through and right-turn movements are forecast to operate with delays greater than 55 seconds. The northbound and southbound left-turn movements and eastbound and southbound right-turn movements are forecast to operate with queues exceeding available lane capacity.
- ▶ **Homer Watson Boulevard and Doon South Drive:** In the AM peak hour and PM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and Conestoga College Boulevard:**
 - In the AM peak hour, the southbound through movement is forecast to operate with delays greater than 55 seconds; and
 - In the PM peak hour, the eastbound left-turn and southbound through movements are forecast to operate with delays greater than 55 seconds.
- ▶ **Homer Watson Boulevard and New Dundee Road/Highway 401 Ramp:**
 - In the AM peak hour, the eastbound left-turn and right-turn movements are forecast to operate with delays greater than 55 seconds. The eastbound left-turn movement is forecast to operate with queues exceeding available lane capacity; and



- In the PM peak hour, the eastbound left-turn, eastbound right-turn, westbound through, and northbound left-turn movements are forecast to operate with delays greater than 55 seconds. The eastbound and northbound left-turn movements are forecast to operate with queues exceeding available lane capacity.
- ▶ **New Dundee Road and Pinnacle Drive:** In the PM peak hour, the southbound approach is forecast to operate with delays greater than 55 seconds.
- ▶ **New Dundee Road and Reidel Drive/Cameron Road:** In the PM peak hour, the northbound approach is forecast to operate with delays greater than 55 seconds.
- ▶ **Doons Mills Road and Apple Ridge Drive:** In the PM peak hour, the southbound approach is forecast to operate with delays greater than 55 seconds.

Appendix G contains the detailed Synchro reports.



TABLE 6.7: 2033 TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR

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	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.42 - -	> > > > >	A 3 - - -	< < < < <	A 3 0.24 3 -	> > > > >	A 3 - - -	< < < < <	A 4 0.47 7 -	> > > > >	A 4 - - -	< < < < <	A 3 0.07 7 -	> > > > >	A 3 - - -	A 3
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 269 1.46 248 275 27	E 36 0.76 200 - -	C 25 0.27 38 80 42	F 91	E 36 0.12 6 120 114	F 156 1.21 296 200 41	F 60 0.82 159 200 41	F 123	E 49 0.83 130 25 -105	F 54 0.55 74 - -	> > > > >	F 52 0.70 62 105 43	F 64 0.42 63 - 46	E 53 0.11 19 65 46	F 47 0.11 65 46	F 57	F 92 1.23
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 49 0.80 76 -	C 29 0.15 17 -	D 39	< < < < <	C 28 0.00 0 -	> > > > >	C 28	D 45 0.51 31 110 79	C 25 0.93 273 -	> > > > >	C 26 0 0.00 0 55 55	A 0 1.10 306 -	F 82 0.11 306 -	> > > > >	F 82	D 51 1.02
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 41 0.64 38 50 12	D 39 0.21 13 -	> > > > >	D 40	D 37 0.50 25 50 25	D 40 0.19 12 -	A 40 0.07 4 -	D 39	C 31 0.71 62 205 143	B 18 0.67 118 -	B 13 0.17 17 -	B 19	D 41 0.37 16 175 159	F 88 1.12 259 -	B 14 0.02 0 190 190	F 85	D 48 0.98
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	E 65 0.77 84 75 -9		F 645 2.31 439 -	F 555	C 32 0.49 76 -	C 34 0.49 94 -	A 3 0.70 0 -	B 14	D 47 0.79 56 180 125	B 20 0.52 98 -	> > > > >	C 23		C 33 0.75 134 -	C 22 0.04 0 65 65	C 32	F 140 1.3
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.00 0 -		A 0		A 0 0.25 0 -	> > > > >	A 0					F 70 0.59 23 -	> > > > >	F 70		
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 5 0.59 7 -		A 5		A 3 0.25 7 -	> > > > >	A 3					< < < < <	A 4 0.35 7 -	> > > > >	A 4	A 4
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 0 0.01 0 -	> > > > >	A 0	< < < < <	A 1 0.01 0 -	> > > > >	A 1	< < < < <	D 29 0.38 13 -	> > > > >	D 29	< < < < <	C 23 0.25 8 -	> > > > >	C 23	
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.11 7 -	> > > > >	A 3	< < < < <	A 4 0.20 7 -	> > > > >	A 4	< < < < <	A 4 0.14 7 -	> > > > >	A 4	< < < < <	A 4 0.03 7 -	> > > > >	A 4	A 4
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 14 0.45 - -		> > > >	B 14					< < < < <	C 16 0.61 - -		C 16		B 13 0.48 - -	> > > >	B 13	
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.29 10 -		> > > >	A 10		A 0 0.01 0 -	> > > >	A 0	< < < < <	A 7 0.10 3 -		A 7	
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.23 18 20 3	B 16 0.17 16 -	> > > > >	B 16	< < < < <	B 15 0.09 10 -	B 15 0.06 8 30 22	B 15	A 9 0.11 8 20 12	B 15 0.59 64 -	> > > > >	B 14 0.17 10 30 20	B 13 0.47 43 -	> > > > >	B 13	B 14 0.44	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



TABLE 6.8: 2033 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	Overall
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	Strasburg Road and Huron Road	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.45 7 -	> > > > >	A 4 - - -	< < < < <	A 6 0.70 16 -	> > > > >	A 6 - - -	< < < < <	A 3 0.32 7 -	> > > > >	A 3 - - -	< < < < <	A 5 0.33 7 -	> > > > >	A 5 - - -	A 5	
	Homer Watson Boulevard and Manitou Drive/Doon Village Road	TCS	LOS Delay V/C Q Ex Avail.	F 201 1.29 218 275 57	E 48 0.89 231 80 -	D 42 0.73 145 -	F 73 - - -65	E 42 0.43 14 120 106	F 207 1.32 308 200 65	F 58 0.75 135 -	F 156 - - -	F 108 1.05 160 25 -135	F 58 0.54 69 -	> > > > >	F 83 - - -	F 168 1.21 189 105 -84	F 93 0.98 206 99 65	F 62 0.68 99 -	F 119 - - -34	F 109 1.24 -	
	Homer Watson Boulevard and Doon South Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	D 45 0.69 49 -	C 32 0.09 15 -	D 39 - -	< < < < <	C 31 0.03 5 -	> > > > >	C 31 - -	D 40 0.55 45 110 65	C 20 0.92 282 -	> > > > >	C 21 - -	B 13 0.03 2 55 53	F 129 1.22 347 -	> > > > >	F 128 - -	E 70 1.08 -	
	Homer Watson Boulevard and Conestoga College Boulevard	TCS	LOS Delay V/C Q Ex Avail.	F 120 1.08 85 50 -35	D 40 0.22 15 -	> > > > >	F 83 - -	C 34 0.59 41 50 10	D 38 0.26 21 -	D 37 0.09 12 -	D 36 - -	C 27 0.67 52 205 153	C 25 0.79 142 -	B 15 0.07 0 -	C 24 - -	D 39 0.33 19 175 156	F 86 1.11 271 190 190	B 15 0.04 0 190 190	F 81 - -	D 53 1.01 -	
	Homer Watson Boulevard and WB 401 Ramp/New Dundee Road	TCS	LOS Delay V/C Q Ex Avail.	F 573 2.05 90 75 -15	F 125 1.11 203 -	F 201 - -	F 201 - -	C 29 0.43 77 -	F 181 1.30 401 -	A 4 0.78 0 -	E 79 - -	F 456 1.92 209 180 -29	B 20 0.49 86 -	> > > > >	F 161 - -	C 31 0.67 111 -	C 23 0.13 17 65 48	C 30 - -	F 100 1.96 -		
	New Dundee Road and Pinnacle Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.02 1 -	> > > > >	A 1 - -	A 0 0.90 0 -	> > > > >	A 0 - -	A 0 - -					F 425 1.42 50 -	> > > > >	F 425 - -			
	New Dundee Road and Robert Ferrie Drive	TCS	LOS Delay V/C Q Ex Avail.	< < < < <	A 3 0.39 7 -	> > > > >	A 3 - -	A 7 0.73 28 -	> > > > >	A 7 - -	A 7 - -					< < < < <	A 5 0.26 7 -	> > > > >	A 5 - -	A 5	
	New Dundee Road and Reidel Drive	TWSC	LOS Delay V/C Q Ex Avail.	< < < < <	A 1 0.03 1 -	> > > > >	A 1 - -	A 1 0.02 1 -	> > > > >	A 1 - -	A 1 - -	< < < < <	F 320 1.46 93 -	> > > > >	F 320 - -	< < < < <	E 44 0.39 13 -	> > > > >	E 44 - -		
	Robert Ferrie Drive and South Creek Drive	RBT	LOS Delay V/C Q Ex Avail.	< < < < <	A 4 0.14 7 -	> > > > >	A 4 - -	A 4 0.25 7 -	> > > > >	A 4 - -	A 4 - -	< < < < <	A 4 0.12 7 -	> > > > >	A 4 - -	< < < < <	A 4 0.01 7 -	> > > > >	A 4 - -	A 4	
	Doon Mills Road and Apple Ridge Drive	AWSC	LOS Delay V/C Q Ex Avail.	B 15 0.44 -	B 15 -	> > > > >	B 15 - -					< < < < <	B 15 0.51 -	> > > > >	B 15 - -	F 87 1.11 -	> > > > >	F 87 - -			
	Biehn Drive and Caryndale Drive	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.27 9 -	> > > > >	A 10 - -	A 10 - -	A 0 0.01 0 -	> > > > >	A 0 - -	A 0 - -	< < < < <	A 7 0.13 4 -	> > > > >	A 7 - -		
	Doon Village Road and Pioneer Drive	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.17 13 20 7	B 16 0.15 15 -	> > > > >	B 16 - -	< < < < <	B 17 0.25 22 30 21	B 15 0.07 9 -	B 16 - -	A 9 0.07 4 20 17	B 13 0.50 51 -	> > > > >	B 13 - -	B 12 0.34 21 30 9	C 29 0.89 136 -	> > > > >	C 26 - -	C 20 0.63 -	

MOE - Measure of Effectiveness

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Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)

Ex. - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

<- Shared Left/Through Lane

>- Shared Right/Through Lane

UM - Unopposed Movement



7 Remedial Measures

7.1 Intersection Control Improvements

The analyses presented in **Section 6.2** indicate two study intersections along New Dundee Road and the intersection of Doon Mills Road and Apple Ridge Drive are forecast to operate with critical movements after build-out of the outstanding units.

While the planned widening of New Dundee Road (see **Table 5.1**) may alleviate critical movements at New Dundee Road and Pinnacle Road, and New Dundee Road and Reidel Drive, these critical movements are confined to vehicles on the minor road which are not afforded opportunities, or gaps, to enter the traffic stream on the major road. The widening of New Dundee Road is also assumed outside of the 2028 and 2033 horizon years used in this study.

Intersection control improvements, such as traffic control signals (if warranted) may alleviate these critical movements by providing a gap in the major road traffic stream. The warrant analysis for each intersection is based on Justification 7 outlined in Ontario Traffic Manual (OTM) *Book 12 (Traffic Signals)*.⁹ Justification 7 uses forecast traffic volumes to determine the need for traffic control signals at an intersection and comprises two warrants:

- ▶ Warrant 1: Minimum Vehicular Volume; and
- ▶ Warrant 2: Delay to Cross Traffic.

Appendix H contains the warrant analyses worksheets based on 2033 total traffic volumes. **Table 7.1** summarizes the findings of the warrant review indicating traffic control signals are not warranted at any of the three intersections.

⁹ Ontario Ministry of Transportation, *Ontario Traffic Manual Book 12: Traffic Signals*, (Toronto: Queen's Printer of Ontario, 2012).



TABLE 7.1: TRAFFIC CONTROL WARRANT SUMMARY

Intersection	Warrant				Warranted
	1A	1B	2A	2B	
New Dundee Road and Pinnacle Drive	217%	19%	210%	58%	No
New Dundee Road and Reidel Road	144%	78%	124%	114%	No
Doon Mills Road and Apple Ridge Drive	82%	51%	64%	145%	No

Notes:

For existing intersections with forecast traffic volumes, either Warrant 1A and 1B, or 2A and 2B must both be satisfied to 120%. For new intersections with forecast traffic volumes, either Warrant 1A and 1B, or 2A and 2B must both be satisfied to 150%.



8 Biehn Drive Extension

The analyses contained in **Section 6** does not account for a potential extension of Biehn Drive to Robert Ferrie Drive because the ultimate alignment and timing of this extension remains unknown. The *Biehn Drive Municipal Class Environmental Assessment Study Design Report (Revision 1)*¹⁰ did review four alignment alternatives of Biehn Drive and recommended “that the extension of Biehn Drive only consider connections to the extension of Robert Ferrie Drive, [rather than a connection to Strasburg Road].”¹¹

At the request of City of Kitchener staff, Paradigm has reviewed the need and justification for the Biehn Drive extension within the context of the future traffic forecasts contained in this report and the existing road classification system in the study area.

8.1 Existing Road Classifications and Network Structure

The City of Kitchener Official Plan defines six road classifications: provincial highways, regional roads, city arterial streets, major community collector streets, minor neighbourhood collector streets, and local streets. Each road classification serves a specific transportation and mobility role in the City’s transportation network.

Biehn Drive and Robert Ferrie Drive are both classified as major community collector streets. These roads are intended to “balance the provision of mobility in the city with land access, [and] do this by collecting and distributing people and goods [...] from Local Streets and Minor Neighbourhood Collector Streets to City Arterial Streets and Regional Roads.”¹²

Conversely, Caryndale Drive is classified as a minor neighbourhood collector street, whose function is “to move people and goods primarily within neighbourhoods. They connect lower volume local roads to higher volume major community collector streets.”¹³

Although Caryndale Drive is classified as a minor neighbourhood community collector street, its location in the current road network means it functions as a major community collector, independent of

¹⁰ BT Engineering Inc., *Biehn Drive Municipal Class Environmental Assessment Study Design Report, Revision 1*, 2021.

¹¹ BT Engineering Inc., *Biehn Drive Municipal Class Environmental Assessment Study Design Report, Revision 1*, 2021, 21.

¹² City of Kitchener, “Integrated Transportation System,” chap. 13 in *Official Plan, A Complete and Healthy Kitchener*, (Kitchener, 2014), 11.

¹³ City of Kitchener, “Integrated Transportation System,” chap. 13 in *Official Plan, A Complete and Healthy Kitchener*, (Kitchener, 2014), 12.



traffic volumes. This is because it provides the only connection between Biehn Drive and Robert Ferrie Drive, both of which connect to arterial streets (Biehn Drive connecting to Huron Road) or regional roads (Robert Ferrie Drive connecting to New Dundee Road).

Because Robert Ferrie Drive and Biehn Drive both terminate near Caryndale Drive, vehicles must use Caryndale Drive to continue their journey.

8.2 Future Road Network and Classification

The future extension of Strasburg Road south to New Dundee Road will provide a parallel north-south route between New Dundee Road and Huron Road. Map 11 in the Official Plan identifies this new connection as a City Arterial Street. This extension will replace the role currently being facilitated by Robert Ferrie Drive, Caryndale Drive, and Biehn Drive, assuming motorists seek New Dundee Road and Huron Road as east-west alternatives to Robert Ferrie Drive.

The planned extension of Robert Ferrie Drive to Strasburg Road will provide a continuous east-west corridor parallel to New Dundee Road. This extension in combination with that of Strasburg Road would be expected to redistribute a portion of existing trips using Caryndale Drive. This is because these new connections will permit motorists using Robert Ferrie Drive and Caryndale Drive to use Robert Ferrie Drive and Strasburg Road instead.

While this will accommodate motorists in the southern areas of the Doon South neighbourhood (that is, along and south of Robert Ferrie Drive) those residing in streets connecting to Biehn Drive or Caryndale Drive (such as Evenstone Avenue and Hearthway Street) will still need to use Caryndale Drive or Old Huron Road for local access to Robert Ferrie Drive or Huron Road, respectively.

Extending Biehn Drive to Robert Ferrie Drive would provide the necessary “bypass” of Caryndale Drive to ensure Caryndale Drive remains closer to its intended classification in the Official Plan, and design guidance published in *Complete Streets Kitchener* which indicates “minor collector streets will carry traffic primarily originating from within the neighbourhood it serves. Cut-through traffic is discouraged through traffic calming or diversion techniques.”¹⁴

¹⁴ City of Kitchener, *Complete Streets Kitchener*, (Kitchener, 2019), 25.



8.3 Traffic Volume Considerations

The 24-hour ATR data illustrated in **Figure 3.3** indicate Caryndale Drive is serving approximately 3,800 daily vehicles between Chapel Hill Drive and Evenstone Avenue, and 1,500 vehicles between Robert Ferrie Drive and Stauffer Drive.¹⁵ Biehn Drive is servicing approximately 6,500 daily vehicles between Caryndale Drive and Black Walnut Drive. Robert Ferrie Drive immediately east of South Creek Drive is also serving approximately 3,700 daily vehicles. All four segments are operating with daily traffic volumes less than 8,000 – the upper threshold for a minor collector street defined in the City of Kitchener *Development Manual*.¹⁶

In the absence of a detailed vehicle trace study, it is difficult to estimate the percentage of existing traffic on Caryndale Drive that represents local trips, rather than those cutting through the area to access other roads. It is also acknowledged that the split catchment area of Brigadoon Public School likely results in trips from outside the study area of this report (namely lands on the east side of Homer Watson Boulevard north of Highway 401) using Caryndale Drive to get to and from Brigadoon Public School. These trips would not be considered cut-through trips because the motorists' destination (Brigadoon Public School) is on Caryndale Drive and inaccessible via other routes.

In both the AM peak hour and PM peak hour, the existing volume data in **Figure 3.1** and **Figure 3.2** indicate a net loss of southbound vehicles and a net gain of northbound traffic on Caryndale Drive between Biehn Drive and Robert Ferrie Drive. This could indicate southbound traffic terminates or northbound traffic commences their trip south of Biehn Drive. The differing peak hours at both intersections may also explain these traffic volume trends.

The future total traffic volumes illustrated in **Figure 5.7** through **Figure 5.10** assume the future extensions of Robert Ferrie Drive and Strasburg Road are in place. Given the location of outstanding development is nearer New Dundee Road (for Doon South Phase 2) and Strasburg Road (for Brigadoon), it is assumed trips generated by outstanding development activity will seek routes primarily via the higher order arterial road network, rather than the internal collector road network. Therefore, the traffic assignments illustrated in **Figure 5.5** and **Figure 5.6** do not add additional traffic onto Robert Ferrie Drive at South Creek Drive, or at Biehn Drive and Caryndale Drive.

¹⁵ The segment of Caryndale Road between Evenstone Avenue and Stauffer Drive represents part of the future alignment of Robert Ferrie Drive from to Strasburg Road.

¹⁶ City of Kitchener, *Development Manual*, (Kitchener, 2021), 41.



An undetermined portion of existing traffic volumes on Caryndale Drive between Biehn Drive and Robert Ferrie Drive could be assumed to divert once Robert Ferrie Drive is extended to Strasburg Road. Without an extension of Biehn Drive, Caryndale Drive would be expected to continue functioning as a major community collector street. This is because Biehn Drive will not connect to another major community collector street or higher order road; it will only connect to Huron Road.

8.4 Operational Considerations

Under existing conditions, the intersection of Biehn Drive and Caryndale Drive is operating at acceptable levels of service (LOS A) and within capacity in both the AM peak hour and the PM peak hour. In the existing road network, the intersection is part of the shortest route to and from the west of the study area, via the intersection of Battler Road and Huron Road. A longer more circuitous route is provided by Fisher Hallman Road and New Dundee Road.

Under future total conditions the intersection is forecast to continue operating at an acceptable level of service (LOS A) and within capacity. This is because the analysis of future total conditions, assumes the extension of Robert Ferrie Drive westward to the extension of Strasburg Road. These new road segments provide an alternate route for those trips destined to and from the west of the study area. Because Caryndale Drive and Biehn Drive both feature traffic calming devices, it is assumed that Strasburg Road and Robert Ferrie Drive will absorb new trips generated by the outstanding development in Doon Phase 2 and Brigadoon.

An undetermined portion of existing cut-through traffic on Biehn Drive and Caryndale Drive would also be expected to use Robert Ferrie Drive and Strasburg Road instead. This would reduce overall traffic volumes at the intersection of Biehn Drive and Caryndale Drive, resulting in an improved level of service.

8.5 Need and Justification

Until Strasburg Road and Robert Ferrie Drive are extended, Caryndale Drive will continue to provide the only north-south connection in the west area of the study area. Despite being classified as a minor neighbourhood collector street, Caryndale Drive is functioning as a major neighborhood community collector because:

- ▶ It provides the only connection between Biehn Drive and Robert Ferrie Drive (which are both major community collectors); and



- ▶ In combination with Biehn Drive and Robert Ferrie Drive these roads provide the only continuous route through the western area of the Doon South neighbourhood.

Based on the existing cross-section, speed limit, and traffic calming devices on Caryndale Drive, the road – as designed – is consistent with that for a minor collector street defined in the City of Kitchener *Complete Streets Kitchener* and *Development Manual*. The former publication also states “minor collector streets will carry traffic primarily originating from within the neighbourhood it serves. Cut-through traffic is discouraged through traffic calming or diversion techniques.”¹⁷

If Biehn Drive is not extended:

- ▶ residents living on Spencer Court, Kilkerran Crescent, Kilbirnie Court, McLeod Court, Mitton Place, Robertson Crescent, Macintosh Place, Sutherland Walk, Culloden Place, and a portion of Biehn Drive will still need to use Caryndale Drive as one of two ways to exit the subdivision – the other being Old Huron Road; and
- ▶ Caryndale Drive would be expected to continue functioning as a major community collector street because Biehn Drive would not connect to another major community collector street or higher order road; it would only connect to Huron Road at the north.

The findings of this study (see **Table 6.7** and **Table 6.8**) estimate the intersection to operate at an acceptable level of service (LOS A) after build-out of the remaining units. The need for the Biehn Drive extension is largely independent of traffic operations because existing cut-through traffic using Biehn Drive and Caryndale Drive would be able to use Robert Ferrie Drive and Strasburg Road instead. This would reduce overall traffic volumes at Biehn Drive and Caryndale Drive, resulting in an improved level of service.

Overall, an extension of Biehn Drive to Robert Ferrie Drive is justified to:

- ▶ Provide a diversion route around the Caryndale Drive corridor for residents living on and adjacent to Biehn Drive; and
- ▶ Ensure Caryndale Drive better serves its function as a minor neighbourhood collector street, as detailed in the City of Kitchener Official Plan, and based on existing design details (such as traffic calming and the presence of schools) in the corridor.

¹⁷ City of Kitchener, *Complete Streets Kitchener*, (Kitchener, 2019), 25.



9 Conclusions and Recommendations

9.1 Findings and Conclusions

Based on the analyses contained herein, the findings of this report are as follows:

Transportation Impact Assessment

- ▶ Under existing (2023) conditions, most study intersections are operating at acceptable levels of service and within capacity. In both the AM peak hour and PM peak hour, there are critical movements at Homer Watson Boulevard and Manitou Drive/Doon Village Road, and Homer Watson Boulevard and New Dundee Road/Highway 401 Off-Ramp;
- ▶ Under future background traffic conditions (2028 and 2033), most study intersections are forecast to continue to operate at acceptable levels of service and within capacity. In both the AM peak hour and PM peak hour, critical movements are forecast at:
 - Homer Watson Boulevard and Manitou Drive/Doon Village Road;
 - Homer Watson Boulevard and Conestoga College Boulevard; and
 - Homer Watson Boulevard and New Dundee Road/Highway 401 Off-Ramp.
- ▶ Approximately 2,841 units remain outstanding in the Doon South and Brigadoon areas of the City. This comprises 1,652 units in Doon South and 1,189 units in Brigadoon.
- ▶ Build-out of these remaining units is estimated to generate 1,593 trips in the weekday AM peak hour and 2,297 trips in the weekday PM peak hour.
- ▶ Under future total traffic conditions (2028 and 2033), including several planned roadway and intersection improvements, traffic operations throughout the Homer Watson Boulevard corridor are forecast to further deteriorate.

Several critical movements are forecast at Homer Watson Boulevard and its intersections with Manitou Drive/Doon Village Road, Doon South Drive, Conestoga College Boulevard, and New Dundee Road/Highway 401 Off-Ramp. Critical movements are also forecast at New Dundee Road and its intersections with Pinnacle Drive, and Reidel Drive.



- ▶ Traffic control signals are not warranted at New Dundee Road and Reidel Drive, New Dundee Road and Pinnacle Drive, or Doon Mills Road and Apple Ridge Drive.

Biehn Drive Extension Need and Justification

- ▶ Within the existing road network (and without the extension of Robert Ferrie Drive) Caryndale Drive is functioning as a major neighborhood community collector (despite being classified as a minor neighbourhood collector street). It provides the only westerly connection between Biehn Drive and Robert Ferrie Drive;
- ▶ Caryndale Drive in combination with Biehn Drive and Robert Ferrie Drive provides the only continuous route through the western area of the Doon South neighbourhood between New Dundee Road and Huron Road;
- ▶ The future extension of Robert Ferrie Drive west to Strasburg Road, and the extension of Strasburg Road south to New Dundee Road is likely to redistribute traffic volumes on Caryndale Drive by providing a parallel north-south route to Caryndale Drive; and
- ▶ Without the Biehn Drive extension to Robert Ferrie Drive, Caryndale Drive is expected to continue functioning as a major community collector street because Biehn Drive (which itself is classified as a major community collector street) will not connect to another major community collector street or higher order road; it will only connect to Huron Road.

Based on the findings of this report it is concluded that:

- ▶ The Homer Waston Boulevard and New Dundee Road corridors offer insufficient capacity to accommodate future traffic volumes associated with the remaining units in Doon South and Brigadoon; and
- ▶ Overall, an extension of Biehn Drive to Robert Ferrie Drive is justified to:
 - Provide a diversion route around the Caryndale Drive corridor for residents living on and adjacent to Biehn Drive; and
 - Ensure Caryndale Drive better serves its function as a minor neighbourhood collector street, as detailed in the City of Kitchener Official Plan, and based on existing design details (such as traffic calming and the presence of schools) in the corridor.



9.2 Recommendations

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

- ▶ The City of Kitchener coordinate with the Region of Waterloo to identify remedial measures in the Homer Watson Boulevard and New Dundee corridors; and
- ▶ The City of Kitchener proceed with an extension of Biehn Drive from Robert Ferrie Drive to its current terminus west of Caryndale Drive.



Appendix A

Turning Movement Count Data and Signal Timing Plans





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Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
Page No: 1

Turning Movement Data

Start Time	Huron Road Eastbound						Huron Road Westbound						Strasburg Road Northbound						Strasburg Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	51	119	8	0	0	178	5	40	26	0	1	71	11	11	26	0	0	48	3	1	13	0	0	17	314
7:45 AM	65	121	5	0	0	191	7	45	22	1	1	75	9	17	20	0	0	46	13	5	13	0	1	31	343
Hourly Total	116	240	13	0	0	369	12	85	48	1	2	146	20	28	46	0	0	94	16	6	26	0	1	48	657
8:00 AM	42	97	5	1	0	145	4	58	9	0	0	71	14	11	24	0	0	49	6	6	16	0	3	28	293
8:15 AM	32	136	10	0	0	178	7	60	6	0	1	73	13	13	17	0	0	43	5	5	22	0	0	32	326
8:30 AM	27	136	8	0	1	171	6	59	5	0	1	70	7	17	20	0	0	44	5	3	17	0	1	25	310
8:45 AM	35	121	12	0	2	168	11	44	7	0	1	62	6	16	7	0	0	29	3	5	17	0	2	25	284
Hourly Total	136	490	35	1	3	662	28	221	27	0	3	276	40	57	68	0	0	165	19	19	72	0	6	110	1213
9:00 AM	24	73	5	0	0	102	7	54	2	1	1	64	9	7	14	0	1	30	11	7	13	0	1	31	227
9:15 AM	14	76	6	0	0	96	8	52	5	0	0	65	14	7	10	0	2	31	3	6	31	0	0	40	232
9:30 AM	14	69	4	0	0	87	7	48	4	0	0	59	6	16	12	0	1	34	5	5	17	0	0	27	207
9:45 AM	20	66	6	0	0	92	10	34	8	1	0	53	5	7	9	0	1	21	5	8	11	0	0	24	190
Hourly Total	72	284	21	0	0	377	32	188	19	2	1	241	34	37	45	0	5	116	24	26	72	0	1	122	856
10:00 AM	12	63	6	0	0	81	10	55	5	0	0	70	6	6	8	0	1	20	7	3	17	0	1	27	198
10:15 AM	23	48	7	0	0	78	5	55	8	0	0	68	7	13	15	0	0	35	6	8	10	0	0	24	205
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	35	111	13	0	0	159	15	110	13	0	0	138	13	19	23	0	1	55	13	11	27	0	1	51	403
12:00 PM	17	58	8	0	0	83	9	78	1	0	0	88	5	7	15	0	0	27	11	7	26	0	0	44	242
12:15 PM	19	65	6	0	0	90	12	56	10	0	1	78	5	8	14	0	1	27	5	6	28	0	4	39	234
12:30 PM	16	81	6	0	3	103	8	64	4	0	1	76	1	7	12	0	1	20	5	5	36	0	3	46	245
12:45 PM	23	80	6	1	4	110	15	67	13	0	1	95	10	16	26	0	0	52	9	12	20	0	0	41	298
Hourly Total	75	284	26	1	7	386	44	265	28	0	3	337	21	38	67	0	2	126	30	30	110	0	7	170	1019
1:00 PM	22	67	6	0	0	95	12	72	3	0	1	87	5	9	18	0	0	32	4	7	22	0	0	33	247
1:15 PM	21	64	6	0	0	91	11	53	5	0	0	69	6	5	11	0	0	22	8	4	26	0	2	38	220
1:30 PM	23	74	6	0	0	103	11	72	12	0	1	95	8	5	12	0	0	25	5	8	20	0	2	33	256
1:45 PM	24	67	6	0	2	97	11	63	10	0	2	84	2	7	14	0	1	23	18	5	30	0	3	53	257
Hourly Total	90	272	24	0	2	386	45	260	30	0	4	335	21	26	55	0	1	102	35	24	98	0	7	157	980
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	19	72	9	0	1	100	8	95	12	0	0	115	12	10	14	0	4	36	10	12	33	0	0	55	306
3:15 PM	32	88	9	0	0	129	15	113	9	0	0	137	14	8	7	0	1	29	12	8	47	0	2	67	362
3:30 PM	27	85	14	0	0	126	18	118	4	0	2	140	8	13	10	0	1	31	23	9	39	0	4	71	368
3:45 PM	39	92	17	0	0	148	19	130	5	0	0	154	23	7	11	0	0	41	4	6	46	0	2	56	399
Hourly Total	117	337	49	0	1	503	60	456	30	0	2	546	57	38	42	0	6	137	49	35	165	0	8	249	1435
4:00 PM	22	87	18	0	0	127	15	150	5	0	3	170	6	8	12	0	0	26	8	13	61	0	3	82	405
4:15 PM	40	111	12	0	1	163	29	137	5	0	4	171	11	7	25	0	0	43	7	13	34	0	3	54	431

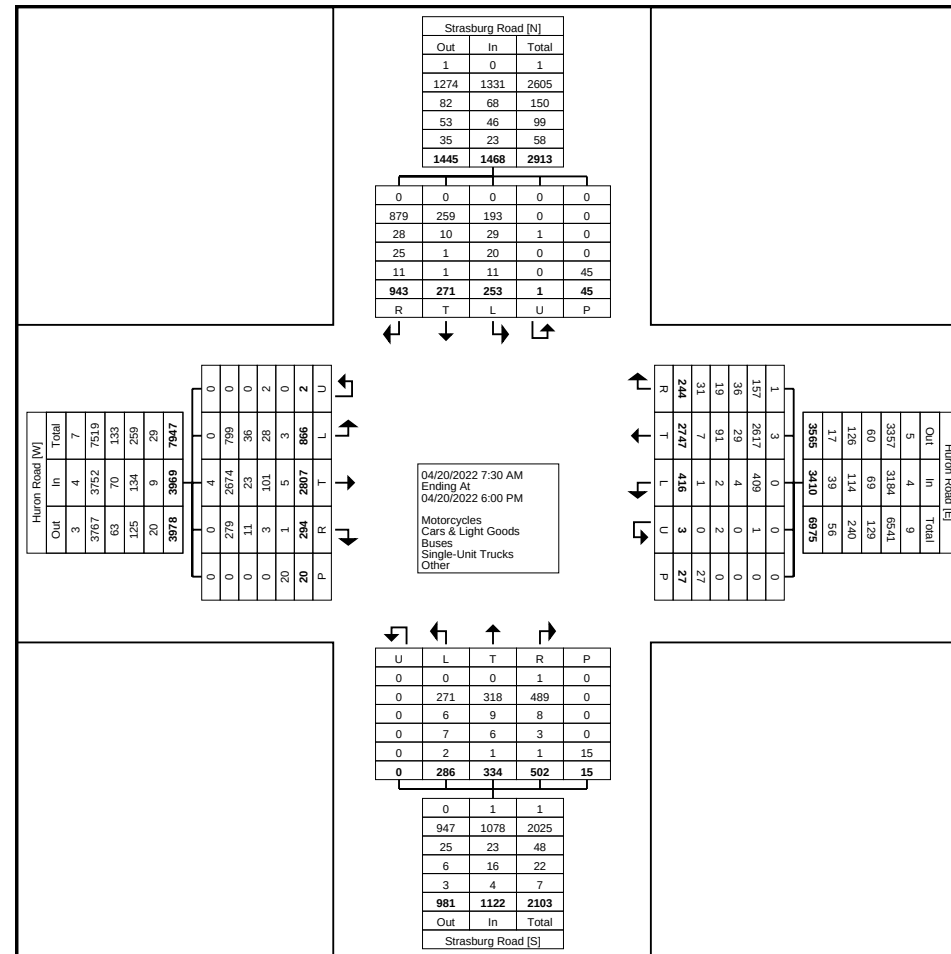
4:30 PM	30	100	16	0	2	146	20	136	8	0	0	164	9	18	11	0	0	38	14	17	72	0	4	103	451
4:45 PM	28	102	13	0	0	143	23	127	7	0	1	157	11	13	18	0	0	42	6	13	42	0	1	61	403
Hourly Total	120	400	59	0	3	579	87	550	25	0	8	662	37	46	66	0	0	149	35	56	209	0	11	300	1690
5:00 PM	22	98	14	0	0	134	22	168	8	0	2	198	9	8	24	0	0	41	10	17	56	0	1	83	456
5:15 PM	33	90	9	0	3	132	24	178	2	0	1	204	15	15	24	0	0	54	6	18	37	0	1	61	451
5:30 PM	27	98	18	0	1	143	25	134	6	0	1	165	8	12	24	0	0	44	6	13	40	0	0	59	411
5:45 PM	23	103	13	0	0	139	22	132	8	0	0	162	11	10	18	0	0	39	10	16	31	1	1	58	398
Hourly Total	105	389	54	0	4	548	93	612	24	0	4	729	43	45	90	0	0	178	32	64	164	1	3	261	1716
Grand Total	866	2807	294	2	20	3969	416	2747	244	3	27	3410	286	334	502	0	15	1122	253	271	943	1	45	1468	9969
Approach %	21.8	70.7	7.4	0.1	-	-	12.2	80.6	7.2	0.1	-	-	25.5	29.8	44.7	0.0	-	-	17.2	18.5	64.2	0.1	-	-	-
Total %	8.7	28.2	2.9	0.0	-	39.8	4.2	27.6	2.4	0.0	-	34.2	2.9	3.4	5.0	0.0	-	11.3	2.5	2.7	9.5	0.0	-	14.7	-
Motorcycles	0	4	0	0	-	4	0	3	1	0	-	4	0	0	1	0	-	1	0	0	0	0	-	0	9
% Motorcycles	0.0	0.1	0.0	0.0	-	0.1	0.0	0.1	0.4	0.0	-	0.1	0.0	0.0	0.2	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.1
Cars & Light Goods	799	2674	279	0	-	3752	409	2617	157	1	-	3184	271	318	489	0	-	1078	193	259	879	0	-	1331	9345
% Cars & Light Goods	92.3	95.3	94.9	0.0	-	94.5	98.3	95.3	64.3	33.3	-	93.4	94.8	95.2	97.4	-	-	96.1	76.3	95.6	93.2	0.0	-	90.7	93.7
Buses	36	23	11	0	-	70	4	29	36	0	-	69	6	9	8	0	-	23	29	10	28	1	-	68	230
% Buses	4.2	0.8	3.7	0.0	-	1.8	1.0	1.1	14.8	0.0	-	2.0	2.1	2.7	1.6	-	-	2.0	11.5	3.7	3.0	100.0	-	4.6	2.3
Single-Unit Trucks	28	101	3	2	-	134	2	91	19	2	-	114	7	6	3	0	-	16	20	1	25	0	-	46	310
% Single-Unit Trucks	3.2	3.6	1.0	100.0	-	3.4	0.5	3.3	7.8	66.7	-	3.3	2.4	1.8	0.6	-	-	1.4	7.9	0.4	2.7	0.0	-	3.1	3.1
Articulated Trucks	3	5	1	0	-	9	1	7	31	0	-	39	2	1	1	0	-	4	11	1	9	0	-	21	73
% Articulated Trucks	0.3	0.2	0.3	0.0	-	0.2	0.2	0.3	12.7	0.0	-	1.1	0.7	0.3	0.2	-	-	0.4	4.3	0.4	1.0	0.0	-	1.4	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	2	0	-	2	2
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.2	0.0	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	30.0	-	-	-	-	-	3.7	-	-	-	-	-	6.7	-	-	-	-	-	6.7	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	26	-	-	-	-	-	14	-	-	-	-	-	42	-	-
% Pedestrians	-	-	-	-	70.0	-	-	-	-	-	96.3	-	-	-	-	-	93.3	-	-	-	-	-	93.3	-	-



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Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

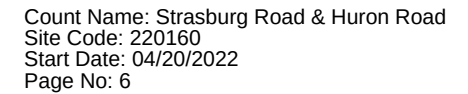
Cambridge, Ontario, Canada N1R 8J8
519-896-3163 asteinsky@pts1.com

Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
Page No: 4

Approach Data

Start Time	Eb Street Eastbound						Wb Street Westbound						Nb Street Northbound						Sb Street Southbound					
	Peds CCW	Peds CW	Circulat g	Out	In	Next	Peds CCW	Peds CW	Circulat g	Out	In	Next	Peds CCW	Peds CW	Circulat g	Out	In	Next	Peds CCW	Peds CW	Circulat g	Out	In	Next
7:30 AM	0	0	9	65	179	119	0	1	72	150	71	26	0	0	174	15	47	11	0	0	57	90	17	1
7:45 AM	0	0	25	67	190	121	0	1	90	155	76	22	0	0	199	17	45	9	0	1	63	104	30	5
Hourly Total	0	0	34	132	369	240	0	2	162	305	147	48	0	0	373	32	92	20	0	1	120	194	47	6
8:00 AM	0	0	18	89	145	97	0	0	65	127	71	9	0	0	147	15	48	14	2	1	78	62	30	6
8:15 AM	0	0	15	96	177	136	0	1	60	158	73	6	0	0	172	22	44	13	0	0	80	52	31	5
8:30 AM	0	1	12	83	171	136	0	1	52	161	69	5	0	0	169	17	45	7	0	1	71	50	24	3
8:45 AM	0	2	19	67	167	121	0	1	57	131	62	7	0	0	158	29	29	6	1	1	61	57	25	5
Hourly Total	0	3	64	335	660	490	0	3	234	577	275	27	0	0	646	83	166	40	3	3	290	221	110	19
9:00 AM	0	0	26	76	102	73	0	1	40	98	63	2	1	0	108	19	30	9	0	1	70	33	32	7
9:15 AM	0	0	15	97	95	76	0	0	35	89	65	5	1	1	92	21	31	14	0	0	74	26	38	6
9:30 AM	0	0	16	72	87	69	0	0	35	86	59	4	0	1	88	17	33	6	0	0	61	35	26	5
9:45 AM	0	0	23	51	92	66	0	0	33	81	55	8	1	0	93	24	22	5	0	0	53	35	24	8
Hourly Total	0	0	80	296	376	284	0	1	143	354	242	19	3	2	381	81	116	34	0	1	258	129	120	26
10:00 AM	0	0	19	78	81	63	0	0	25	78	71	5	0	1	83	19	21	6	0	1	73	23	27	3
10:15 AM	0	0	18	72	78	48	0	0	42	69	69	8	0	0	78	20	34	7	0	0	68	43	24	8
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	37	150	159	111	0	0	67	147	140	13	0	1	161	39	55	13	0	1	141	66	51	11
12:00 PM	0	0	26	109	83	58	0	0	28	84	88	1	0	0	86	24	26	5	0	0	92	25	43	7
12:15 PM	0	0	22	89	90	65	0	1	31	85	77	10	1	0	90	25	26	5	3	1	72	38	39	6
12:30 PM	0	3	16	102	103	81	1	0	23	99	76	4	0	1	103	20	19	1	3	0	74	28	45	5
12:45 PM	2	2	37	98	109	80	0	1	45	116	94	13	0	0	112	34	49	10	0	0	93	54	41	12
Hourly Total	2	5	101	398	385	284	1	2	127	384	335	28	1	1	391	103	120	21	6	1	331	145	168	30
1:00 PM	0	0	21	100	94	67	1	0	33	90	87	3	0	0	93	26	30	5	0	0	90	36	32	7
1:15 PM	0	0	23	87	90	64	0	0	27	84	68	5	0	0	93	23	19	6	0	2	69	33	37	4
1:30 PM	0	0	23	101	103	74	0	1	36	92	94	12	0	0	102	26	24	8	0	2	90	42	32	8
1:45 PM	1	1	32	95	96	67	1	1	30	99	83	10	1	0	108	23	21	2	1	2	76	42	52	5
Hourly Total	1	1	99	383	383	272	2	2	126	365	332	30	1	0	396	98	94	21	1	6	325	153	153	24
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	1	30	141	100	72	0	0	39	96	114	12	4	0	103	30	35	12	0	0	114	41	55	12
3:15 PM	0	0	33	175	128	88	0	0	55	108	138	9	0	1	132	34	29	14	2	0	143	50	66	8
3:30 PM	0	0	49	166	125	85	1	1	47	117	139	4	1	0	134	43	31	8	1	3	143	45	70	9
3:45 PM	0	0	29	200	147	92	0	0	68	107	153	5	0	0	135	43	40	23	2	0	170	51	56	6
Hourly Total	0	1	141	682	500	337	1	1	209	428	544	30	5	1	504	150	135	57	5	3	570	187	247	35
4:00 PM	0	0	35	218	127	87	0	3	35	108	169	5	0	0	118	48	25	6	0	3	170	36	81	13
4:15 PM	1	0	48	184	162	111	1	3	56	143	171	5	0	0	157	54	42	11	3	0	179	52	53	13

4:30 PM	1	1	49	216	146	100	0	0	56	125	165	8	0	0	144	54	37	9	1	3	167	57	102	17
4:45 PM	0	0	41	181	142	102	0	1	50	127	156	7	0	0	136	51	41	11	1	0	161	50	60	13
Hourly Total	2	1	173	799	577	400	1	7	197	503	661	25	0	0	555	207	145	37	5	6	677	195	296	56
5:00 PM	0	0	47	233	134	98	1	1	37	133	197	8	0	0	131	54	40	9	0	1	199	40	82	17
5:15 PM	2	1	46	230	132	90	1	0	60	121	204	2	0	0	129	52	52	15	1	0	220	53	60	18
5:30 PM	0	1	42	183	142	98	1	0	47	128	165	6	0	0	130	56	44	8	0	0	168	46	58	13
5:45 PM	0	0	47	174	139	103	0	0	44	133	162	8	0	0	137	52	38	11	1	0	166	44	57	16
Hourly Total	2	2	182	820	547	389	3	1	188	515	728	24	0	0	527	214	174	43	2	1	753	183	257	64
Grand Total	7	13	911	3995	3956	2807	8	19	1453	3578	3404	244	10	5	3934	1007	1097	286	22	23	3465	1473	1449	271
Approach %	-	-	7.8	34.2	33.9	24.1	-	-	16.7	41.2	39.2	2.8	-	-	62.2	15.9	17.3	4.5	-	-	52.0	22.1	21.8	4.1
Total %	-	-	2.7	12.0	11.9	8.4	-	-	4.4	10.7	10.2	0.7	-	-	11.8	3.0	3.3	0.9	-	-	10.4	4.4	4.3	0.8
Motorcycles	-	-	0	4	5	4	-	-	1	6	4	1	-	-	5	0	1	0	-	-	3	1	0	0
% Motorcycles	-	-	0.0	0.1	0.1	0.1	-	-	0.1	0.2	0.1	0.4	-	-	0.1	0.0	0.1	0.0	-	-	0.1	0.1	0.0	0.0
Cars & Light Goods	-	-	829	3775	3738	2674	-	-	1352	3368	3175	157	-	-	3666	971	1054	271	-	-	3306	1298	1311	259
% Cars & Light Goods	-	-	91.0	94.5	94.5	95.3	-	-	93.0	94.1	93.3	64.3	-	-	93.2	96.4	96.1	94.8	-	-	95.4	88.1	90.5	95.6
Buses	-	-	45	64	68	23	-	-	52	60	70	36	-	-	88	25	23	6	-	-	41	82	69	10
% Buses	-	-	4.9	1.6	1.7	0.8	-	-	3.6	1.7	2.1	14.8	-	-	2.2	2.5	2.1	2.1	-	-	1.2	5.6	4.8	3.7
Single-Unit Trucks	-	-	23	129	135	101	-	-	41	126	116	19	-	-	155	7	15	7	-	-	105	55	45	1
% Single-Unit Trucks	-	-	2.5	3.2	3.4	3.6	-	-	2.8	3.5	3.4	7.8	-	-	3.9	0.7	1.4	2.4	-	-	3.0	3.7	3.1	0.4
Articulated Trucks	-	-	14	21	10	5	-	-	7	18	39	31	-	-	20	3	4	2	-	-	10	36	22	1
% Articulated Trucks	-	-	1.5	0.5	0.3	0.2	-	-	0.5	0.5	1.1	12.7	-	-	0.5	0.3	0.4	0.7	-	-	0.3	2.4	1.5	0.4
Bicycles on Road	-	-	0	2	0	0	-	-	0	0	0	0	-	-	0	1	0	0	-	-	0	1	2	0
% Bicycles on Road	-	-	0.0	0.1	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.0	0.0	-	-	0.0	0.1	0.1	0.0
Bicycles on Crosswalk	3	3	-	-	-	-	0	1	-	-	-	-	0	1	-	-	-	-	2	1	-	-	-	-
% Bicycles on Crosswalk	42.9	23.1	-	-	-	-	0.0	5.3	-	-	-	-	0.0	20.0	-	-	-	-	9.1	4.3	-	-	-	-
Pedestrians	4	10	-	-	-	-	8	18	-	-	-	-	10	4	-	-	-	-	20	22	-	-	-	-
% Pedestrians	57.1	76.9	-	-	-	-	100.0	94.7	-	-	-	-	100.0	80.0	-	-	-	-	90.9	95.7	-	-	-	-

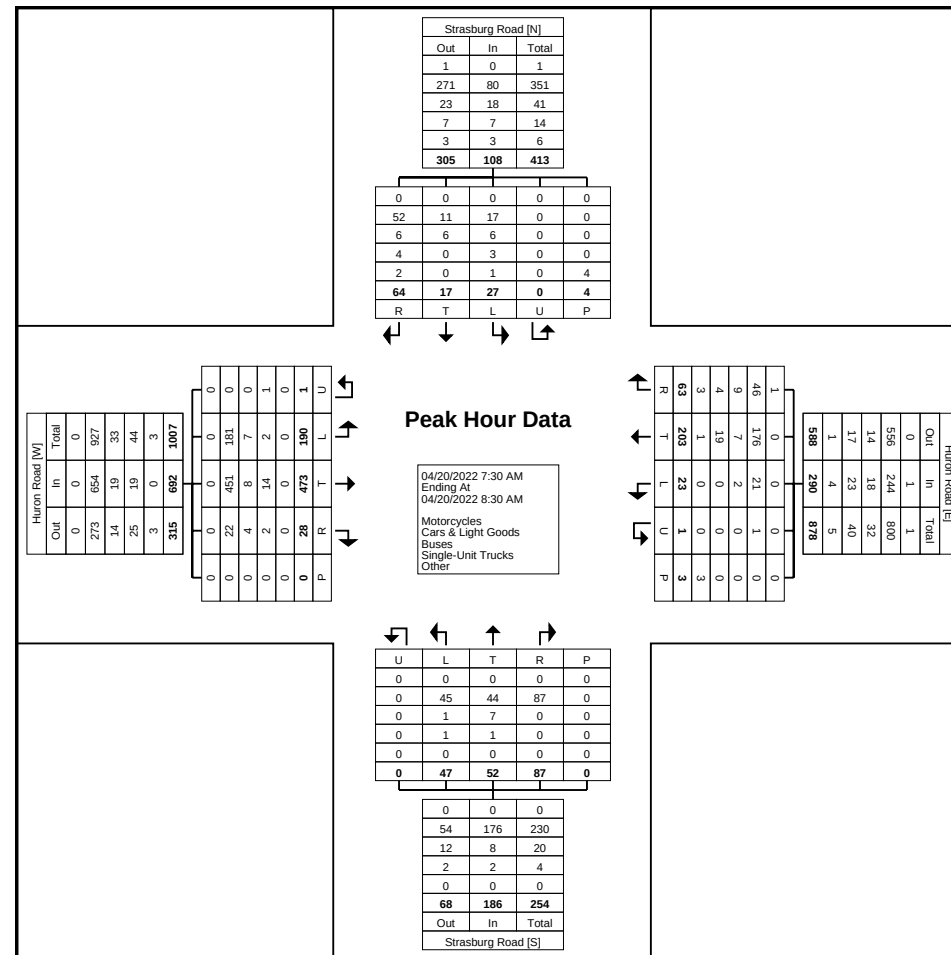




Paradigm Transportation Solutions Limited
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Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
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Turning Movement Peak Hour Data Plot (7:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
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Turning Movement Peak Hour Data (12:15 PM)

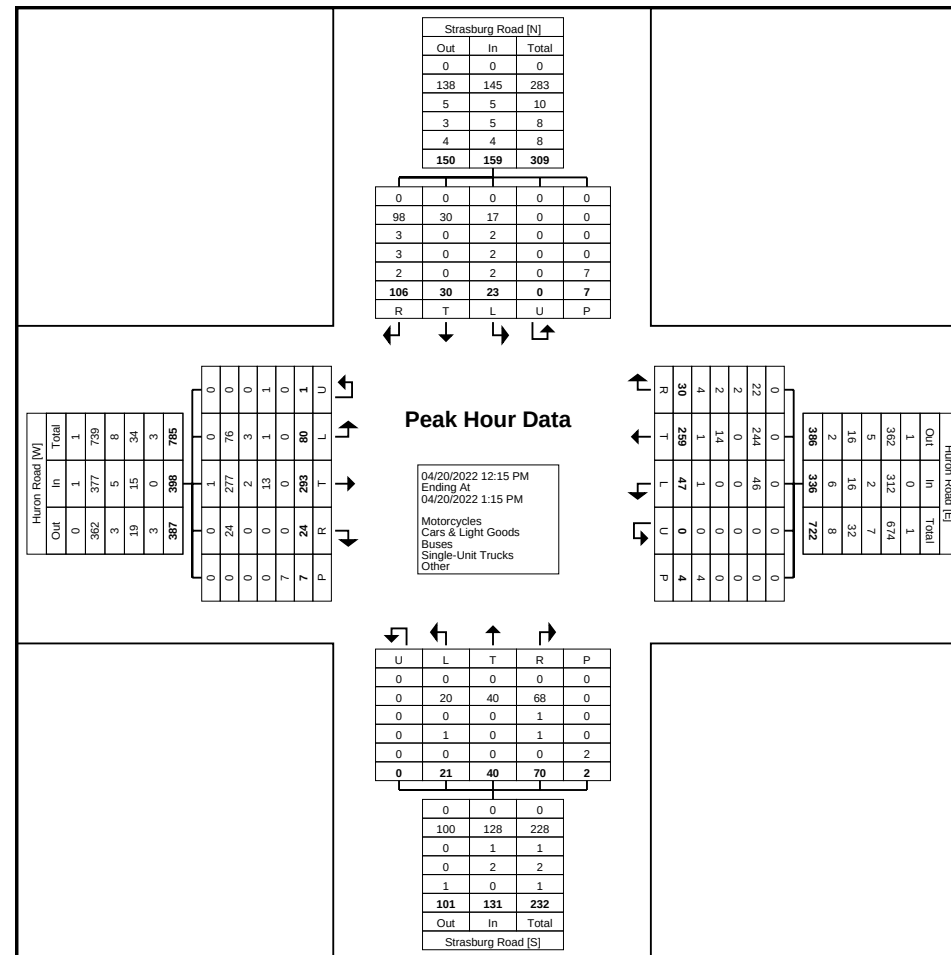
Start Time	Huron Road Eastbound						Huron Road Westbound						Strasburg Road Northbound						Strasburg Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	19	65	6	0	0	90	12	56	10	0	1	78	5	8	14	0	1	27	5	6	28	0	4	39	234
12:30 PM	16	81	6	0	3	103	8	64	4	0	1	76	1	7	12	0	1	20	5	5	36	0	3	46	245
12:45 PM	23	80	6	1	4	110	15	67	13	0	1	95	10	16	26	0	0	52	9	12	20	0	0	41	298
1:00 PM	22	67	6	0	0	95	12	72	3	0	1	87	5	9	18	0	0	32	4	7	22	0	0	33	247
Total	80	293	24	1	7	398	47	259	30	0	4	336	21	40	70	0	2	131	23	30	106	0	7	159	1024
Approach %	20.1	73.6	6.0	0.3	-	-	14.0	77.1	8.9	0.0	-	-	16.0	30.5	53.4	0.0	-	-	14.5	18.9	66.7	0.0	-	-	-
Total %	7.8	28.6	2.3	0.1	-	38.9	4.6	25.3	2.9	0.0	-	32.8	2.1	3.9	6.8	0.0	-	12.8	2.2	2.9	10.4	0.0	-	15.5	-
PHF	0.870	0.904	1.000	0.250	-	0.905	0.783	0.899	0.577	0.000	-	0.884	0.525	0.625	0.673	0.000	-	0.630	0.639	0.625	0.736	0.000	-	0.864	0.859
Motorcycles	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.3	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	76	277	24	0	-	377	46	244	22	0	-	312	20	40	68	0	-	128	17	30	98	0	-	145	962
% Cars & Light Goods	95.0	94.5	100.0	0.0	-	94.7	97.9	94.2	73.3	-	-	92.9	95.2	100.0	97.1	-	-	97.7	73.9	100.0	92.5	-	-	91.2	93.9
Buses	3	2	0	0	-	5	0	0	2	0	-	2	0	0	1	0	-	1	2	0	3	0	-	5	13
% Buses	3.8	0.7	0.0	0.0	-	1.3	0.0	0.0	6.7	-	-	0.6	0.0	0.0	1.4	-	-	0.8	8.7	0.0	2.8	-	-	3.1	1.3
Single-Unit Trucks	1	13	0	1	-	15	0	14	2	0	-	16	1	0	1	0	-	2	2	0	3	0	-	5	38
% Single-Unit Trucks	1.3	4.4	0.0	100.0	-	3.8	0.0	5.4	6.7	-	-	4.8	4.8	0.0	1.4	-	-	1.5	8.7	0.0	2.8	-	-	3.1	3.7
Articulated Trucks	0	0	0	0	-	0	1	1	4	0	-	6	0	0	0	0	-	0	2	0	2	0	-	4	10
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	2.1	0.4	13.3	-	-	1.8	0.0	0.0	0.0	-	-	0.0	8.7	0.0	1.9	-	-	2.5	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	28.6	-	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	71.4	-	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-	-	-	-	100.0	-	-



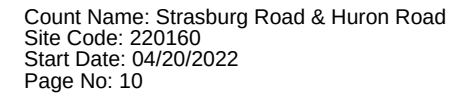
Paradigm Transportation Solutions Limited
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Count Name: Strasburg Road & Huron Road
Site Code: 220160
Start Date: 04/20/2022
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Turning Movement Peak Hour Data Plot (12:15 PM)



Start Time	Huron Road Eastbound						Huron Road Westbound						Strasburg Road Northbound						Strasburg Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	30	100	16	0	2	146	20	136	8	0	0	164	9	18	11	0	0	38	14	17	72	0	4	103	451
4:45 PM	28	102	13	0	0	143	23	127	7	0	1	157	11	13	18	0	0	42	6	13	42	0	1	61	403
5:00 PM	22	98	14	0	0	134	22	168	8	0	2	198	9	8	24	0	0	41	10	17	56	0	1	83	456
5:15 PM	33	90	9	0	3	132	24	178	2	0	1	204	15	15	24	0	0	54	6	18	37	0	1	61	451
Total	113	390	52	0	5	555	89	609	25	0	4	723	44	54	77	0	0	175	36	65	207	0	7	308	1761
Approach %	20.4	70.3	9.4	0.0	-	-	12.3	84.2	3.5	0.0	-	-	25.1	30.9	44.0	0.0	-	-	11.7	21.1	67.2	0.0	-	-	-
Total %	6.4	22.1	3.0	0.0	-	31.5	5.1	34.6	1.4	0.0	-	41.1	2.5	3.1	4.4	0.0	-	9.9	2.0	3.7	11.8	0.0	-	17.5	-
PHF	0.856	0.956	0.813	0.000	-	0.950	0.927	0.855	0.781	0.000	-	0.886	0.733	0.750	0.802	0.000	-	0.810	0.643	0.903	0.719	0.000	-	0.748	0.965
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	109	383	52	0	-	544	89	599	12	0	-	700	43	54	77	0	-	174	29	64	203	0	-	296	1714
% Cars & Light Goods	96.5	98.2	100.0	-	-	98.0	100.0	98.4	48.0	-	-	96.8	97.7	100.0	100.0	-	-	99.4	80.6	98.5	98.1	-	-	96.1	97.3
Buses	3	0	0	0	-	3	0	1	4	0	-	5	1	0	0	0	-	1	4	1	2	0	-	7	16
% Buses	2.7	0.0	0.0	-	-	0.5	0.0	0.2	16.0	-	-	0.7	2.3	0.0	0.0	-	-	0.6	11.1	1.5	1.0	-	-	2.3	0.9
Single-Unit Trucks	0	7	0	0	-	7	0	8	1	0	-	9	0	0	0	0	-	0	1	0	0	0	-	1	17
% Single-Unit Trucks	0.0	1.8	0.0	-	-	1.3	0.0	1.3	4.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	2.8	0.0	0.0	-	-	0.3	1.0
Articulated Trucks	1	0	0	0	-	1	0	1	8	0	-	9	0	0	0	0	-	0	2	0	1	0	-	3	13
% Articulated Trucks	0.9	0.0	0.0	-	-	0.2	0.0	0.2	32.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	5.6	0.0	0.5	-	-	1.0	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.5	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	20.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	28.6	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	80.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	71.4	-	-

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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Turning Movement Data

Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon Village Road Northbound						Manitou Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	60	259	29	0	2	348	2	231	130	0	4	363	106	85	7	0	6	198	80	30	36	0	3	146	1055
7:45 AM	91	252	55	1	0	399	1	256	167	0	8	424	98	94	5	0	3	197	70	38	26	0	1	134	1154
Hourly Total	151	511	84	1	2	747	3	487	297	0	12	787	204	179	12	0	9	395	150	68	62	0	4	280	2209
8:00 AM	68	205	61	0	3	334	3	278	157	0	0	438	87	67	2	0	1	156	68	35	30	0	1	133	1061
8:15 AM	81	231	73	0	0	385	7	247	114	0	1	368	75	87	1	0	0	163	62	41	25	0	3	128	1044
8:30 AM	64	210	53	0	0	327	2	144	94	0	3	240	114	94	3	0	2	211	67	44	32	0	1	143	921
8:45 AM	75	172	56	0	0	303	4	157	109	0	3	270	97	105	5	1	1	208	74	34	21	0	1	129	910
Hourly Total	288	818	243	0	3	1349	16	826	474	0	7	1316	373	353	11	1	4	738	271	154	108	0	6	533	3936
9:00 AM	46	171	55	0	0	272	5	189	118	1	1	313	96	93	4	0	0	193	58	42	34	0	0	134	912
9:15 AM	77	173	48	0	0	298	1	169	93	0	3	263	79	70	3	0	0	152	57	44	28	0	0	129	842
9:30 AM	59	179	45	1	0	284	2	161	115	0	1	278	64	61	3	0	1	128	63	45	36	0	0	144	834
9:45 AM	61	168	47	0	0	276	9	156	101	0	1	266	63	49	8	0	0	120	73	28	26	0	0	127	789
Hourly Total	243	691	195	1	0	1130	17	675	427	1	6	1120	302	273	18	0	1	593	251	159	124	0	0	534	3377
10:00 AM	50	148	31	0	1	229	3	160	97	0	1	260	51	74	8	0	2	133	60	32	26	0	0	118	740
10:15 AM	54	153	44	1	1	252	3	163	85	0	2	251	52	48	4	0	2	104	66	36	25	0	0	127	734
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	104	301	75	1	2	481	6	323	182	0	3	511	103	122	12	0	4	237	126	68	51	0	0	245	1474
12:00 PM	61	171	67	1	2	300	0	157	99	0	1	256	50	55	5	0	1	110	83	65	38	0	0	186	852
12:15 PM	53	158	55	0	1	266	8	174	127	0	4	309	64	69	8	0	2	141	82	59	35	0	1	176	892
12:30 PM	56	180	72	0	1	308	12	172	105	0	6	289	59	57	10	0	2	126	68	65	44	0	2	177	900
12:45 PM	49	156	43	0	1	248	4	150	123	0	2	277	61	65	7	0	0	133	83	66	55	0	2	204	862
Hourly Total	219	665	237	1	5	1122	24	653	454	0	13	1131	234	246	30	0	5	510	316	255	172	0	5	743	3506
1:00 PM	40	137	52	0	0	229	1	175	117	0	1	293	46	51	8	0	1	105	86	78	42	0	0	206	833
1:15 PM	33	180	46	0	0	259	9	166	135	0	1	310	65	71	7	0	1	143	78	47	37	0	0	162	874
1:30 PM	50	140	55	0	0	245	0	146	102	0	2	248	73	65	11	0	1	149	95	73	33	0	0	201	843
1:45 PM	60	191	59	1	0	311	5	136	123	0	6	264	68	51	5	0	6	124	87	56	34	0	0	177	876
Hourly Total	183	648	212	1	0	1044	15	623	477	0	10	1115	252	238	31	0	9	521	346	254	146	0	0	746	3426
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	75	164	96	0	0	335	10	223	110	0	3	343	55	48	7	0	3	110	124	91	68	0	1	283	1071
3:15 PM	60	197	108	0	0	365	8	222	146	0	0	376	59	53	5	0	1	117	144	76	88	0	0	308	1166
3:30 PM	55	227	90	0	0	372	5	225	108	0	1	338	76	62	4	0	1	142	108	91	91	0	1	290	1142
3:45 PM	55	214	96	2	0	367	9	256	162	0	2	427	87	60	4	0	1	151	125	68	69	0	3	262	1207
Hourly Total	245	802	390	2	0	1439	32	926	526	0	6	1484	277	223	20	0	6	520	501	326	316	0	5	1143	4586
4:00 PM	66	233	112	0	0	411	5	237	125	0	2	367	72	82	6	0	3	160	120	93	75	0	0	288	1226
4:15 PM	54	226	109	0	0	389	9	284	137	0	1	430	76	55	6	0	1	137	139	86	76	0	0	301	1257

4:30 PM	73	286	128	0	1	487	4	212	144	0	2	360	66	88	2	0	6	156	145	96	77	0	2	318	1321
4:45 PM	93	256	145	0	4	494	5	252	155	0	0	412	79	83	2	0	4	164	151	72	58	0	4	281	1351
Hourly Total	286	1001	494	0	5	1781	23	985	561	0	5	1569	293	308	16	0	14	617	555	347	286	0	6	1188	5155
5:00 PM	76	274	138	0	3	488	9	218	121	0	1	348	90	92	9	0	0	191	174	96	71	0	1	341	1368
5:15 PM	82	282	143	1	3	508	11	286	146	0	0	443	68	60	5	0	0	133	165	89	63	0	3	317	1401
5:30 PM	61	245	140	1	4	447	14	234	140	0	2	388	83	73	6	0	0	162	165	93	77	0	0	335	1332
5:45 PM	65	207	106	2	1	380	12	260	122	0	11	394	64	92	5	0	0	161	108	94	71	0	0	273	1208
Hourly Total	284	1008	527	4	11	1823	46	998	529	0	14	1573	305	317	25	0	0	647	612	372	282	0	4	1266	5309
Grand Total	2003	6445	2457	11	28	10916	182	6496	3927	1	76	10606	2343	2259	175	1	52	4778	3128	2003	1547	0	30	6678	32978
Approach %	18.3	59.0	22.5	0.1	-	-	1.7	61.2	37.0	0.0	-	-	49.0	47.3	3.7	0.0	-	-	46.8	30.0	23.2	0.0	-	-	-
Total %	6.1	19.5	7.5	0.0	-	33.1	0.6	19.7	11.9	0.0	-	32.2	7.1	6.9	0.5	0.0	-	14.5	9.5	6.1	4.7	0.0	-	20.2	-
Motorcycles	2	4	0	0	-	6	1	2	0	0	-	3	1	0	0	0	-	1	1	0	2	0	-	3	13
% Motorcycles	0.1	0.1	0.0	0.0	-	0.1	0.5	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	-	-	0.0	0.0
Cars & Light Goods	1772	5941	2405	11	-	10129	170	5968	3593	1	-	9732	2283	2192	171	1	-	4647	2850	1910	1434	0	-	6194	30702
% Cars & Light Goods	88.5	92.2	97.9	100.0	-	92.8	93.4	91.9	91.5	100.0	-	91.8	97.4	97.0	97.7	100.0	-	97.3	91.1	95.4	92.7	-	-	92.8	93.1
Buses	17	34	29	0	-	80	5	57	102	0	-	164	32	50	3	0	-	85	95	66	10	0	-	171	500
% Buses	0.8	0.5	1.2	0.0	-	0.7	2.7	0.9	2.6	0.0	-	1.5	1.4	2.2	1.7	0.0	-	1.8	3.0	3.3	0.6	-	-	2.6	1.5
Single-Unit Trucks	196	237	20	0	-	453	5	215	113	0	-	333	24	15	0	0	-	39	76	21	73	0	-	170	995
% Single-Unit Trucks	9.8	3.7	0.8	0.0	-	4.1	2.7	3.3	2.9	0.0	-	3.1	1.0	0.7	0.0	0.0	-	0.8	2.4	1.0	4.7	-	-	2.5	3.0
Articulated Trucks	16	226	3	0	-	245	1	254	119	0	-	374	3	2	1	0	-	6	106	5	28	0	-	139	764
% Articulated Trucks	0.8	3.5	0.1	0.0	-	2.2	0.5	3.9	3.0	0.0	-	3.5	0.1	0.1	0.6	0.0	-	0.1	3.4	0.2	1.8	-	-	2.1	2.3
Bicycles on Road	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	4
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	12	-	-	-	-	-	6	-	-	-	-	-	10	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	42.9	-	-	-	-	-	7.9	-	-	-	-	-	19.2	-	-	-	-	-	20.0	-	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	70	-	-	-	-	-	42	-	-	-	-	-	24	-	-
% Pedestrians	-	-	-	-	57.1	-	-	-	-	-	92.1	-	-	-	-	-	80.8	-	-	-	-	-	80.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon Village Road Northbound						Manitou Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	60	259	29	0	2	348	2	231	130	0	4	363	106	85	7	0	6	198	80	30	36	0	3	146	1055
7:45 AM	91	252	55	1	0	399	1	256	167	0	8	424	98	94	5	0	3	197	70	38	26	0	1	134	1154
8:00 AM	68	205	61	0	3	334	3	278	157	0	0	438	87	67	2	0	1	156	68	35	30	0	1	133	1061
8:15 AM	81	231	73	0	0	385	7	247	114	0	1	368	75	87	1	0	0	163	62	41	25	0	3	128	1044
Total	300	947	218	1	5	1466	13	1012	568	0	13	1593	366	333	15	0	10	714	280	144	117	0	8	541	4314
Approach %	20.5	64.6	14.9	0.1	-	-	0.8	63.5	35.7	0.0	-	-	51.3	46.6	2.1	0.0	-	-	51.8	26.6	21.6	0.0	-	-	-
Total %	7.0	22.0	5.1	0.0	-	34.0	0.3	23.5	13.2	0.0	-	36.9	8.5	7.7	0.3	0.0	-	16.6	6.5	3.3	2.7	0.0	-	12.5	-
PHF	0.824	0.914	0.747	0.250	-	0.919	0.464	0.910	0.850	0.000	-	0.909	0.863	0.886	0.536	0.000	-	0.902	0.875	0.878	0.813	0.000	-	0.926	0.935
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	272	878	203	1	-	1354	12	960	528	0	-	1500	357	322	15	0	-	694	244	132	111	0	-	487	4035
% Cars & Light Goods	90.7	92.7	93.1	100.0	-	92.4	92.3	94.9	93.0	-	-	94.2	97.5	96.7	100.0	-	-	97.2	87.1	91.7	94.9	-	-	90.0	93.5
Buses	3	8	12	0	-	23	1	4	15	0	-	20	7	8	0	0	-	15	13	9	0	0	-	22	80
% Buses	1.0	0.8	5.5	0.0	-	1.6	7.7	0.4	2.6	-	-	1.3	1.9	2.4	0.0	-	-	2.1	4.6	6.3	0.0	-	-	4.1	1.9
Single-Unit Trucks	23	37	3	0	-	63	0	24	14	0	-	38	2	3	0	0	-	5	10	3	5	0	-	18	124
% Single-Unit Trucks	7.7	3.9	1.4	0.0	-	4.3	0.0	2.4	2.5	-	-	2.4	0.5	0.9	0.0	-	-	0.7	3.6	2.1	4.3	-	-	3.3	2.9
Articulated Trucks	2	24	0	0	-	26	0	24	11	0	-	35	0	0	0	0	-	0	13	0	1	0	-	14	75
% Articulated Trucks	0.7	2.5	0.0	0.0	-	1.8	0.0	2.4	1.9	-	-	2.2	0.0	0.0	0.0	-	-	0.0	4.6	0.0	0.9	-	-	2.6	1.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	80.0	-	-	-	-	-	15.4	-	-	-	-	-	50.0	-	-	-	-	-	12.5	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	5	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	20.0	-	-	-	-	-	84.6	-	-	-	-	-	50.0	-	-	-	-	-	87.5	-	-

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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

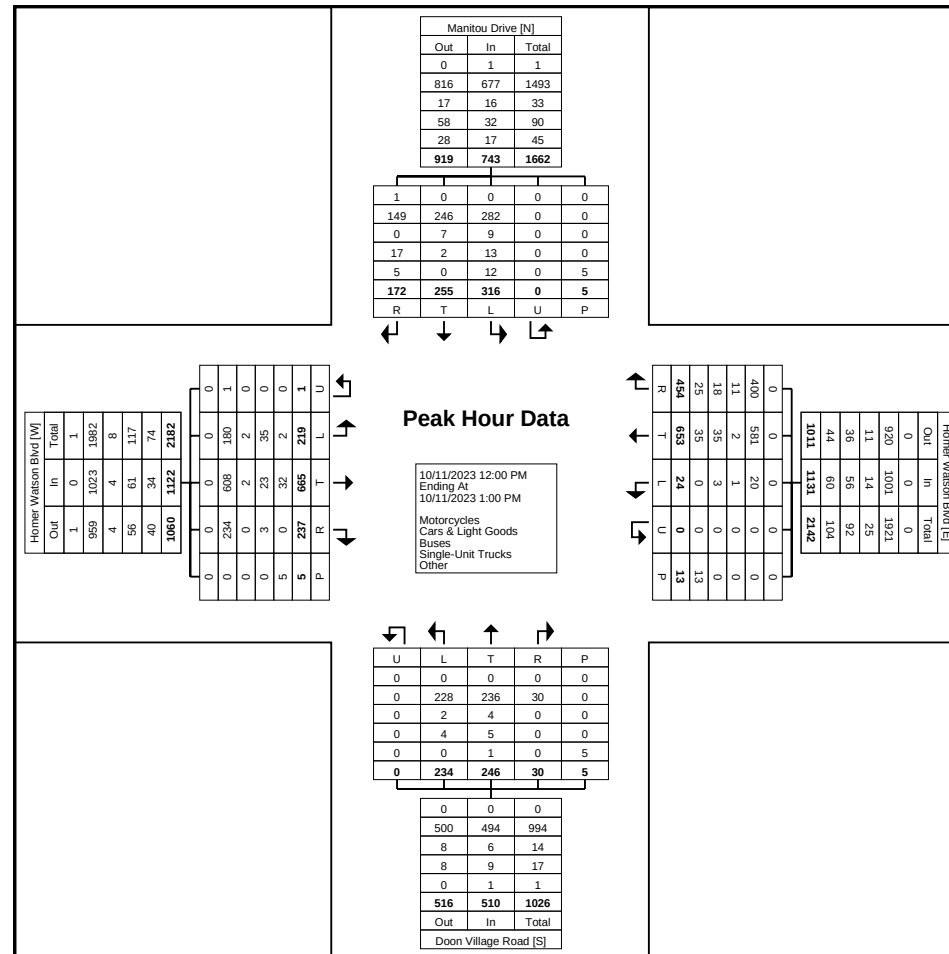
Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon Village Road Northbound						Manitou Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	61	171	67	1	2	300	0	157	99	0	1	256	50	55	5	0	1	110	83	65	38	0	0	186	852
12:15 PM	53	158	55	0	1	266	8	174	127	0	4	309	64	69	8	0	2	141	82	59	35	0	1	176	892
12:30 PM	56	180	72	0	1	308	12	172	105	0	6	289	59	57	10	0	2	126	68	65	44	0	2	177	900
12:45 PM	49	156	43	0	1	248	4	150	123	0	2	277	61	65	7	0	0	133	83	66	55	0	2	204	862
Total	219	665	237	1	5	1122	24	653	454	0	13	1131	234	246	30	0	5	510	316	255	172	0	5	743	3506
Approach %	19.5	59.3	21.1	0.1	-	-	2.1	57.7	40.1	0.0	-	-	45.9	48.2	5.9	0.0	-	-	42.5	34.3	23.1	0.0	-	-	-
Total %	6.2	19.0	6.8	0.0	-	32.0	0.7	18.6	12.9	0.0	-	32.3	6.7	7.0	0.9	0.0	-	14.5	9.0	7.3	4.9	0.0	-	21.2	-
PHF	0.898	0.924	0.823	0.250	-	0.911	0.500	0.938	0.894	0.000	-	0.915	0.914	0.891	0.750	0.000	-	0.904	0.952	0.966	0.782	0.000	-	0.911	0.974
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.6	-	-	0.1	0.0
Cars & Light Goods	180	608	234	1	-	1023	20	581	400	0	-	1001	228	236	30	0	-	494	282	246	149	0	-	677	3195
% Cars & Light Goods	82.2	91.4	98.7	100.0	-	91.2	83.3	89.0	88.1	-	-	88.5	97.4	95.9	100.0	-	-	96.9	89.2	96.5	86.6	-	-	91.1	91.1
Buses	2	2	0	0	-	4	1	2	11	0	-	14	2	4	0	0	-	6	9	7	0	0	-	16	40
% Buses	0.9	0.3	0.0	0.0	-	0.4	4.2	0.3	2.4	-	-	1.2	0.9	1.6	0.0	-	-	1.2	2.8	2.7	0.0	-	-	2.2	1.1
Single-Unit Trucks	35	23	3	0	-	61	3	35	18	0	-	56	4	5	0	0	-	9	13	2	17	0	-	32	158
% Single-Unit Trucks	16.0	3.5	1.3	0.0	-	5.4	12.5	5.4	4.0	-	-	5.0	1.7	2.0	0.0	-	-	1.8	4.1	0.8	9.9	-	-	4.3	4.5
Articulated Trucks	2	32	0	0	-	34	0	35	25	0	-	60	0	1	0	0	-	1	12	0	5	0	-	17	112
% Articulated Trucks	0.9	4.8	0.0	0.0	-	3.0	0.0	5.4	5.5	-	-	5.3	0.0	0.4	0.0	-	-	0.2	3.8	0.0	2.9	-	-	2.3	3.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	2	-	-	-
% Bicycles on Crosswalk	-	-	-	-	60.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	40.0	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	13	-	-	-	-	-	5	-	-	-	-	3	-	-	-
% Pedestrians	-	-	-	-	40.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	60.0	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 7



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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

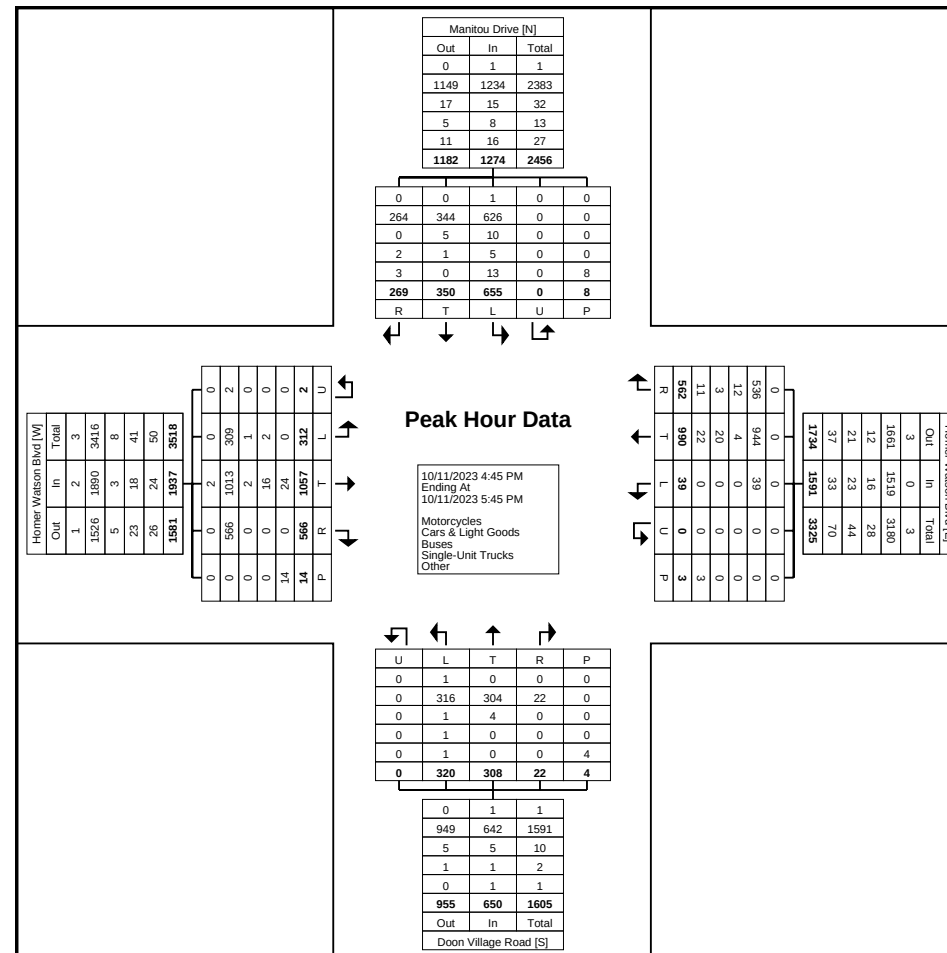
Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon Village Road Northbound						Manitou Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	93	256	145	0	4	494	5	252	155	0	0	412	79	83	2	0	4	164	151	72	58	0	4	281	1351
5:00 PM	76	274	138	0	3	488	9	218	121	0	1	348	90	92	9	0	0	191	174	96	71	0	1	341	1368
5:15 PM	82	282	143	1	3	508	11	286	146	0	0	443	68	60	5	0	0	133	165	89	63	0	3	317	1401
5:30 PM	61	245	140	1	4	447	14	234	140	0	2	388	83	73	6	0	0	162	165	93	77	0	0	335	1332
Total	312	1057	566	2	14	1937	39	990	562	0	3	1591	320	308	22	0	4	650	655	350	269	0	8	1274	5452
Approach %	16.1	54.6	29.2	0.1	-	-	2.5	62.2	35.3	0.0	-	-	49.2	47.4	3.4	0.0	-	-	51.4	27.5	21.1	0.0	-	-	-
Total %	5.7	19.4	10.4	0.0	-	35.5	0.7	18.2	10.3	0.0	-	29.2	5.9	5.6	0.4	0.0	-	11.9	12.0	6.4	4.9	0.0	-	23.4	-
PHF	0.839	0.937	0.976	0.500	-	0.953	0.696	0.865	0.906	0.000	-	0.898	0.889	0.837	0.611	0.000	-	0.851	0.941	0.911	0.873	0.000	-	0.934	0.973
Motorcycles	0	2	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	1	0	0	0	-	1	4
% Motorcycles	0.0	0.2	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.3	0.0	0.0	-	-	0.2	0.2	0.0	0.0	-	-	0.1	0.1
Cars & Light Goods	309	1013	566	2	-	1890	39	944	536	0	-	1519	316	304	22	0	-	642	626	344	264	0	-	1234	5285
% Cars & Light Goods	99.0	95.8	100.0	100.0	-	97.6	100.0	95.4	95.4	-	-	95.5	98.8	98.7	100.0	-	-	98.8	95.6	98.3	98.1	-	-	96.9	96.9
Buses	1	2	0	0	-	3	0	4	12	0	-	16	1	4	0	0	-	5	10	5	0	0	-	15	39
% Buses	0.3	0.2	0.0	0.0	-	0.2	0.0	0.4	2.1	-	-	1.0	0.3	1.3	0.0	-	-	0.8	1.5	1.4	0.0	-	-	1.2	0.7
Single-Unit Trucks	2	16	0	0	-	18	0	20	3	0	-	23	1	0	0	0	-	1	5	1	2	0	-	8	50
% Single-Unit Trucks	0.6	1.5	0.0	0.0	-	0.9	0.0	2.0	0.5	-	-	1.4	0.3	0.0	0.0	-	-	0.2	0.8	0.3	0.7	-	-	0.6	0.9
Articulated Trucks	0	23	0	0	-	23	0	22	11	0	-	33	1	0	0	0	-	1	13	0	3	0	-	16	73
% Articulated Trucks	0.0	2.2	0.0	0.0	-	1.2	0.0	2.2	2.0	-	-	2.1	0.3	0.0	0.0	-	-	0.2	2.0	0.0	1.1	-	-	1.3	1.3
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	35.7	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	12.5	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	64.3	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	87.5	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Doon Village Road & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 9



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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon South Drive & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Turning Movement Data

Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon South Drive Northbound						Parking Lot Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	366	9	0	0	375	8	305	0	1	0	314	59	0	48	0	1	107	0	0	1	0	0	1	797
7:45 AM	0	348	14	0	0	362	15	340	0	0	0	355	69	0	68	0	1	137	0	0	0	0	0	0	854
Hourly Total	0	714	23	0	0	737	23	645	0	1	0	669	128	0	116	0	2	244	0	0	1	0	0	1	1651
8:00 AM	0	300	22	0	0	322	16	309	1	1	0	327	50	0	48	0	1	98	0	0	1	0	0	1	748
8:15 AM	0	291	36	0	1	327	25	293	1	0	1	319	60	0	49	0	4	109	0	0	0	0	0	0	755
8:30 AM	0	280	28	0	0	308	26	223	1	0	0	250	62	0	45	0	2	107	0	0	0	0	0	0	665
8:45 AM	1	265	20	0	0	286	64	178	1	3	0	246	39	1	50	3	1	93	0	2	0	0	1	2	627
Hourly Total	1	1136	106	0	1	1243	131	1003	4	4	1	1142	211	1	192	3	8	407	0	2	1	0	1	3	2795
9:00 AM	0	265	22	0	0	287	23	180	1	2	0	206	21	1	43	0	0	65	0	2	0	0	0	2	560
9:15 AM	0	246	14	0	1	260	9	180	1	0	1	190	43	0	37	0	1	80	0	0	2	0	1	2	532
9:30 AM	0	251	13	0	0	264	12	246	0	2	0	260	36	0	32	0	1	68	1	0	0	0	0	1	593
9:45 AM	1	243	21	0	0	265	10	243	1	1	0	255	27	0	25	0	0	52	0	1	0	0	0	1	573
Hourly Total	1	1005	70	0	1	1076	54	849	3	5	1	911	127	1	137	0	2	265	1	3	2	0	1	6	2258
10:00 AM	0	220	19	0	2	239	14	279	0	0	0	293	20	0	32	0	2	52	0	1	0	0	0	1	585
10:15 AM	1	206	18	0	0	225	17	249	0	1	0	267	25	0	25	0	3	50	0	0	1	0	0	1	543
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	426	37	0	2	464	31	528	0	1	0	560	45	0	57	0	5	102	0	1	1	0	0	2	1128
12:00 PM	1	185	24	0	0	210	22	281	1	3	2	307	27	0	22	0	3	49	0	0	1	0	0	1	567
12:15 PM	0	186	30	0	1	216	8	282	0	3	2	293	30	0	21	0	1	51	0	0	0	0	0	0	560
12:30 PM	0	246	38	0	1	284	14	284	0	0	0	298	30	0	17	0	3	47	0	0	0	0	0	0	629
12:45 PM	0	238	26	0	1	264	17	241	0	0	0	258	29	1	21	0	0	51	0	0	0	0	1	0	573
Hourly Total	1	855	118	0	3	974	61	1088	1	6	4	1156	116	1	81	0	7	198	0	0	1	0	1	1	2329
1:00 PM	0	197	25	0	0	222	23	261	2	1	0	287	22	0	20	0	2	42	0	0	0	0	2	0	551
1:15 PM	0	244	29	0	0	273	18	273	1	1	1	293	37	0	27	0	3	64	1	0	1	0	0	2	632
1:30 PM	0	237	34	0	0	271	22	260	0	0	0	282	31	0	14	0	4	45	2	0	0	0	0	2	600
1:45 PM	1	270	28	0	0	299	12	252	1	0	0	265	22	0	31	0	4	53	1	0	1	0	0	2	619
Hourly Total	1	948	116	0	0	1065	75	1046	4	2	1	1127	112	0	92	0	13	204	4	0	2	0	2	6	2402
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	279	48	0	2	327	41	351	2	0	1	394	46	0	28	0	2	74	1	0	0	0	0	1	796
3:15 PM	0	290	28	0	0	318	28	350	0	1	1	379	32	0	16	0	3	48	0	0	0	0	0	0	745
3:30 PM	0	301	53	1	2	355	32	362	2	3	1	399	42	0	33	0	4	75	2	0	0	1	0	3	832
3:45 PM	1	293	39	0	3	333	31	406	1	0	0	438	30	0	15	0	1	45	0	0	2	0	0	2	818
Hourly Total	1	1163	168	1	7	1333	132	1469	5	4	3	1610	150	0	92	0	10	242	3	0	2	1	0	6	3191
4:00 PM	0	328	44	1	2	373	29	477	1	2	0	509	31	0	23	0	0	54	0	1	0	0	0	1	937
4:15 PM	0	330	51	3	1	384	28	519	1	2	0	550	38	2	34	0	0	74	1	1	0	0	0	2	1010

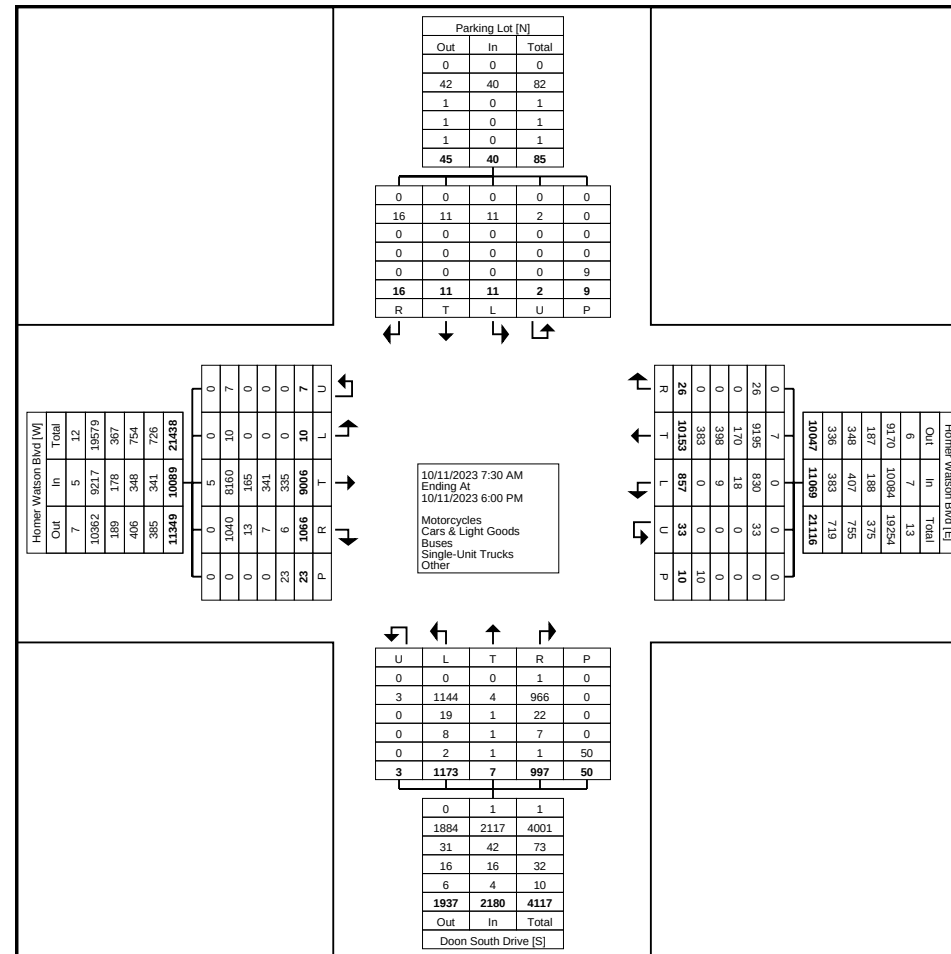
4:30 PM	0	337	46	0	0	383	49	465	1	0	0	515	35	0	38	0	0	73	1	0	0	1	0	2	973
4:45 PM	2	328	46	0	3	376	44	456	4	0	0	504	37	1	21	0	0	59	1	2	0	0	0	3	942
Hourly Total	2	1323	187	4	6	1516	150	1917	7	4	0	2078	141	3	116	0	0	260	3	4	0	1	0	8	3862
5:00 PM	0	318	54	0	0	372	49	406	0	0	0	455	37	0	16	0	1	53	0	0	3	0	1	3	883
5:15 PM	1	358	58	1	0	418	53	444	1	1	0	499	38	1	31	0	0	70	0	1	1	0	0	2	989
5:30 PM	0	392	66	0	1	458	49	412	0	2	0	463	24	0	34	0	1	58	0	0	2	0	2	2	981
5:45 PM	1	368	63	1	2	433	49	346	1	3	0	399	44	0	33	0	1	77	0	0	0	0	1	0	909
Hourly Total	2	1436	241	2	3	1681	200	1608	2	6	0	1816	143	1	114	0	3	258	0	1	6	0	4	7	3762
Grand Total	10	9006	1066	7	23	10089	857	10153	26	33	10	11069	1173	7	997	3	50	2180	11	11	16	2	9	40	23378
Approach %	0.1	89.3	10.6	0.1	-	-	7.7	91.7	0.2	0.3	-	-	53.8	0.3	45.7	0.1	-	-	27.5	27.5	40.0	5.0	-	-	-
Total %	0.0	38.5	4.6	0.0	-	43.2	3.7	43.4	0.1	0.1	-	47.3	5.0	0.0	4.3	0.0	-	9.3	0.0	0.0	0.1	0.0	-	0.2	-
Motorcycles	0	5	0	0	-	5	0	7	0	0	-	7	0	0	1	0	-	1	0	0	0	0	-	0	13
% Motorcycles	0.0	0.1	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1
Cars & Light Goods	10	8160	1040	7	-	9217	830	9195	26	33	-	10084	1144	4	966	3	-	2117	11	11	16	2	-	40	21458
% Cars & Light Goods	100.0	90.6	97.6	100.0	-	91.4	96.8	90.6	100.0	100.0	-	91.1	97.5	57.1	96.9	100.0	-	97.1	100.0	100.0	100.0	100.0	-	100.0	91.8
Buses	0	165	13	0	-	178	18	170	0	0	-	188	19	1	22	0	-	42	0	0	0	0	-	0	408
% Buses	0.0	1.8	1.2	0.0	-	1.8	2.1	1.7	0.0	0.0	-	1.7	1.6	14.3	2.2	0.0	-	1.9	0.0	0.0	0.0	0.0	-	0.0	1.7
Single-Unit Trucks	0	341	7	0	-	348	9	398	0	0	-	407	8	1	7	0	-	16	0	0	0	0	-	0	771
% Single-Unit Trucks	0.0	3.8	0.7	0.0	-	3.4	1.1	3.9	0.0	0.0	-	3.7	0.7	14.3	0.7	0.0	-	0.7	0.0	0.0	0.0	0.0	-	0.0	3.3
Articulated Trucks	0	334	5	0	-	339	0	382	0	0	-	382	1	0	1	0	-	2	0	0	0	0	-	0	723
% Articulated Trucks	0.0	3.7	0.5	0.0	-	3.4	0.0	3.8	0.0	0.0	-	3.5	0.1	0.0	0.1	0.0	-	0.1	0.0	0.0	0.0	0.0	-	0.0	3.1
Bicycles on Road	0	1	1	0	-	2	0	1	0	0	-	1	1	1	0	0	-	2	0	0	0	0	-	0	5
% Bicycles on Road	0.0	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	14.3	0.0	0.0	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	13	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	17.4	-	-	-	-	-	20.0	-	-	-	-	-	26.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	19	-	-	-	-	-	8	-	-	-	-	-	37	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	82.6	-	-	-	-	-	80.0	-	-	-	-	-	74.0	-	-	-	-	-	100.0	-	-



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Count Name: Doon South Drive & Homer
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Site Code: 230376
Start Date: 10/11/2023
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Doon South Drive & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon South Drive Northbound						Parking Lot Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	366	9	0	0	375	8	305	0	1	0	314	59	0	48	0	1	107	0	0	1	0	0	1	797
7:45 AM	0	348	14	0	0	362	15	340	0	0	0	355	69	0	68	0	1	137	0	0	0	0	0	0	854
8:00 AM	0	300	22	0	0	322	16	309	1	1	0	327	50	0	48	0	1	98	0	0	1	0	0	1	748
8:15 AM	0	291	36	0	1	327	25	293	1	0	1	319	60	0	49	0	4	109	0	0	0	0	0	0	755
Total	0	1305	81	0	1	1386	64	1247	2	2	1	1315	238	0	213	0	7	451	0	0	2	0	0	2	3154
Approach %	0.0	94.2	5.8	0.0	-	-	4.9	94.8	0.2	0.2	-	-	52.8	0.0	47.2	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	41.4	2.6	0.0	-	43.9	2.0	39.5	0.1	0.1	-	41.7	7.5	0.0	6.8	0.0	-	14.3	0.0	0.0	0.1	0.0	-	0.1	-
PHF	0.000	0.891	0.563	0.000	-	0.924	0.640	0.917	0.500	0.500	-	0.926	0.862	0.000	0.783	0.000	-	0.823	0.000	0.000	0.500	0.000	-	0.500	0.923
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	1
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.5	-	-	0.2	-	-	0.0	-	-	0.0	0.0
Cars & Light Goods	0	1189	78	0	-	1267	62	1141	2	2	-	1207	234	0	206	0	-	440	0	0	2	0	-	2	2916
% Cars & Light Goods	-	91.1	96.3	-	-	91.4	96.9	91.5	100.0	100.0	-	91.8	98.3	-	96.7	-	-	97.6	-	-	100.0	-	-	100.0	92.5
Buses	0	29	2	0	-	31	2	19	0	0	-	21	4	0	6	0	-	10	0	0	0	0	-	0	62
% Buses	-	2.2	2.5	-	-	2.2	3.1	1.5	0.0	0.0	-	1.6	1.7	-	2.8	-	-	2.2	-	-	0.0	-	-	0.0	2.0
Single-Unit Trucks	0	52	0	0	-	52	0	49	0	0	-	49	0	0	0	0	-	0	0	0	0	0	-	0	101
% Single-Unit Trucks	-	4.0	0.0	-	-	3.8	0.0	3.9	0.0	0.0	-	3.7	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	3.2
Articulated Trucks	0	35	1	0	-	36	0	38	0	0	-	38	0	0	0	0	-	0	0	0	0	0	-	0	74
% Articulated Trucks	-	2.7	1.2	-	-	2.6	0.0	3.0	0.0	0.0	-	2.9	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	2.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	0	-	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	14.3	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	85.7	-	-	-	-	-	-	-	-

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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon South Drive & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 6

Turning Movement Peak Hour Data (1:00 PM)

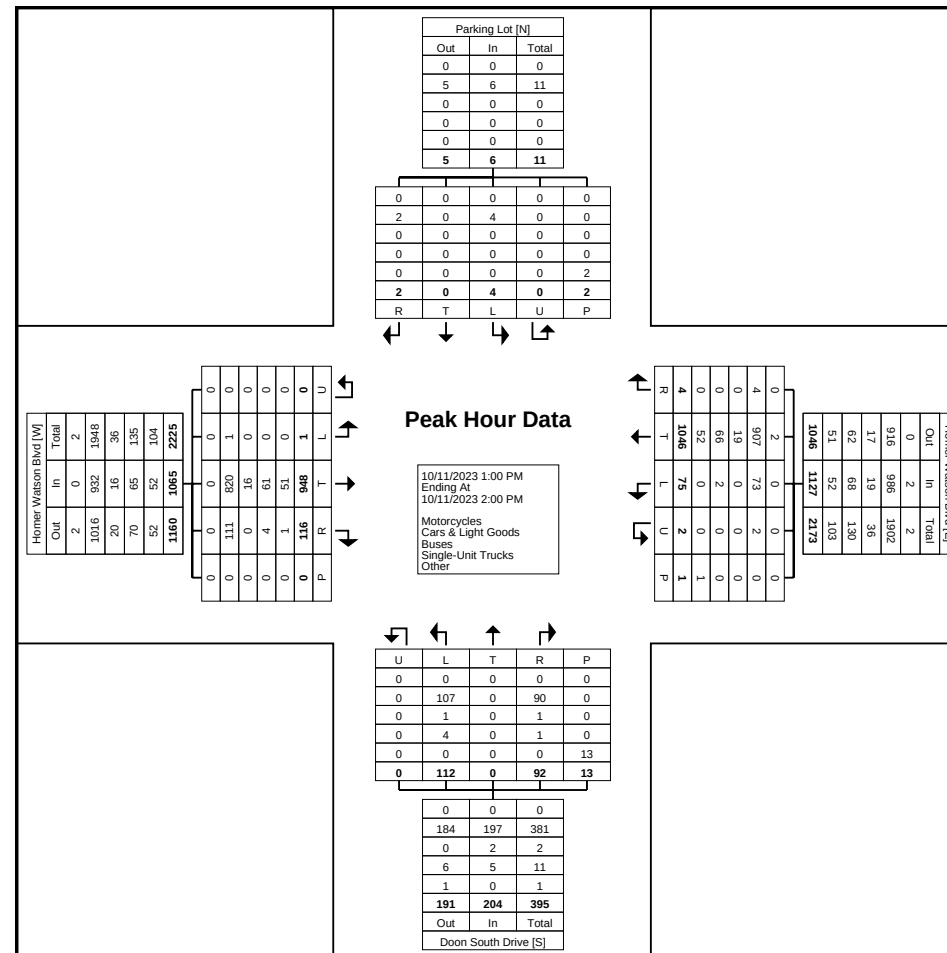
Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon South Drive Northbound						Parking Lot Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
1:00 PM	0	197	25	0	0	222	23	261	2	1	0	287	22	0	20	0	2	42	0	0	0	0	2	0	551
1:15 PM	0	244	29	0	0	273	18	273	1	1	1	293	37	0	27	0	3	64	1	0	1	0	0	2	632
1:30 PM	0	237	34	0	0	271	22	260	0	0	0	282	31	0	14	0	4	45	2	0	0	0	0	2	600
1:45 PM	1	270	28	0	0	299	12	252	1	0	0	265	22	0	31	0	4	53	1	0	1	0	0	2	619
Total	1	948	116	0	0	1065	75	1046	4	2	1	1127	112	0	92	0	13	204	4	0	2	0	2	6	2402
Approach %	0.1	89.0	10.9	0.0	-	-	6.7	92.8	0.4	0.2	-	-	54.9	0.0	45.1	0.0	-	-	66.7	0.0	33.3	0.0	-	-	-
Total %	0.0	39.5	4.8	0.0	-	44.3	3.1	43.5	0.2	0.1	-	46.9	4.7	0.0	3.8	0.0	-	8.5	0.2	0.0	0.1	0.0	-	0.2	-
PHF	0.250	0.878	0.853	0.000	-	0.890	0.815	0.958	0.500	0.500	-	0.962	0.757	0.000	0.742	0.000	-	0.797	0.500	0.000	0.500	0.000	-	0.750	0.950
Motorcycles	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	0.0	-	0.2	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.1
Cars & Light Goods	1	820	111	0	-	932	73	907	4	2	-	986	107	0	90	0	-	197	4	0	2	0	-	6	2121
% Cars & Light Goods	100.0	86.5	95.7	-	-	87.5	97.3	86.7	100.0	100.0	-	87.5	95.5	-	97.8	-	-	96.6	100.0	-	100.0	-	-	100.0	88.3
Buses	0	16	0	0	-	16	0	19	0	0	-	19	1	0	1	0	-	2	0	0	0	0	-	0	37
% Buses	0.0	1.7	0.0	-	-	1.5	0.0	1.8	0.0	0.0	-	1.7	0.9	-	1.1	-	-	1.0	0.0	-	0.0	-	-	0.0	1.5
Single-Unit Trucks	0	61	4	0	-	65	2	66	0	0	-	68	4	0	1	0	-	5	0	0	0	0	-	0	138
% Single-Unit Trucks	0.0	6.4	3.4	-	-	6.1	2.7	6.3	0.0	0.0	-	6.0	3.6	-	1.1	-	-	2.5	0.0	-	0.0	-	-	0.0	5.7
Articulated Trucks	0	51	0	0	-	51	0	52	0	0	-	52	0	0	0	0	-	0	0	0	0	0	-	0	103
% Articulated Trucks	0.0	5.4	0.0	-	-	4.8	0.0	5.0	0.0	0.0	-	4.6	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	4.3
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.9	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	46.2	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	7	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	53.8	-	-	-	-	-	100.0	-	-

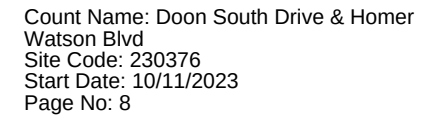


Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon South Drive & Homer
Watson Blvd
Site Code: 230376
Start Date: 10/11/2023
Page No: 7





Start Time	Homer Watson Blvd Eastbound						Homer Watson Blvd Westbound						Doon South Drive Northbound						Parking Lot Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	0	328	44	1	2	373	29	477	1	2	0	509	31	0	23	0	0	54	0	1	0	0	0	1	937
4:15 PM	0	330	51	3	1	384	28	519	1	2	0	550	38	2	34	0	0	74	1	1	0	0	0	2	1010
4:30 PM	0	337	46	0	0	383	49	465	1	0	0	515	35	0	38	0	0	73	1	0	0	1	0	2	973
4:45 PM	2	328	46	0	3	376	44	456	4	0	0	504	37	1	21	0	0	59	1	2	0	0	0	3	942
Total	2	1323	187	4	6	1516	150	1917	7	4	0	2078	141	3	116	0	0	260	3	4	0	1	0	8	3862
Approach %	0.1	87.3	12.3	0.3	-	-	7.2	92.3	0.3	0.2	-	-	54.2	1.2	44.6	0.0	-	-	37.5	50.0	0.0	12.5	-	-	-
Total %	0.1	34.3	4.8	0.1	-	39.3	3.9	49.6	0.2	0.1	-	53.8	3.7	0.1	3.0	0.0	-	6.7	0.1	0.1	0.0	0.0	-	0.2	-
PHF	0.250	0.981	0.917	0.333	-	0.987	0.765	0.923	0.438	0.500	-	0.945	0.928	0.375	0.763	0.000	-	0.878	0.750	0.500	0.000	0.250	-	0.667	0.956
Motorcycles	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	-	0.0
Cars & Light Goods	2	1253	184	4	-	1443	148	1804	7	4	-	1963	136	1	110	0	-	247	3	4	0	1	-	8	3661
% Cars & Light Goods	100.0	94.7	98.4	100.0	-	95.2	98.7	94.1	100.0	100.0	-	94.5	96.5	33.3	94.8	-	-	95.0	100.0	100.0	-	100.0	-	100.0	94.8
Buses	0	18	2	0	-	20	2	28	0	0	-	30	3	1	4	0	-	8	0	0	0	0	-	0	58
% Buses	0.0	1.4	1.1	0.0	-	1.3	1.3	1.5	0.0	0.0	-	1.4	2.1	33.3	3.4	-	-	3.1	0.0	0.0	-	0.0	-	0.0	1.5
Single-Unit Trucks	0	25	1	0	-	26	0	44	0	0	-	44	2	1	2	0	-	5	0	0	0	0	-	0	75
% Single-Unit Trucks	0.0	1.9	0.5	0.0	-	1.7	0.0	2.3	0.0	0.0	-	2.1	1.4	33.3	1.7	-	-	1.9	0.0	0.0	-	0.0	-	0.0	1.9
Articulated Trucks	0	26	0	0	-	26	0	40	0	0	-	40	0	0	0	0	-	0	0	0	0	0	-	0	66
% Articulated Trucks	0.0	2.0	0.0	0.0	-	1.7	0.0	2.1	0.0	0.0	-	1.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	1.7
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	83.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

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

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

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
Cloudy
Person(s) who counted:
AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21

North Leg Total: 2,235
North Entering: 1,116
North Peds: 6
Peds Cross: X

	% Trks	21%	9%	19%	
Heavys	2	57	15	74	
Trucks	3	35	0	38	
Cars	19	922	63	1,004	
Total		24	1,014	78	

Heavys 63
Trucks 25
Cars 1,031
Total 1,119

East Leg Total: 400
East Entering: 166
East Peds: 3
Peds Cross: X

Heavys 25
Trucks 6
Cars 151
Total 182

Conestoga College Blvd

% Trks	Heavys	Trucks	Cars	Total
7%	6	2	99	107
11%	3	0	24	27
40%	19	2	32	53
	28	4	155	

Homer Watson Blvd



Total	Cars	Trucks	Heavys	% Trks
65	51	1	13	22%
23	21	0	2	9%
78	68	1	9	13%
	140	2	24	

Conestoga College Blvd

Cars 209
Trucks 0
Heavys 25
Total 234

Homer Watson Blvd

Peds Cross: X
West Peds: 1
West Entering: 187
West leg Total: 369

Heavys 85
Trucks 38
Cars 1,022
Total 1,145

Total	135	947	129	
Cars	111	881	122	1,114
Trucks	3	22	0	25
Heavys	21	44	7	72
% Trks	18%	7%	5%	

Peds Cross: X
South Peds: 8
South Entering: 1,211
South leg Total: 2,356

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 = **2,680**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **187**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

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

Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

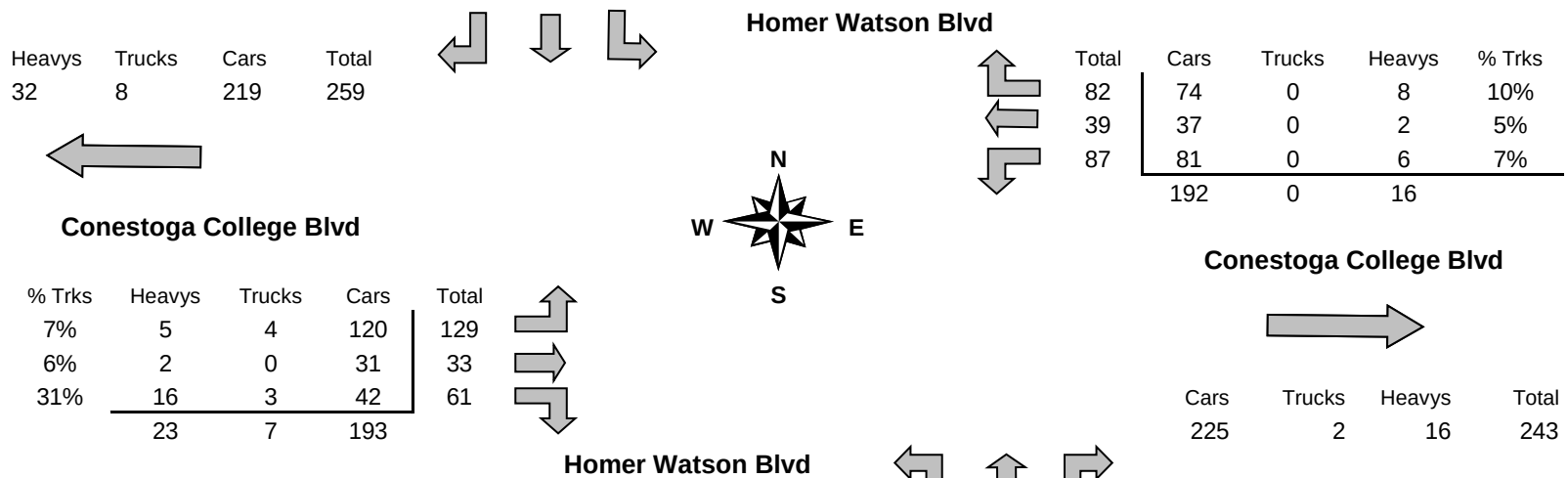
Weather conditions:
 Cloudy
Person(s) who counted:
 AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21

North Leg Total:	1,798	% Trks	10%	9%	8%	
North Entering:	930	Heavys	5	49	9	63
North Peds:	11	Trucks	2	20	0	22
Peds Cross:	⊠	Cars	65	680	100	845
		Total	72	749	109	

Heavys	79
Trucks	21
Cars	768
Total	868

East Leg Total:	451
East Entering:	208
East Peds:	1
Peds Cross:	⊠



Peds Cross:	⊠
West Peds:	17
West Entering:	223
West leg Total:	482

Heavys	71
Trucks	23
Cars	803
Total	897

Peds Cross:	⊠
South Peds:	12
South Entering:	906
South leg Total:	1,803

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 = **2,267**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **223**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

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

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
 Cloudy
Person(s) who counted:
 AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21

North Leg Total: 3,489
North Entering: 1,553
North Peds: 11
Peds Cross: X

	% Trks	2%	4%	14%	
Heavys	1	44	13	58	
Trucks	0	15	0	15	
Cars	53	1,344	83	1,480	
Total		54	1,403	96	

Heavys 75
 Trucks 33
 Cars 1,828
 Total 1,936

East Leg Total: 514
East Entering: 293
East Peds: 1
Peds Cross: X

Heavys 18
 Trucks 3
 Cars 287
 Total 308

Conestoga College Blvd

% Trks	Heavys	Trucks	Cars	Total
4%	4	4	200	208
7%	2	0	26	28
16%	13	1	72	86
	19	5	298	

Homer Watson Blvd



Homer Watson Blvd

Total	Cars	Trucks	Heavys	% Trks
107	95	0	12	11%
50	48	0	2	4%
136	126	2	8	7%
	269	2	22	

Conestoga College Blvd

Cars 198
 Trucks 1
 Heavys 22
 Total 221

Peds Cross: X
West Peds: 7
West Entering: 322
West leg Total: 630

Heavys 65
 Trucks 18
 Cars 1,542
 Total 1,625

Total	204	1,621	97	
Cars	186	1,533	89	1,808
Trucks	3	29	1	33
Heavys	15	59	7	81
% Trks	9%	5%	8%	

Peds Cross: X
South Peds: 13
South Entering: 1,922
South leg Total: 3,547

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 = **4,090**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **322**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT

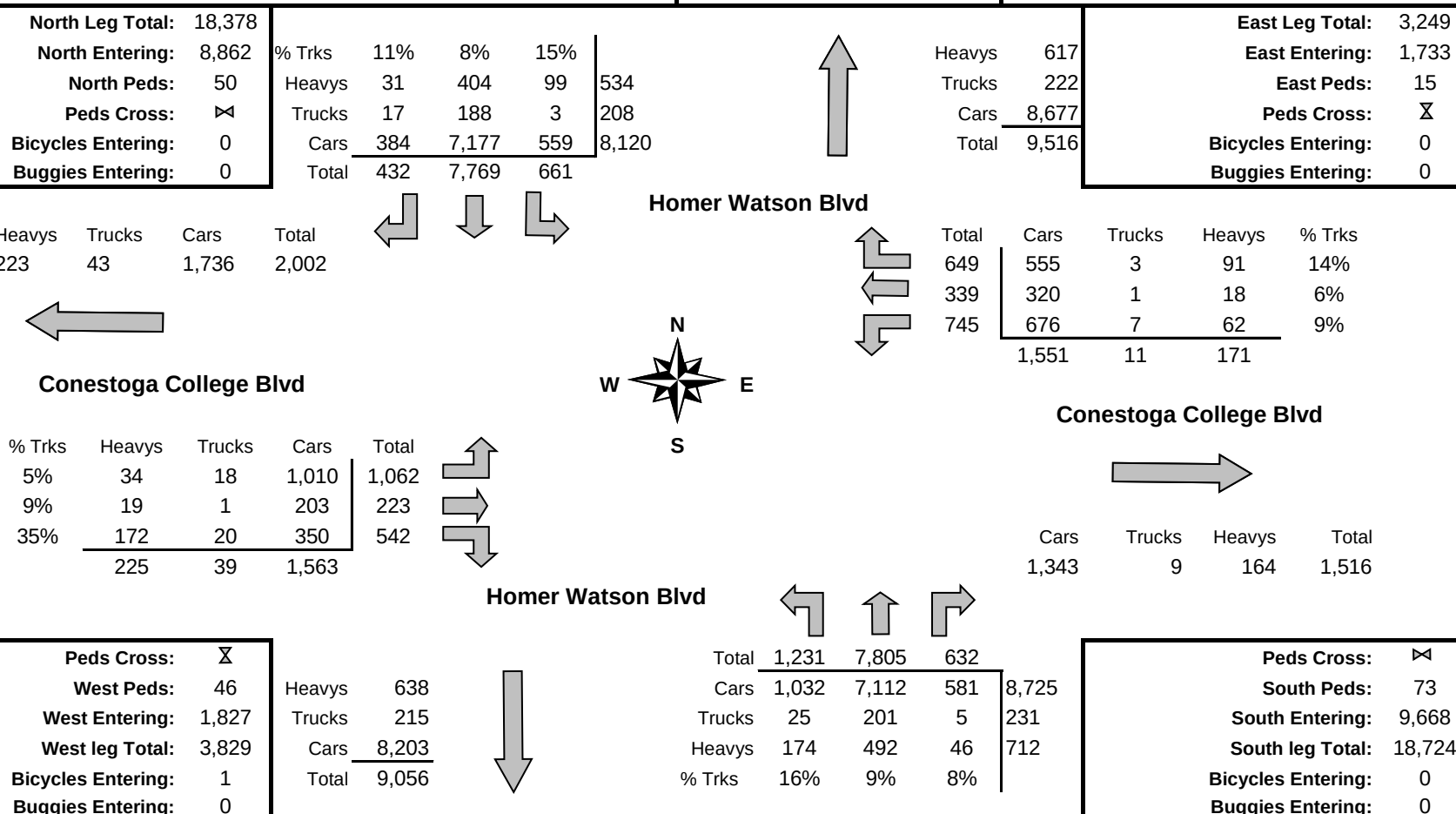


Total Count Diagram

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
 Cloudy
Person(s) who counted:
 AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21



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 = **22,090**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **1,827**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

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

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
 Cloudy
Person(s) who counted:
 AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21

North Leg Total: 31,978
North Entering: 15,420
North Peds: N/A
Peds Cross: X

% Trks	11%	8%	15%
Heavys	54	703	172
Trucks	30	327	5
Cars	668	12,488	973
Total	752	13,518	1,150

Heavys 1,074
 Trucks 386
 Cars 15,098
 Total 16558

East Leg Total: 5,653
East Entering: 3,015
East Peds: N/A
Peds Cross: X

Heavys 388
 Trucks 75
 Cars 3,021
 Total 3,483

Conestoga College Blvd

% Trks	5%	9%	35%
Heavys	59	33	299
Trucks	31	2	35
Cars	1,757	353	609
Total	1,848	388	943

Homer Watson Blvd



Homer Watson Blvd

Total	Cars	Trucks	Heavys	% Trks
1,129	966	5	158	14%
590	557	2	31	6%
1,296	1,176	12	108	9%
2,699	19	298		

Conestoga College Blvd

Cars	Trucks	Heavys	Total
2,337	16	285	2,638

Peds Cross: X
West Peds: N/A
West Entering: 3,179
West leg Total: 6,662

Heavys 1,110
 Trucks 374
 Cars 14,273
 Total 15,757

Total	2,142	13,581	1,100
Cars	1,796	12,375	1,011
Trucks	44	350	9
Heavys	303	856	80
% Trks	16%	9%	8%

Peds Cross: X
South Peds: N/A
South Entering: 16,822
South leg Total: 32,580

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:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2} \quad EDT = \quad 38,437$$

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Kitchener
Intersection: Homer Watson Blvd & Conestoga College Blvd
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
Cloudy
Person(s) who counted:
AT22-AB

GeoID: 16119
Count Date: Thursday, 04-Nov-21

North Approach PHF

AM Peak: 0.88
Mid-day Peak: 0.99
PM Peak: 0.93

East Approach PHF

AM Peak: 0.83
Mid-day Peak: 0.90
PM Peak: 0.68

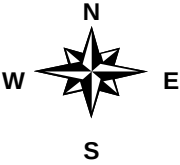
Movement			
PM	0.59	0.96	0.77
MID	0.78	0.96	0.91
AM	0.60	0.89	0.67

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

Conestoga College Blvd

Movement	PM	MID	AM
	0.81	0.83	0.86
	0.64	0.75	0.52
	0.90	0.80	0.78

Homer Watson Blvd



Homer Watson Blvd

Conestoga College Blvd

AM	MID	PM	Movement
0.71	0.85	0.76	
0.72	0.81	0.63	
0.85	0.91	0.65	



0.91	0.88	0.77	AM
0.95	0.91	0.77	MID
0.78	0.88	0.78	PM
Movement			

West Approach PHF

AM Peak: 0.79
Mid-day Peak: 0.91
PM Peak: 0.85

South Approach PHF

AM Peak: 0.89
Mid-day Peak: 0.94
PM Peak: 0.92

Comments

Intersection: Homer Watson Blvd & Conestoga Cr
GeoID: 16119
Municipality: Kitchener
Major Road: Homer Watson Blvd

Intersection Control: Signalized
Date: Thursday, 04-Nov-21
Name: AT22-AB
Weather: Cloudy

Approach Control	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Signalized			Signalized			Signalized			Signalized				
7:30 to 7:45	23	4	16	18	3	19	27	229	42	29	284	4	698	2,680
7:45 to 8:00	24	6	14	23	4	15	34	269	37	11	275	2	714	
8:00 to 8:15	31	4	6	18	8	8	37	220	25	16	235	10	618	
8:15 to 8:30	29	13	17	19	8	23	37	229	25	22	220	8	650	
8:30 to 8:45	25	8	17	14	10	15	38	210	18	25	262	15	657	
8:45 to 9:00	25	6	23	19	14	13	39	188	23	30	205	9	594	
9:00 to 9:15	17	5	21	26	13	27	34	164	18	14	206	9	554	
9:15 to 9:30	15	8	14	28	7	16	31	165	12	15	180	8	499	
9:30 to 9:45	20	6	11	19	14	15	32	154	8	23	210	15	527	
9:45 to 10:00	13	5	20	15	5	20	34	141	7	11	177	7	455	
10:00 to 10:15	28	3	21	30	14	22	30	134	5	13	169	8	477	
10:15 to 10:30	22	6	10	14	6	6	32	155	8	16	156	11	442	
AM Peak Hour 7:30 to 8:30	107	27	53	78	23	65	135	947	129	78	1,014	24	2,680	
# of trucks in peak	2	0	2	1	0	1	3	22	0	0	35	3	69	
# of heavies in peak	6	3	19	9	2	13	21	44	7	15	57	2	198	
% heavies (Total)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%	10%	

12:00 to 12:15	39	8	11	21	7	21	39	162	33	24	195	16	576	2,267
12:15 to 12:30	33	4	13	24	10	24	39	170	22	30	186	18	573	
12:30 to 12:45	31	11	19	24	12	15	36	145	19	25	186	15	538	
12:45 to 13:00	26	10	18	18	10	22	34	180	27	30	182	23	580	
13:00 to 13:15	27	8	20	15	14	15	50	159	13	16	163	18	518	
13:15 to 13:30	23	10	15	17	8	18	42	196	6	8	202	14	559	
13:30 to 13:45	35	6	22	29	17	17	49	149	21	14	205	21	585	
13:45 to 14:00	35	7	16	15	9	12	19	197	24	17	184	11	546	
Midday Peak Hour 12:00 to 13:00	129	33	61	87	39	82	148	657	101	109	749	72	2,267	
# of trucks in peak	4	0	3	0	0	0	6	17	2	0	20	2	54	
# of heavies in peak	5	2	16	6	2	8	25	66	5	9	49	5	198	
% heavies (Total)	7%	6%	31%	7%	5%	10%	21%	13%	7%	8%	9%	10%	11%	

15:00 to 15:15	36	3	25	20	9	28	27	290	28	25	280	14	785	3,185
15:15 to 15:30	26	6	12	30	12	30	44	269	22	14	275	17	757	
15:30 to 15:45	44	3	17	18	11	18	38	340	7	14	283	16	809	
15:45 to 16:00	39	15	12	35	15	16	30	318	11	28	297	18	834	
16:00 to 16:15	44	5	19	44	16	32	34	334	14	19	313	17	891	
16:15 to 16:30	42	7	18	21	16	29	35	378	15	30	326	23	940	
16:30 to 16:45	49	11	22	52	20	35	48	370	23	25	338	11	1,004	
16:45 to 17:00	53	6	21	36	10	32	65	408	25	31	365	23	1,075	
17:00 to 17:15	64	7	24	30	11	15	49	380	31	18	343	10	982	
17:15 to 17:30	42	4	19	18	9	25	42	463	18	22	357	10	1,029	
17:30 to 17:45	55	10	14	19	9	24	55	348	27	26	259	20	866	
17:45 to 18:00	47	8	15	16	8	22	51	291	18	20	251	11	758	
PM Peak Hour 16:30 to 17:30	208	28	86	136	50	107	204	1,621	97	96	1,403	54	4,090	
# of trucks in peak	4	0	1	2	0	0	3	29	1	0	15	0	55	
# of heavies in peak	4	2	13	8	2	12	15	59	7	13	44	1	180	
% heavies (Total)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%	6%	

Intersection: Homer Watson Blvd & Conestoga Col

GeoID: 16119

Municipality: Kitchener

Major Road: Homer Watson Blvd

Intersection Control: Signalized

Date: Thursday, 04-Nov-21

Name: AT22-AB

Weather: Cloudy

PEDESTRIAN CROSSING							
Time		Crossing Approach					TOTAL HOUR
		East App.	West App.	North App.	South App.	TOTAL	
7:30	to 7:45	0	0	1	1	2	18
7:45	to 8:00	0	0	1	1	2	
8:00	to 8:15	1	0	2	2	5	
8:15	to 8:30	2	1	2	4	9	
8:30	to 8:45	0	0	0	1	1	
8:45	to 9:00	0	1	0	4	5	
9:00	to 9:15	0	0	0	3	3	
9:15	to 9:30	0	1	0	1	2	
9:30	to 9:45	0	1	0	1	2	
9:45	to 10:00	1	0	0	2	3	
10:00	to 10:15	1	1	1	2	5	
10:15	to 10:30	0	0	1	1	2	
AM Peak Hour						41	
7:30	to 8:30	3	1	6	8	18	
12:00	to 12:15	0	1	0	1	2	41
12:15	to 12:30	0	9	4	6	19	
12:30	to 12:45	0	7	2	5	14	
12:45	to 13:00	1	0	5	0	6	
13:00	to 13:15	1	0	1	1	3	
13:15	to 13:30	0	0	2	1	3	
13:30	to 13:45	2	0	0	1	3	
13:45	to 14:00	0	1	1	2	4	
Midday Peak Hour						54	
12:00	to 13:00	1	17	11	12	41	
15:00	to 15:15	0	5	5	1	11	27
15:15	to 15:30	0	2	0	2	4	
15:30	to 15:45	2	1	3	1	7	
15:45	to 16:00	0	0	0	5	5	
16:00	to 16:15	0	3	3	6	12	
16:15	to 16:30	0	2	1	1	4	
16:30	to 16:45	0	0	3	2	5	
16:45	to 17:00	0	1	2	4	7	
17:00	to 17:15	1	3	3	4	11	
17:15	to 17:30	0	3	3	3	9	
17:30	to 17:45	1	0	1	1	3	
17:45	to 18:00	2	3	3	3	11	
PM Peak Hour						89	
16:30	to 17:30	1	7	11	13	32	

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period

From: 7:30 AM
To: 10:30 AM

Peak Hour

From: 7:30 AM
To: 8:30 AM

Municipality: Kitchener

Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4

Control: Signalized

Major Road: Homer Watson Blvd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 30764

Count Date: Wednesday, 29-Mar-23

North Leg Total: 3,016
North Entering: 1,282
North Peds: 0
Peds Cross: X

% Trks	18%	8%	0%	
Heavys	3	71	0	74
Trucks	2	30	0	32
Cars	23	1,153	0	1,176
Total	28	1,254	0	

Heavys 87
Trucks 39
Cars 1,608
Total 1,734

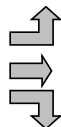
East Leg Total: 1,280
East Entering: 1,280
East Peds: 2
Peds Cross: X

Heavys 17
Trucks 8
Cars 288
Total 313



New Dundee Rd

% Trks	Heavys	Trucks	Cars	Total
6%	0	3	51	54
0%	0	0	0	0
2%	4	5	537	546
	4	8	588	



Homer Watson Blvd



Total	Cars	Trucks	Heavys	% Trks
843	768	25	50	9%
210	196	5	9	7%
227	188	6	33	17%
	1,152	36	92	

Hwy 401 WB Ramp



Cars	Trucks	Heavys	Total
0	0	0	0

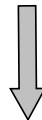
Peds Cross: X

West Peds: 0

West Entering: 600

West leg Total: 913

Heavys	108
Trucks	41
Cars	1,878
Total	2,027



Total	75	837	0	
Cars	69	789	0	858
Trucks	1	11	0	12
Heavys	5	37	0	42
% Trks	8%	6%	0%	

Peds Cross: X

South Peds: 0

South Entering: 912

South leg Total: 2,939

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 = **4,074**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **600**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

Count Period

From: 12:00 PM
To: 2:00 PM

Peak Hour

From: 12:00 PM
To: 1:00 PM

Municipality: Kitchener

Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4

Control: Signalized

Major Road: Homer Watson Blvd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 30764

Count Date: Wednesday, 29-Mar-23

North Leg Total: 1,976

North Entering: 879

North Peds: 0

Peds Cross: X

% Trks	7%	10%	0%	
Heavys	3	52	0	55
Trucks	0	31	0	31
Cars	41	752	0	793
Total	44	835	0	

Heavys	79
Trucks	30
Cars	988
Total	1,097

East Leg Total: 911

East Entering: 911

East Peds: 4

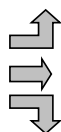
Peds Cross: X

Heavys	18
Trucks	7
Cars	360
Total	385



New Dundee Rd

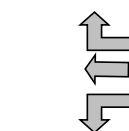
% Trks	9%	0%	4%	
Heavys	1	0	6	7
Trucks	3	0	2	5
Cars	40	0	218	258
Total	44	0	226	



Homer Watson Blvd



Homer Watson Blvd



Total	516	442	19	55	14%
Cars	229	213	5	11	7%
Trucks	166	129	3	34	22%
Heavys					
% Trks					
Total	784	27	100		

Hwy 401 WB Ramp



Cars	0
Trucks	0
Heavys	0
Total	0

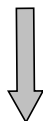
Peds Cross: X

West Peds: 0

West Entering: 270

West leg Total: 655

Heavys	92
Trucks	36
Cars	1,099
Total	1,227



Total	112	537	0	
Cars	106	506	0	612
Trucks	2	8	0	10
Heavys	4	23	0	27
% Trks	5%	6%	0%	

Peds Cross: X

South Peds: 0

South Entering: 649

South leg Total: 1,876

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 = **2,709**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **270**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period

From: 3:00 PM
To: 6:00 PM

Peak Hour

From: 4:30 PM
To: 5:30 PM

Municipality: Kitchener

Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4

Control: Signalized

Major Road: Homer Watson Blvd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 30764

Count Date: Wednesday, 29-Mar-23

North Leg Total: 2,880
North Entering: 1,187
North Peds: 0
Peds Cross: ☒

% Trks	2%	3%	0%	
Heavys	0	29	0	29
Trucks	1	6	0	7
Cars	49	1,102	0	1,151
Total	50	1,137	0	

East Leg Total: 1,719
East Entering: 1,719
East Peds: 2
Peds Cross: ☒

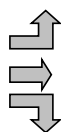
East Leg Total: 1,719
East Entering: 1,719
East Peds: 2
Peds Cross: ☒

Heavys 4 Trucks 6 Cars 825 Total 835



New Dundee Rd

% Trks	4%	0%	2%	
Heavys	2	0	5	7
Trucks	0	0	5	5
Cars	44	0	332	381
Total	46	0	339	



Homer Watson Blvd



Homer Watson Blvd



Total	913	567	239	
Cars	853	564	232	1,649
Trucks	16	2	0	18
Heavys	44	1	7	52
% Trks	7%	1%	3%	

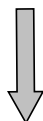
Hwy 401 WB Ramp



Cars 0 Trucks 0 Heavys 0 Total 0

Peds Cross: ☒
West Peds: 0
West Entering: 385
West leg Total: 1,220

Heavys 38 Trucks 11 Cars 1,666 Total 1,715



Total	218	734	0	
Cars	212	698	0	910
Trucks	3	8	0	11
Heavys	3	28	0	31
% Trks	3%	5%	0%	

Peds Cross: ☒
South Peds: 0
South Entering: 952
South leg Total: 2,667

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 = **4,243**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **385**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



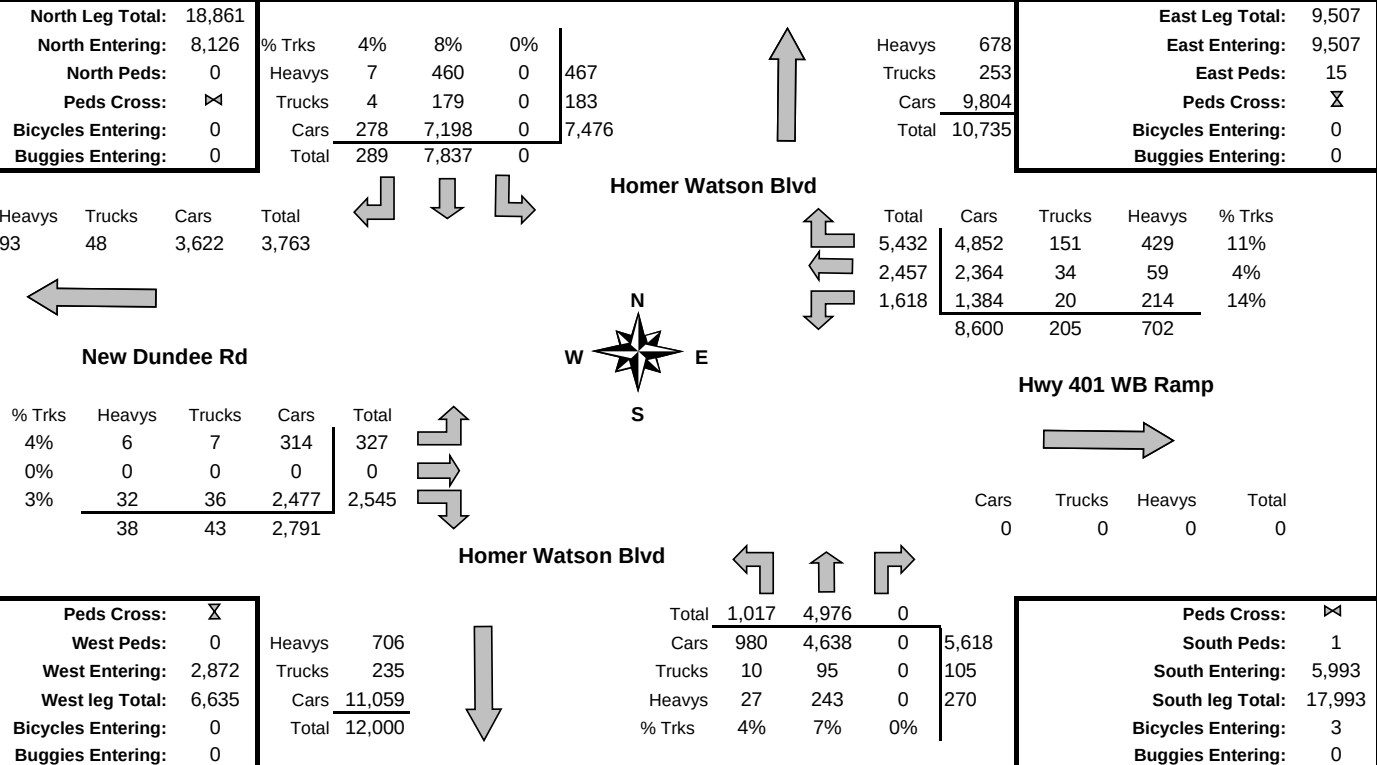
Total Count Diagram

Municipality: Kitchener
Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
 Clear/Dry

Person(s) who counted:
 Cam

GeoID: 30764
Count Date: Wednesday, 29-Mar-23



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 = **26,498**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **2,872**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

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

Municipality: Kitchener
Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4
Control: Signalized
Major Road: Homer Watson Blvd

Weather conditions:
 Clear/Dry
Person(s) who counted:
 Cam

GeoID: 30764
Count Date: Wednesday, 29-Mar-23

North Leg Total: 32,818
North Entering: 14,139
North Peds: N/A
Peds Cross: X

% Trks	4%	8%	0%	
Heavys	12	800	0	813
Trucks	7	311	0	318
Cars	484	12,525	0	13,008
Total	503	13,636	0	

Heavys: 1,180
Trucks: 440
Cars: 17,059
Total: 18,679

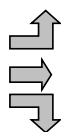
East Leg Total: 16,542
East Entering: 16,542
East Peds: N/A
Peds Cross: X

Heavys: 162
Trucks: 84
Cars: 6,302
Total: 6,548



New Dundee Rd

% Trks	4%	Heavys	10	Trucks	12	Cars	546	Total	569
	0%		0		0		0		0
	3%		56		63		4,310		4,428
			66		75		4,856		



Homer Watson Blvd



Homer Watson Blvd



Total	9,452	Cars	8,442	Trucks	263	Heavys	746	% Trks	11%
	4,275		4,113		59		103		4%
	2,815		2,408		35		372		14%
			14,964		357		1,221		

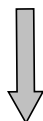
Hwy 401 WB Ramp



Cars: 0
Trucks: 0
Heavys: 0
Total: 0

Peds Cross: X
West Peds: N/A
West Entering: 4,997
West leg Total: 11,545

Heavys	1,228
Trucks	409
Cars	19,243
Total	20,880



Total	1,770	8,658	0
Cars	1,705	8,070	0
Trucks	17	165	0
Heavys	47	423	0
% Trks	4%	7%	0%
			9,775
			183
			470

Peds Cross: X
South Peds: N/A
South Entering: 10,428
South leg Total: 31,308

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:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 46,107

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Kitchener

Intersection: Homer Watston Blvd @ New Dundee Rd/Hwy 4

Control: Signalized

Major Road: Homer Watson Blvd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 30764

Count Date: Wednesday, 29-Mar-23

North Approach PHF

AM Peak: 0.95

Mid-day Peak: 0.88

PM Peak: 0.93

Movement			
PM	0.83	0.94	0.00
MID	0.61	0.90	0.00
AM	0.64	0.95	0.00

East Approach PHF

AM Peak: 0.86

Mid-day Peak: 0.92

PM Peak: 0.94

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

New Dundee Rd

Movement	PM	MID	AM
	0.58	0.92	0.90
	0.00	0.00	0.00
	0.78	0.87	0.86

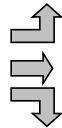
Homer Watson Blvd



AM	MID	PM	Movement
0.83	0.90	0.94	
0.91	0.92	0.96	
0.92	0.77	0.84	

Hwy 401 WB Ramp

Homer Watson Blvd



West Approach PHF

AM Peak: 0.87

Mid-day Peak: 0.90

PM Peak: 0.83

0.78	0.89	0.00	AM
0.85	0.87	0.00	MID
0.96	0.88	0.00	PM
Movement			

South Approach PHF

AM Peak: 0.88

Mid-day Peak: 0.86

PM Peak: 0.90

Comments

Intersection: Homer Watston Blvd @ New Dundee
GeoID: 30764
Municipality: Kitchener
Major Road: Homer Watson Blvd

Intersection Control: Signalized
Date: Wednesday, 29-Mar-23
Name: Cam
Weather: Clear/Dry

Approach Control	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Signalized			Signalized			Signalized			Signalized				
7:30 to 7:45	15	0	158	53	48	224	14	193	0	0	314	5	1,024	4,074
7:45 to 8:00	13	0	144	62	56	255	24	234	0	0	329	7	1,124	
8:00 to 8:15	14	0	118	60	48	199	19	220	0	0	326	11	1,015	
8:15 to 8:30	12	0	126	52	58	165	18	190	0	0	285	5	911	
8:30 to 8:45	10	0	124	66	65	159	26	172	0	0	224	5	851	
8:45 to 9:00	9	0	104	58	55	164	30	150	0	0	250	7	827	
9:00 to 9:15	7	0	79	39	46	127	20	136	0	0	228	10	692	
9:15 to 9:30	6	0	89	36	43	120	29	123	0	0	195	10	651	
9:30 to 9:45	11	0	82	52	48	129	8	119	0	0	182	5	636	
9:45 to 10:00	8	0	76	54	38	157	14	107	0	0	219	5	678	
10:00 to 10:15	17	0	39	41	40	112	8	114	0	0	222	6	599	2,564
10:15 to 10:30	6	0	55	34	35	125	12	122	0	0	191	0	580	2,493
AM Peak Hour														
7:30 to 8:30	54	0	546	227	210	843	75	837	0	0	1,254	28	4,074	
# of trucks in peak	3	0	5	6	5	25	1	11	0	0	30	2	88	
# of heavies in peak	0	0	4	33	9	50	5	37	0	0	71	3	212	
% heavies (Total)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%	7%	

12:00 to 12:15	11	0	56	54	55	111	24	139	0	0	231	18	699	2,709
12:15 to 12:30	11	0	51	25	52	132	33	155	0	0	201	5	665	
12:30 to 12:45	10	0	65	43	62	143	25	111	0	0	213	10	682	
12:45 to 13:00	12	0	54	44	60	130	30	132	0	0	190	11	663	
13:00 to 13:15	12	0	47	41	46	147	23	143	0	0	210	8	677	
13:15 to 13:30	5	0	67	46	62	127	18	115	0	0	205	13	658	
13:30 to 13:45	12	0	62	45	50	112	18	104	0	0	213	8	624	
13:45 to 14:00	16	0	57	42	49	154	28	123	0	0	185	8	662	
Midday Peak Hour														
12:00 to 13:00	44	0	226	166	229	516	112	537	0	0	835	44	2,709	
# of trucks in peak	3	0	2	3	5	19	2	8	0	0	31	0	73	
# of heavies in peak	1	0	6	34	11	55	4	23	0	0	52	3	189	
% heavies (Total)	9%	0%	4%	22%	7%	14%	5%	6%	0%	0%	10%	7%	10%	

15:00 to 15:15	11	0	77	36	83	163	44	140	0	0	257	6	817	3,582
15:15 to 15:30	8	0	58	50	90	172	32	155	0	0	292	7	864	
15:30 to 15:45	7	0	59	64	114	166	69	156	0	0	269	15	919	
15:45 to 16:00	13	0	83	55	118	187	59	174	0	0	287	6	982	
16:00 to 16:15	6	0	83	65	138	210	60	186	0	0	259	9	1,016	
16:15 to 16:30	8	0	60	59	126	220	63	200	0	0	267	10	1,013	
16:30 to 16:45	8	0	83	44	135	214	51	184	0	0	304	15	1,038	
16:45 to 17:00	10	0	80	56	147	230	57	208	0	0	281	9	1,078	
17:00 to 17:15	8	0	108	68	142	227	55	161	0	0	263	13	1,045	
17:15 to 17:30	20	0	68	71	143	242	55	181	0	0	289	13	1,082	
17:30 to 17:45	4	0	82	69	147	190	31	161	0	0	234	17	935	4,140
17:45 to 18:00	7	0	51	34	58	219	20	168	0	0	222	12	791	3,853
PM Peak Hour														
16:30 to 17:30	46	0	339	239	567	913	218	734	0	0	1,137	50	4,243	
# of trucks in peak	0	0	5	0	2	16	3	8	0	0	6	1	41	
# of heavies in peak	2	0	2	7	1	44	3	28	0	0	29	0	116	
% heavies (Total)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%	4%	

Intersection: Homer Watston Blvd @ New Dundee

GeoID: 30764

Municipality: Kitchener

Major Road: Homer Watson Blvd

Intersection Control: Signalized

Date: Wednesday, 29-Mar-23

Name: Cam

Weather: Clear/Dry

PEDESTRIAN CROSSING							
Time		Crossing Approach					TOTAL HOUR
		East App.	West App.	North App.	South App.	TOTAL	
7:30 to 7:45		0	0	0	0	0	
7:45 to 8:00		1	0	0	0	1	
8:00 to 8:15		0	0	0	0	0	
8:15 to 8:30		1	0	0	0	1	2
8:30 to 8:45		0	0	0	0	0	2
8:45 to 9:00		0	0	0	0	0	1
9:00 to 9:15		0	0	0	0	0	1
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		0	0	0	0	0	1
10:15 to 10:30		0	0	0	0	0	1
AM Peak Hour						3	
7:30 to 8:30		2	0	0	0	2	
12:00 to 12:15		2	0	0	0	2	
12:15 to 12:30		0	0	0	0	0	
12:30 to 12:45		1	0	0	0	1	
12:45 to 13:00		1	0	0	0	1	4
13:00 to 13:15		1	0	0	0	1	3
13:15 to 13:30		0	0	0	0	0	3
13:30 to 13:45		2	0	0	0	2	4
13:45 to 14:00		0	0	0	0	0	3
Midday Peak Hour						7	
12:00 to 13:00		4	0	0	0	4	
15:00 to 15:15		0	0	0	0	0	
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		0	0	0	0	0	1
16:00 to 16:15		1	0	0	0	1	2
16:15 to 16:30		0	0	0	0	0	2
16:30 to 16:45		0	0	0	0	0	1
16:45 to 17:00		1	0	0	0	1	2
17:00 to 17:15		1	0	0	0	1	2
17:15 to 17:30		0	0	0	0	0	2
17:30 to 17:45		1	0	0	0	1	3
17:45 to 18:00		0	0	0	1	1	3
PM Peak Hour						6	
16:30 to 17:30		2	0	0	0	2	

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period

From: 7:30 AM
To: 10:30 AM

Peak Hour

From: 7:30 AM
To: 8:30 AM

Municipality: Kitchener

Intersection: New Dundee Rd @ Pinnacle Dr

Control: Non Signalized

Major Road: New Dundee Rd

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

GeoID: 16097

Count Date: Tuesday, 07-Jun-22

North Leg Total: 95
North Entering: 72
North Peds: 0
Peds Cross: X

% Trks	0%	0%	0%	
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	8	0	64	72
Total	8	0	64	

Heavys 2
Trucks 1
Cars 20
Total 23

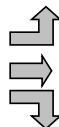
East Leg Total: 904
East Entering: 250
East Peds: 0
Peds Cross: X

Heavys 10
Trucks 6
Cars 223
Total 239



New Dundee Rd

% Trks	Heavys	Trucks	Cars	Total
25%	1	0	3	4
2%	10	3	577	590
0%	0	0	0	0
	11	3	580	



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Pinnacle Dr



Total	Cars	Trucks	Heavys	% Trks
19	17	1	1	11%
231	215	6	10	7%
0	0	0	0	0%
	232	7	11	

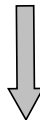
New Dundee Rd



Cars 641
Trucks 3
Heavys 10
Total 654

Peds Cross: X
West Peds: 0
West Entering: 594
West leg Total: 833

Heavys 0
Trucks 0
Cars 0
Total 0



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

Peds Cross: X
South Peds: 0
South Entering: 0
South leg Total: 0

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 = **916**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **594**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

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

Peak Hour
From: 12:15 PM
To: 1:15 PM

Municipality: Kitchener
Intersection: New Dundee Rd @ Pinnacle Dr
Control: Non Signalized
Major Road: New Dundee Rd

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Cam

GeoID: 16097
Count Date: Tuesday, 07-Jun-22

North Leg Total: 95
North Entering: 41
North Peds: 0
Peds Cross: X

% Trks	11%	0%	0%	
Heavys	0	0	0	0
Trucks	1	0	0	1
Cars	8	0	32	40
Total	9	0	32	

Heavys 0
 Trucks 1
 Cars 53
 Total 54

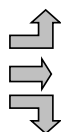
East Leg Total: 686
East Entering: 364
East Peds: 0
Peds Cross: X

Heavys 7
 Trucks 5
 Cars 316
 Total 328



New Dundee Rd

% Trks	0%	4%	0%	
Heavys	0	10	0	
Trucks	0	3	0	
Cars	9	277	0	
Total	9	290	0	



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Pinnacle Dr



Total	Cars	Trucks	Heavys	% Trks
45	44	1	0	2%
319	308	4	7	3%
0	0	0	0	0%
	352	5	7	

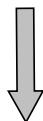
New Dundee Rd



Cars 309
 Trucks 3
 Heavys 10
 Total 322

Peds Cross: X
West Peds: 0
West Entering: 299
West leg Total: 627

Heavys 0
 Trucks 0
 Cars 0
 Total 0



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

Peds Cross: X
South Peds: 0
South Entering: 0
South leg Total: 0

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 = **704**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **299**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period

From: 3:00 PM
To: 6:00 PM

Peak Hour

From: 4:30 PM
To: 5:30 PM

Municipality: Kitchener

Intersection: New Dundee Rd @ Pinnacle Dr

Control: Non Signalized

Major Road: New Dundee Rd

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

GeoID: 16097

Count Date: Tuesday, 07-Jun-22

North Leg Total: 172
North Entering: 64
North Peds: 0
Peds Cross: X

% Trks	0%	0%	0%	
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	12	0	52	64
Total	12	0	52	

Heavys 0
Trucks 1
Cars 107
Total 108

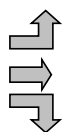
East Leg Total: 1,414
East Entering: 907
East Peds: 0
Peds Cross: X

Heavys 7
Trucks 7
Cars 808
Total 822



New Dundee Rd

% Trks	0%	3%	0%	
Heavys	0	8	0	
Trucks	0	5	0	
Cars	11	442	0	
Total	11	455	0	



na

Pinnacle Dr



Total	Cars	Trucks	Heavys	% Trks
97	96	1	0	1%
810	796	7	7	2%
0	0	0	0	0%
892	8	7		

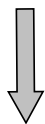
New Dundee Rd



Cars 494
Trucks 5
Heavys 8
Total 507

Peds Cross: X
West Peds: 0
West Entering: 466
West leg Total: 1,288

Heavys 0
Trucks 0
Cars 0
Total 0



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

Peds Cross: X
South Peds: 0
South Entering: 0
South leg Total: 0

Comments

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

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,437**

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

Therefore, vehicles entering from the west = **466**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Kitchener

Intersection: New Dundee Rd @ Pinnacle Dr

Control: Non Signalized

Major Road: New Dundee Rd

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

GeoID: 16097

Count Date: Tuesday, 07-Jun-22

North Leg Total: 847

North Entering: 399

North Peds: 0

Peds Cross: X

Bicycles Entering: 1

Buggies Entering: 0

% Trks	5%	0%	1%	
Heavys	2	0	1	3
Trucks	1	0	2	3
Cars	61	0	332	393
Total	64	0	335	

Heavys	5
Trucks	6
Cars	437
Total	448

East Leg Total: 7,666

East Entering: 4,199

East Peds: 0

Peds Cross: X

Bicycles Entering: 2

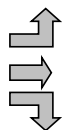
Buggies Entering: 0

Heavys	87
Trucks	46
Cars	3,740
Total	3,873



New Dundee Rd

% Trks	2%	3%	0%	
Heavys	1	70	0	58
Trucks	0	32	0	3,132
Cars	0	0	0	0
Total	71	32	0	3,087



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

Total	390	380	6	4	3%
Cars	3,809	3,679	45	85	3%
Trucks	0	0	0	0	0%
Heavys	4,059	51	89		

New Dundee Rd



Cars	3,362
Trucks	34
Heavys	71
Total	3,467

Peds Cross: X

West Peds: 0

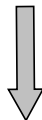
West Entering: 3,190

West leg Total: 7,063

Bicycles Entering: 3

Buggies Entering: 0

Heavys	0
Trucks	0
Cars	0
Total	0



Peds Cross: X

South Peds: 0

South Entering: 0

South leg Total: 0

Bicycles Entering: 0

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 = **7,788**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **3,190**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

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

Municipality: Kitchener

Intersection: New Dundee Rd @ Pinnacle Dr

Control: Non Signalized

Major Road: New Dundee Rd

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

GeoID: 16097

Count Date: Tuesday, 07-Jun-22

North Leg Total: 1,474

North Entering: 694

North Peds: N/A

Peds Cross: X

% Trks	5%	0%	1%	
Heavys	3	0	2	5
Trucks	2	0	3	5
Cars	106	0	578	684
Total	111	0	583	

Heavys	9
Trucks	10
Cars	760
Total	780

East Leg Total: 13,339

East Entering: 7,306

East Peds: N/A

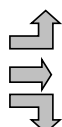
Peds Cross: X

Heavys	151
Trucks	80
Cars	6,508
Total	6,739



New Dundee Rd

% Trks	2%	3%	0%	
Heavys	2	122	0	101
Trucks	0	56	0	5,450
Cars	99	5,272	0	0
Total	124	56	5,371	



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

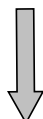
Peds Cross: X

West Peds: N/A

West Entering: 5,551

West leg Total: 12,290

Heavys	0
Trucks	0
Cars	0
Total	0



Total	679	Cars	661	Trucks	10	Heavys	7	% Trks	3%
	6,628		6,401		78		148		3%
	0		0		0		0		0%
			7,063		89		155		

New Dundee Rd



Cars	5,850
Trucks	59
Heavys	124
Total	6,033

Peds Cross: X

South Peds: N/A

South Entering: 0

South leg Total: 0

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:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$

EDT = 13,551

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Kitchener

Intersection: New Dundee Rd @ Pinnacle Dr

Control: Non Signalized

Major Road: New Dundee Rd

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

GeoID: 16097

Count Date: Tuesday, 07-Jun-22

North Approach PHF

AM Peak: 0.78

Mid-day Peak: 0.73

PM Peak: 0.80

Movement			
PM	0.60	0.00	0.72
MID	0.75	0.00	0.73
AM	0.50	0.00	0.84

East Approach PHF

AM Peak: 0.87

Mid-day Peak: 0.89

PM Peak: 0.95

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

New Dundee Rd

Movement	PM	MID	AM
	0.69	0.75	0.50
	0.90	0.87	0.88
	0.00	0.00	0.00

Pinnacle Dr



AM	MID	PM	Movement
0.68	0.70	0.69	
0.89	0.88	0.96	
0.00	0.00	0.00	

New Dundee Rd



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West Approach PHF

AM Peak: 0.87

Mid-day Peak: 0.87

PM Peak: 0.90

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

South Approach PHF

AM Peak: 0.00

Mid-day Peak: 0.00

PM Peak: 0.00

Comments

Intersection: New Dundee Rd @ Pinnacle Dr
GeoID: 16097
Municipality: Kitchener
Major Road: New Dundee Rd

Intersection Control: Non Signalized
Date: Tuesday, 07-Jun-22
Name: Cam
Weather: Overcast/Wet

Approach Control	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Free Flow			Free Flow			N/A			Stop Control				
7:30 to 7:45	2	168	0	0	64	5	0	0	0	19	0	4	262	916
7:45 to 8:00	2	159	0	0	58	2	0	0	0	18	0	2	241	
8:00 to 8:15	0	121	0	0	65	7	0	0	0	16	0	2	211	
8:15 to 8:30	0	142	0	0	44	5	0	0	0	11	0	0	202	
8:30 to 8:45	2	145	0	0	82	7	0	0	0	14	0	3	253	
8:45 to 9:00	3	121	0	0	64	3	0	0	0	10	0	0	201	
9:00 to 9:15	3	87	0	0	60	4	0	0	0	14	0	3	171	
9:15 to 9:30	0	114	0	0	75	9	0	0	0	9	0	0	207	
9:30 to 9:45	0	83	0	0	61	3	0	0	0	10	0	1	158	
9:45 to 10:00	2	90	0	0	71	8	0	0	0	8	0	0	179	
10:00 to 10:15	1	72	0	0	64	6	0	0	0	15	0	4	162	
10:15 to 10:30	1	59	0	0	58	7	0	0	0	5	0	1	131	
AM Peak Hour														
7:30 to 8:30	4	590	0	0	231	19	0	0	0	64	0	8	916	
# of trucks in peak	0	3	0	0	6	1	0	0	0	0	0	0	10	
# of heavies in peak	1	10	0	0	10	1	0	0	0	0	0	0	22	
% heavies (Total)	25%	2%	0%	0%	7%	11%	0%	0%	0%	0%	0%	0%	3%	

12:00 to 12:15	1	67	0	0	78	7	0	0	0	5	0	3	161	701
12:15 to 12:30	0	67	0	0	85	11	0	0	0	8	0	1	172	
12:30 to 12:45	3	83	0	0	91	11	0	0	0	6	0	2	196	
12:45 to 13:00	3	58	0	0	85	16	0	0	0	7	0	3	172	
13:00 to 13:15	3	82	0	0	58	7	0	0	0	11	0	3	164	
13:15 to 13:30	2	54	0	0	63	7	0	0	0	9	0	1	136	
13:30 to 13:45	1	95	0	0	68	9	0	0	0	10	0	1	184	
13:45 to 14:00	0	76	0	0	84	10	0	0	0	10	0	2	182	
Midday Peak Hour														
12:15 to 13:15	9	290	0	0	319	45	0	0	0	32	0	9	704	
# of trucks in peak	0	3	0	0	4	1	0	0	0	0	0	1	9	
# of heavies in peak	0	10	0	0	7	0	0	0	0	0	0	0	17	
% heavies (Total)	0%	4%	0%	0%	3%	2%	0%	0%	0%	0%	0%	11%	4%	

15:00 to 15:15	1	68	0	0	215	12	0	0	0	11	0	2	309	1,309
15:15 to 15:30	6	87	0	0	201	20	0	0	0	11	0	2	327	
15:30 to 15:45	1	88	0	0	210	22	0	0	0	8	0	2	331	
15:45 to 16:00	4	103	0	0	204	21	0	0	0	6	0	4	342	
16:00 to 16:15	1	91	0	0	217	13	0	0	0	9	0	2	333	
16:15 to 16:30	3	98	0	0	202	17	0	0	0	7	0	1	328	
16:30 to 16:45	0	127	0	0	211	23	0	0	0	10	0	3	374	
16:45 to 17:00	4	97	0	0	204	21	0	0	0	12	0	2	340	
17:00 to 17:15	3	126	0	0	192	18	0	0	0	12	0	5	356	
17:15 to 17:30	4	105	0	0	203	35	0	0	0	18	0	2	367	
17:30 to 17:45	1	117	0	0	194	20	0	0	0	7	0	2	341	1,404
17:45 to 18:00	1	82	0	0	178	24	0	0	0	9	0	1	295	1,359
PM Peak Hour														
16:30 to 17:30	11	455	0	0	810	97	0	0	0	52	0	12	1,437	
# of trucks in peak	0	5	0	0	7	1	0	0	0	0	0	0	13	
# of heavies in peak	0	8	0	0	7	0	0	0	0	0	0	0	15	
% heavies (Total)	0%	3%	0%	0%	2%	1%	0%	0%	0%	0%	0%	0%	2%	

Intersection: New Dundee Rd @ Pinnacle Dr
GeoID: 16097
Municipality: Kitchener
Major Road: New Dundee Rd

Intersection Control: Non Signalized
Date: Tuesday, 07-Jun-22
Name: Cam
Weather: Overcast/Wet

PEDESTRIAN CROSSING							
Time		Crossing Approach					TOTAL HOUR
		East App.	West App.	North App.	South App.	TOTAL	
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		0	0	0	0	0	0
10:00 to 10:15		0	0	0	0	0	0
10:15 to 10:30		0	0	0	0	0	0
AM Peak Hour						0	
7:30 to 8:30		0	0	0	0	0	
12:00 to 12:15		0	0	0	0	0	
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	0
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						0	
12:15 to 13:15		0	0	0	0	0	
15:00 to 15:15		0	0	0	0	0	
15:15 to 15:30		0	0	0	0	0	
15:30 to 15:45		0	0	0	0	0	
15:45 to 16:00		0	0	0	0	0	0
16:00 to 16:15		0	0	0	0	0	0
16:15 to 16:30		0	0	0	0	0	0
16:30 to 16:45		0	0	0	0	0	0
16:45 to 17:00		0	0	0	0	0	0
17:00 to 17:15		0	0	0	0	0	0
17:15 to 17:30		0	0	0	0	0	0
17:30 to 17:45		0	0	0	0	0	0
17:45 to 18:00		0	0	0	0	0	0
PM Peak Hour						0	
16:30 to 17:30		0	0	0	0	0	

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

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

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

Municipality: Kitchener
Intersection: New Dundee Rd @ Robert Ferrie Dr
Control: Signalized
Major Road: New Dundee Rd

Weather conditions:
 Clear/Dry
Person(s) who counted:
 Cam

GeoID: 32185
Count Date: Wednesday, 29-Mar-23

North Leg Total: 622
North Entering: 462
North Peds: 0
Peds Cross: X

% Trks	3%	0%	1%	
Heavys	3	0	3	6
Trucks	1	0	1	2
Cars	127	0	327	454
Total	131	0	331	

Heavys 9
 Trucks 0
 Cars 151
 Total 160

East Leg Total: 963
East Entering: 286
East Peds: 0
Peds Cross: X

Heavys 10
 Trucks 9
 Cars 302
 Total 321

Robert Ferrie Dr

Total	Cars	Trucks	Heavys	% Trks
96	89	0	7	7%
190	175	8	7	8%
0	0	0	0	0%
	264	8	14	

New Dundee Rd



% Trks	Heavys	Trucks	Cars	Total
3%	2	0	62	64
3%	3	9	334	346
0%	0	0	0	0
	5	9	396	

New Dundee Rd

Cars 661
 Trucks 10
 Heavys 6
 Total 677

Peds Cross: X
West Peds: 0
West Entering: 410
West leg Total: 731

Heavys 0
 Trucks 0
 Cars 0
 Total 0

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

Peds Cross: X
South Peds: 0
South Entering: 0
South leg Total: 0

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 = **1,158**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **410**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



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: Kitchener
Intersection: New Dundee Rd @ Robert Ferrie Dr
Control: Signalized
Major Road: New Dundee Rd

Weather conditions:
 Clear/Dry
Person(s) who counted:
 Cam

GeoID: 32185
Count Date: Wednesday, 29-Mar-23

North Leg Total: 371
North Entering: 182
North Peds: 0
Peds Cross: X

	% Trks	6%	0%	3%	
Heavys	0	0	4	4	
Trucks	3	0	0	3	
Cars	49	0	126	175	
Total	52	0	130		

Heavys: 3
Trucks: 1
Cars: 185
Total: 189

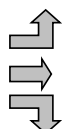
East Leg Total: 631
East Entering: 351
East Peds: 0
Peds Cross: X

Heavys: 11
Trucks: 8
Cars: 243
Total: 262



New Dundee Rd

% Trks	Heavys	Trucks	Cars	Total
2%	0	1	47	48
3%	3	2	145	150
0%	0	0	0	0
	3	3	192	



na

Robert Ferrie Dr



Total	Cars	Trucks	Heavys	% Trks
141	138	0	3	2%
210	194	5	11	8%
0	0	0	0	0%
	332	5	14	

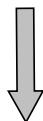
New Dundee Rd



Cars: 271
Trucks: 2
Heavys: 7
Total: 280

Peds Cross: X
West Peds: 0
West Entering: 198
West leg Total: 460

Heavys: 0
Trucks: 0
Cars: 0
Total: 0



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

Peds Cross: X
South Peds: 0
South Entering: 0
South leg Total: 0

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 = **731**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **198**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period

From: 3:00 PM
To: 6:00 PM

Peak Hour

From: 4:15 PM
To: 5:15 PM

Municipality: Kitchener

Intersection: New Dundee Rd @ Robert Ferrie Dr

Control: Signalized

Major Road: New Dundee Rd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 32185

Count Date: Wednesday, 29-Mar-23

North Leg Total: 654
North Entering: 253
North Peds: 0
Peds Cross: X

	% Trks	2%	0%	2%	
Heavys	0	0	3	3	
Trucks	2	0	0	2	
Cars	89	0	159	248	
Total	91	0	162		

Heavys: 3
Trucks: 0
Cars: 398
Total: 401

East Leg Total: 1,121
East Entering: 745
East Peds: 0
Peds Cross: X

Heavys: 3
Trucks: 6
Cars: 531
Total: 540



New Dundee Rd

% Trks	Heavys	Trucks	Cars	Total
1%	1	0	104	105
3%	4	2	208	214
0%	0	0	0	0
	5	2	312	

Robert Ferrie Dr



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Total	Cars	Trucks	Heavys	% Trks
296	294	0	2	1%
449	442	4	3	2%
0	0	0	0	0%
	736	4	5	

New Dundee Rd



Cars: 367
Trucks: 2
Heavys: 7
Total: 376

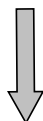
Peds Cross: X

West Peds: 0

West Entering: 319

West leg Total: 859

Heavys: 0
Trucks: 0
Cars: 0
Total: 0



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

Peds Cross: X

South Peds: 0

South Entering: 0

South leg Total: 0

Comments

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

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,317**

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

Therefore, vehicles entering from the west = **319**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Kitchener

Intersection: New Dundee Rd @ Robert Ferrie Dr

Control: Signalized

Major Road: New Dundee Rd

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

GeoID: 32185

Count Date: Wednesday, 29-Mar-23

North Leg Total: 3,890

North Entering: 1,988

North Peds: 1

Peds Cross: X

Bicycles Entering: 0

Buggies Entering: 0

% Trks	5%	0%	2%	
Heavys	13	0	26	39
Trucks	16	0	4	20
Cars	610	0	1,319	1,929
Total	639	0	1,349	

Heavys	38
Trucks	15
Cars	1,849
Total	1,902

East Leg Total: 6,482

East Entering: 3,455

East Peds: 5

Peds Cross: X

Bicycles Entering: 2

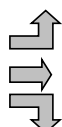
Buggies Entering: 0

Heavys	65
Trucks	61
Cars	2,611
Total	2,737

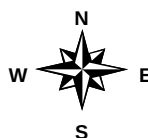


New Dundee Rd

% Trks	3%	4%	0%	
Heavys	8	28	0	36
Trucks	8	39	0	47
Cars	529	1,611	0	2,140
Total	545	1,678	0	



Robert Ferrie Dr



Total	1,357	2,098	0	
Cars	1,320	2,001	0	3,321
Trucks	7	45	0	52
Heavys	30	52	0	82
% Trks	3%	5%	0%	

New Dundee Rd



Cars	2,930
Trucks	43
Heavys	54
Total	3,027

Peds Cross: X

West Peds: 1

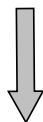
West Entering: 2,223

West leg Total: 4,960

Bicycles Entering: 0

Buggies Entering: 0

Heavys	0
Trucks	0
Cars	0
Total	0



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

Peds Cross: X

South Peds: 0

South Entering: 0

South leg Total: 0

Bicycles Entering: 0

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 = **7,666**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,223**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

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

Municipality: Kitchener
Intersection: New Dundee Rd @ Robert Ferrie Dr
Control: Signalized
Major Road: New Dundee Rd

Weather conditions:
 Clear/Dry
Person(s) who counted:
 Cam

GeoID: 32185
Count Date: Wednesday, 29-Mar-23

North Leg Total:	6,769	% Trks	5%	0%	2%	
North Entering:	3,459	Heavys	23	0	45	68
North Peds:	N/A	Trucks	28	0	7	35
Peds Cross:	⌵	Cars	1,061	0	2,295	3,356
		Total	1,112	0	2,347	

Heavys	66
Trucks	26
Cars	3,217
Total	3309

East Leg Total:	11,279
East Entering:	6,012
East Peds:	N/A
Peds Cross:	⌵

Heavys	113
Trucks	106
Cars	4,543
Total	4,762

Robert Ferrie Dr

Total	2,361	Cars	2,297	Trucks	12	Heavys	52	% Trks	3%
	3,651		3,482		78		90		5%
	0		0		0		0		0%
			5,779		90		143		

New Dundee Rd

% Trks	3%	Heavys	14	Trucks	14	Cars	920	Total	948
	4%		49		68		2,803		2,920
	0%		0		0		0		0
			63		82		3,724		



New Dundee Rd

Cars	5,098	Trucks	75	Heavys	94	Total	5,267
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Peds Cross: ⌵
West Peds: N/A
West Entering: 3,868
West leg Total: 8,630

Heavys	0
Trucks	0
Cars	0
Total	0

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

Peds Cross: ⌵
South Peds: N/A
South Entering: 0
South leg Total: 0

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:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 13,339

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Kitchener
Intersection: New Dundee Rd @ Robert Ferrie Dr
Control: Signalized
Major Road: New Dundee Rd

Weather conditions:
 Clear/Dry
Person(s) who counted:
 Cam

GeoID: 32185
Count Date: Wednesday, 29-Mar-23

North Approach PHF

AM Peak: 0.81
 Mid-day Peak: 0.91
 PM Peak: 0.94

Movement			
PM	0.84	0.00	0.86
MID	0.81	0.00	0.81
AM	0.80	0.00	0.78

East Approach PHF

AM Peak: 0.89
 Mid-day Peak: 0.93
 PM Peak: 0.92

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

New Dundee Rd

Movement	PM	MID	AM
	0.63	0.92	0.73
	0.85	0.85	0.88
	0.00	0.00	0.00

Robert Ferrie Dr



AM	MID	PM	Movement
0.77	0.86	0.91	
0.93	0.86	0.91	
0.00	0.00	0.00	

New Dundee Rd



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West Approach PHF

AM Peak: 0.88
 Mid-day Peak: 0.88
 PM Peak: 0.79

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

South Approach PHF

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

Comments

Intersection: New Dundee Rd @ Robert Ferrie Dr
GeoID: 32185
Municipality: Kitchener
Major Road: New Dundee Rd

Intersection Control: Signalized
Date: Wednesday, 29-Mar-23
Name: Cam
Weather: Clear/Dry

<i>Approach Control</i>	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	<i>Signalized</i>			<i>Signalized</i>			<i>N/A</i>			<i>Signalized</i>				
7:30 to 7:45	8	97	0	0	48	13	0	0	0	106	0	37	309	1,158
7:45 to 8:00	19	98	0	0	50	23	0	0	0	82	0	41	313	
8:00 to 8:15	15	66	0	0	51	29	0	0	0	81	0	28	270	
8:15 to 8:30	22	85	0	0	41	31	0	0	0	62	0	25	266	
8:30 to 8:45	10	84	0	0	53	25	0	0	0	68	0	30	270	
8:45 to 9:00	14	44	0	0	63	26	0	0	0	56	0	19	222	
9:00 to 9:15	20	52	0	0	35	25	0	0	0	44	0	19	195	
9:15 to 9:30	6	56	0	0	44	27	0	0	0	44	0	21	198	
9:30 to 9:45	5	55	0	0	29	16	0	0	0	39	0	15	159	
9:45 to 10:00	7	50	0	0	40	22	0	0	0	45	0	13	177	
10:00 to 10:15	9	41	0	0	40	12	0	0	0	25	0	12	139	673
10:15 to 10:30	14	26	0	0	42	19	0	0	0	43	0	18	162	637
AM Peak Hour														
7:30 to 8:30	64	346	0	0	190	96	0	0	0	331	0	131	1,158	
# of trucks in peak	0	9	0	0	8	0	0	0	0	1	0	1	19	
# of heavies in peak	2	3	0	0	7	7	0	0	0	3	0	3	25	
% heavies (Total)	3%	3%	0%	0%	8%	7%	0%	0%	0%	1%	0%	3%	4%	

12:00 to 12:15	16	44	0	0	45	35	0	0	0	25	0	19	184	706
12:15 to 12:30	11	35	0	0	47	33	0	0	0	26	0	6	158	
12:30 to 12:45	11	36	0	0	53	41	0	0	0	34	0	16	191	
12:45 to 13:00	12	29	0	0	61	33	0	0	0	25	0	13	173	
13:00 to 13:15	12	44	0	0	42	36	0	0	0	40	0	9	183	
13:15 to 13:30	13	41	0	0	54	31	0	0	0	31	0	14	184	
13:30 to 13:45	10	43	0	0	55	24	0	0	0	20	0	19	171	
13:45 to 14:00	7	47	0	0	39	34	0	0	0	24	0	9	160	698
Midday Peak Hour														
12:30 to 13:30	48	150	0	0	210	141	0	0	0	130	0	52	731	
# of trucks in peak	1	2	0	0	5	0	0	0	0	0	0	3	11	
# of heavies in peak	0	3	0	0	11	3	0	0	0	4	0	0	21	
% heavies (Total)	2%	3%	0%	0%	8%	2%	0%	0%	0%	3%	0%	6%	4%	

15:00 to 15:15	28	52	0	0	98	54	0	0	0	33	0	18	283	1,116
15:15 to 15:30	19	39	0	0	68	54	0	0	0	29	0	14	223	
15:30 to 15:45	22	46	0	0	95	71	0	0	0	28	0	20	282	
15:45 to 16:00	24	57	0	0	110	63	0	0	0	41	0	33	328	
16:00 to 16:15	32	45	0	0	109	64	0	0	0	34	0	18	302	
16:15 to 16:30	15	39	0	0	122	81	0	0	0	41	0	26	324	
16:30 to 16:45	42	59	0	0	123	68	0	0	0	36	0	27	355	
16:45 to 17:00	27	63	0	0	105	70	0	0	0	38	0	19	322	
17:00 to 17:15	21	53	0	0	99	77	0	0	0	47	0	19	316	
17:15 to 17:30	25	51	0	0	95	76	0	0	0	27	0	18	292	
17:30 to 17:45	25	44	0	0	89	90	0	0	0	35	0	27	310	1,240
17:45 to 18:00	24	57	0	0	53	54	0	0	0	40	0	17	245	1,163
PM Peak Hour														
16:15 to 17:15	105	214	0	0	449	296	0	0	0	162	0	91	1,317	
# of trucks in peak	0	2	0	0	4	0	0	0	0	0	0	2	8	
# of heavies in peak	1	4	0	0	3	2	0	0	0	3	0	0	13	
% heavies (Total)	1%	3%	0%	0%	2%	1%	0%	0%	0%	2%	0%	2%	2%	

Intersection: New Dundee Rd @ Robert Ferrie Dr
GeoID: 32185
Municipality: Kitchener
Major Road: New Dundee Rd

Intersection Control: Signalized
Date: Wednesday, 29-Mar-23
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING							
Time		Crossing Approach					TOTAL HOUR
		East App.	West App.	North App.	South App.	TOTAL	
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		2	0	0	0	2	2
9:15 to 9:30		0	0	0	0	0	2
9:30 to 9:45		0	0	0	0	0	2
9:45 to 10:00		0	0	0	0	0	2
10:00 to 10:15		0	0	0	0	0	0
10:15 to 10:30		0	0	0	0	0	0
AM Peak Hour						2	
7:30 to 8:30		0	0	0	0	0	
12:00 to 12:15		1	0	1	0	2	
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	2
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						2	
12:30 to 13:30		0	0	0	0	0	
15:00 to 15:15		2	1	0	0	3	
15:15 to 15:30		0	0	0	0	0	
15:30 to 15:45		0	0	0	0	0	
15:45 to 16:00		0	0	0	0	0	3
16:00 to 16:15		0	0	0	0	0	0
16:15 to 16:30		0	0	0	0	0	0
16:30 to 16:45		0	0	0	0	0	0
16:45 to 17:00		0	0	0	0	0	0
17:00 to 17:15		0	0	0	0	0	0
17:15 to 17:30		0	0	0	0	0	0
17:30 to 17:45		0	0	0	0	0	0
17:45 to 18:00		0	0	0	0	0	0
PM Peak Hour						3	
16:15 to 17:15		0	0	0	0	0	



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: New Dundee Road & Reidel Drive
Site Code: 230070
Start Date: 05/31/2023
Page No: 1

Turning Movement Data

Start Time	New Dundee Road Eastbound						New Dundee Road Westbound						Cameron Road Northbound						Reidel Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	51	9	0	0	62	4	34	1	0	0	39	17	3	0	0	0	20	3	5	2	0	1	10	131
7:15 AM	2	66	19	0	0	87	3	34	0	0	0	37	10	7	0	0	0	17	4	8	2	0	0	14	155
7:30 AM	3	76	16	0	0	95	4	47	1	0	0	52	10	3	3	0	0	16	4	14	6	0	0	24	187
7:45 AM	3	72	24	0	0	99	1	51	1	0	0	53	12	10	8	0	0	30	1	7	3	0	0	11	193
Hourly Total	10	265	68	0	0	343	12	166	3	0	0	181	49	23	11	0	0	83	12	34	13	0	1	59	666
8:00 AM	3	89	20	0	0	112	3	58	3	0	0	64	12	3	5	0	0	20	4	7	0	0	0	11	207
8:15 AM	2	73	22	0	0	97	5	53	5	0	0	63	11	7	8	0	0	26	3	13	3	0	0	19	205
8:30 AM	6	72	16	0	0	94	4	58	3	0	0	65	9	6	3	0	0	18	0	4	4	0	0	8	185
8:45 AM	3	57	12	0	0	72	4	52	1	0	0	57	6	8	4	0	0	18	1	8	7	0	0	16	163
Hourly Total	14	291	70	0	0	375	16	221	12	0	0	249	38	24	20	0	0	82	8	32	14	0	0	54	760
9:00 AM	5	53	13	0	0	71	5	41	0	0	0	46	7	5	5	0	0	17	1	0	5	0	0	6	140
9:15 AM	1	43	7	0	0	51	4	33	2	0	0	39	10	1	5	0	0	16	2	4	3	0	0	9	115
9:30 AM	3	44	6	0	0	53	4	48	1	0	0	53	8	3	2	0	0	13	2	8	4	0	0	14	133
9:45 AM	2	35	12	0	0	49	8	42	0	0	0	50	8	2	4	0	0	14	3	2	2	0	0	7	120
Hourly Total	11	175	38	0	0	224	21	164	3	0	0	188	33	11	16	0	0	60	8	14	14	0	0	36	508
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	2	43	12	0	0	57	5	32	1	0	0	38	8	2	0	0	0	10	0	2	1	0	0	3	108
11:45 AM	3	32	3	0	0	38	5	35	0	0	0	40	10	3	3	0	0	16	0	4	7	0	0	11	105
Hourly Total	5	75	15	0	0	95	10	67	1	0	0	78	18	5	3	0	0	26	0	6	8	0	0	14	213
12:00 PM	1	28	3	0	0	32	1	34	1	0	0	36	6	7	5	0	0	18	0	2	4	0	0	6	92
12:15 PM	2	37	8	0	0	47	3	45	1	0	0	49	8	0	3	0	0	11	2	2	2	0	0	6	113
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	65	11	0	0	79	4	79	2	0	0	85	14	7	8	0	0	29	2	4	6	0	0	12	205
2:00 PM	4	44	6	0	0	54	2	53	1	0	0	56	9	22	3	0	0	34	0	1	2	0	0	3	147
2:15 PM	1	46	9	0	0	56	6	56	5	0	0	67	12	6	5	0	0	23	1	3	4	0	0	8	154
2:30 PM	1	51	6	0	0	58	3	54	2	0	0	59	12	4	4	0	0	20	1	4	5	0	0	10	147
2:45 PM	5	44	8	0	0	57	4	74	5	0	0	83	13	4	5	0	0	22	2	3	4	0	0	9	171
Hourly Total	11	185	29	0	0	225	15	237	13	0	0	265	46	36	17	0	0	99	4	11	15	0	0	30	619
3:00 PM	5	77	9	0	0	91	3	74	6	0	0	83	16	7	4	0	0	27	2	6	1	0	0	9	210
3:15 PM	5	55	15	0	0	75	1	76	2	0	0	79	8	3	2	0	0	13	1	6	0	0	0	7	174
3:30 PM	3	64	16	0	0	83	6	69	5	0	0	80	13	8	4	0	0	25	0	1	1	0	0	2	190
3:45 PM	1	44	23	0	0	68	2	89	4	0	0	95	15	12	6	0	0	33	4	3	10	0	0	17	213
Hourly Total	14	240	63	0	0	317	12	308	17	0	0	337	52	30	16	0	0	98	7	16	12	0	0	35	787
4:00 PM	6	53	18	0	0	77	8	88	5	0	0	101	11	12	1	0	0	24	2	8	6	0	0	16	218
4:15 PM	3	64	11	0	0	78	3	120	2	0	0	125	22	14	3	0	0	39	1	5	6	0	0	12	254

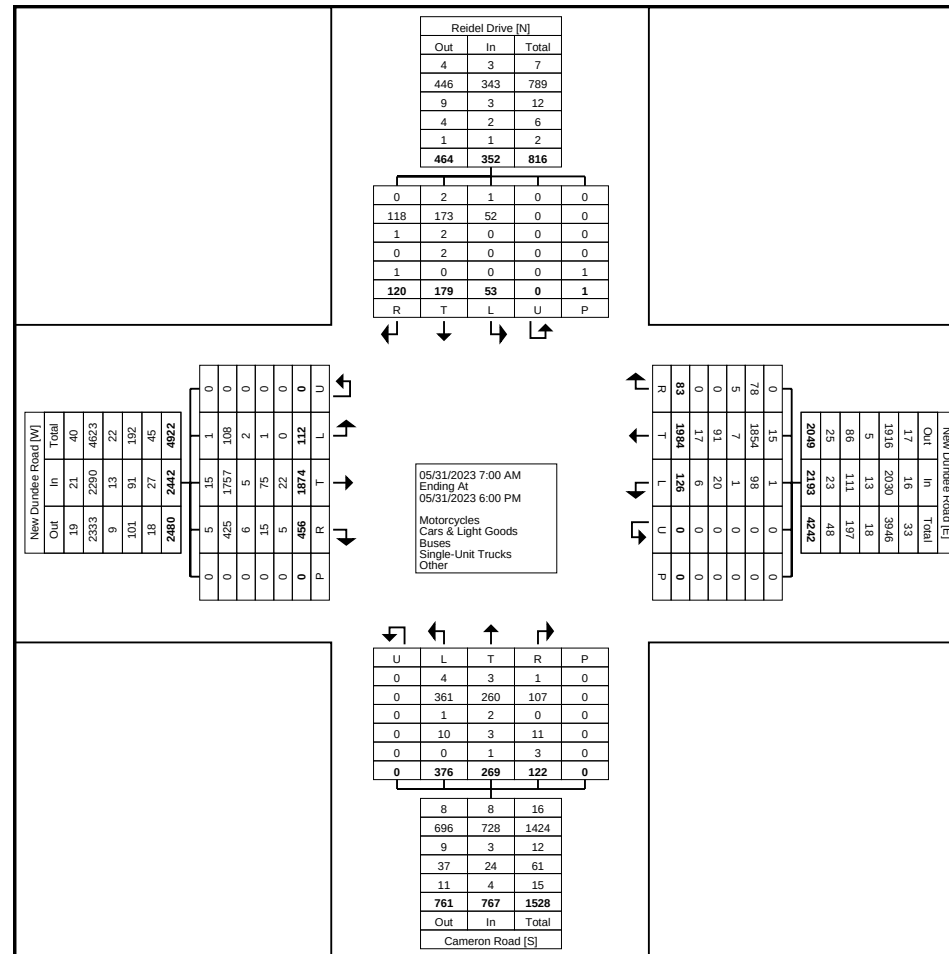
4:30 PM	5	73	21	0	0	99	2	93	5	0	0	100	15	19	4	0	0	38	0	7	2	0	0	9	246
4:45 PM	5	72	19	0	0	96	5	82	5	0	0	92	18	20	7	0	0	45	1	6	8	0	0	15	248
Hourly Total	19	262	69	0	0	350	18	383	17	0	0	418	66	65	15	0	0	146	4	26	22	0	0	52	966
5:00 PM	10	98	23	0	0	131	2	100	8	0	0	110	11	15	3	0	0	29	0	13	2	0	0	15	285
5:15 PM	8	72	29	0	0	109	10	73	3	0	0	86	25	19	7	0	0	51	1	10	4	0	0	15	261
5:30 PM	2	80	18	0	0	100	3	113	2	0	0	118	14	21	2	0	0	37	2	5	5	0	0	12	267
5:45 PM	5	66	23	0	0	94	3	73	2	0	0	78	10	13	4	0	0	27	5	8	5	0	0	18	217
Hourly Total	25	316	93	0	0	434	18	359	15	0	0	392	60	68	16	0	0	144	8	36	16	0	0	60	1030
Grand Total	112	1874	456	0	0	2442	126	1984	83	0	0	2193	376	269	122	0	0	767	53	179	120	0	1	352	5754
Approach %	4.6	76.7	18.7	0.0	-	-	5.7	90.5	3.8	0.0	-	-	49.0	35.1	15.9	0.0	-	-	15.1	50.9	34.1	0.0	-	-	-
Total %	1.9	32.6	7.9	0.0	-	42.4	2.2	34.5	1.4	0.0	-	38.1	6.5	4.7	2.1	0.0	-	13.3	0.9	3.1	2.1	0.0	-	6.1	-
Motorcycles	1	15	5	0	-	21	1	15	0	0	-	16	4	3	1	0	-	8	1	2	0	0	-	3	48
% Motorcycles	0.9	0.8	1.1	-	-	0.9	0.8	0.8	0.0	-	-	0.7	1.1	1.1	0.8	-	-	1.0	1.9	1.1	0.0	-	-	0.9	0.8
Cars & Light Goods	108	1757	425	0	-	2290	98	1854	78	0	-	2030	361	260	107	0	-	728	52	173	118	0	-	343	5391
% Cars & Light Goods	96.4	93.8	93.2	-	-	93.8	77.8	93.4	94.0	-	-	92.6	96.0	96.7	87.7	-	-	94.9	98.1	96.6	98.3	-	-	97.4	93.7
Buses	2	5	6	0	-	13	1	7	5	0	-	13	1	2	0	0	-	3	0	2	1	0	-	3	32
% Buses	1.8	0.3	1.3	-	-	0.5	0.8	0.4	6.0	-	-	0.6	0.3	0.7	0.0	-	-	0.4	0.0	1.1	0.8	-	-	0.9	0.6
Single-Unit Trucks	1	75	15	0	-	91	20	91	0	0	-	111	10	3	11	0	-	24	0	2	0	0	-	2	228
% Single-Unit Trucks	0.9	4.0	3.3	-	-	3.7	15.9	4.6	0.0	-	-	5.1	2.7	1.1	9.0	-	-	3.1	0.0	1.1	0.0	-	-	0.6	4.0
Articulated Trucks	0	20	4	0	-	24	5	16	0	0	-	21	0	0	1	0	-	1	0	0	0	0	-	0	46
% Articulated Trucks	0.0	1.1	0.9	-	-	1.0	4.0	0.8	0.0	-	-	1.0	0.0	0.0	0.8	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.8
Bicycles on Road	0	2	1	0	-	3	1	1	0	0	-	2	0	1	2	0	-	3	0	0	1	0	-	1	9
% Bicycles on Road	0.0	0.1	0.2	-	-	0.1	0.8	0.1	0.0	-	-	0.1	0.0	0.4	1.6	-	-	0.4	0.0	0.0	0.8	-	-	0.3	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



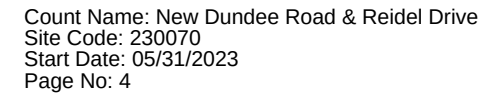
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: New Dundee Road & Reidel Drive
Site Code: 230070
Start Date: 05/31/2023
Page No: 3



Turning Movement Data Plot

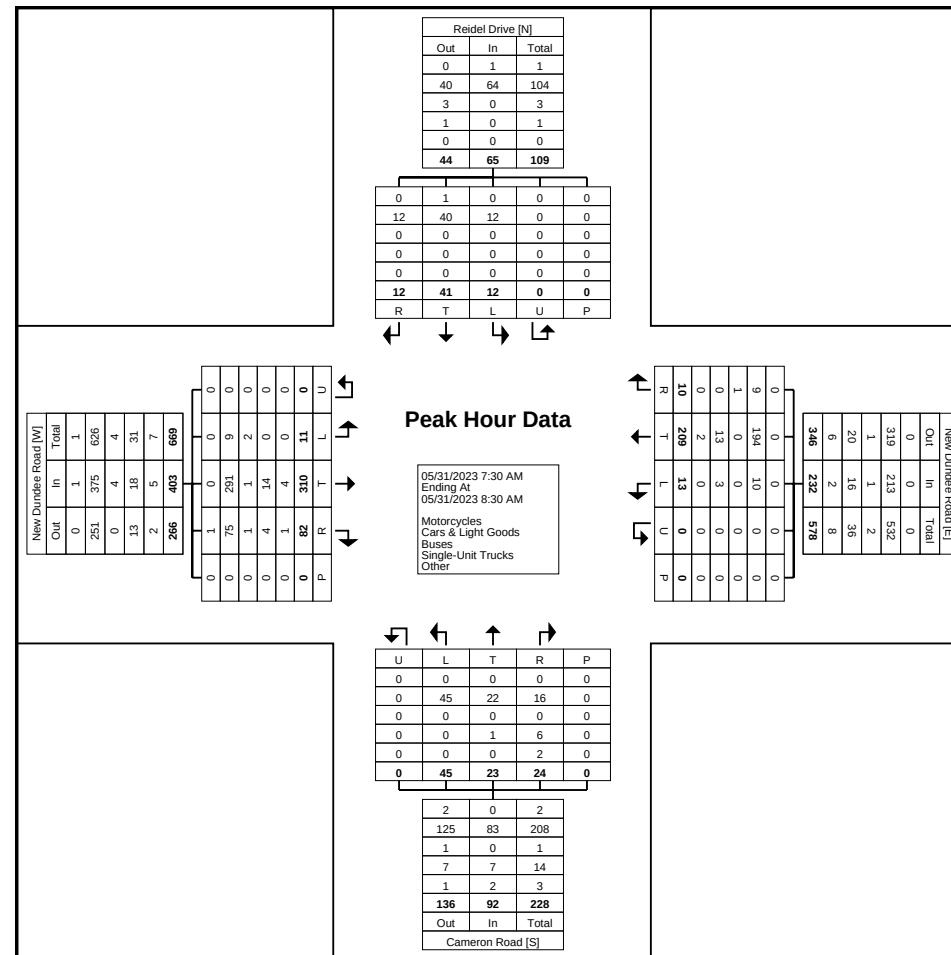




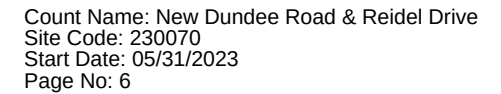
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: New Dundee Road & Reidel Drive
Site Code: 230070
Start Date: 05/31/2023
Page No: 5



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

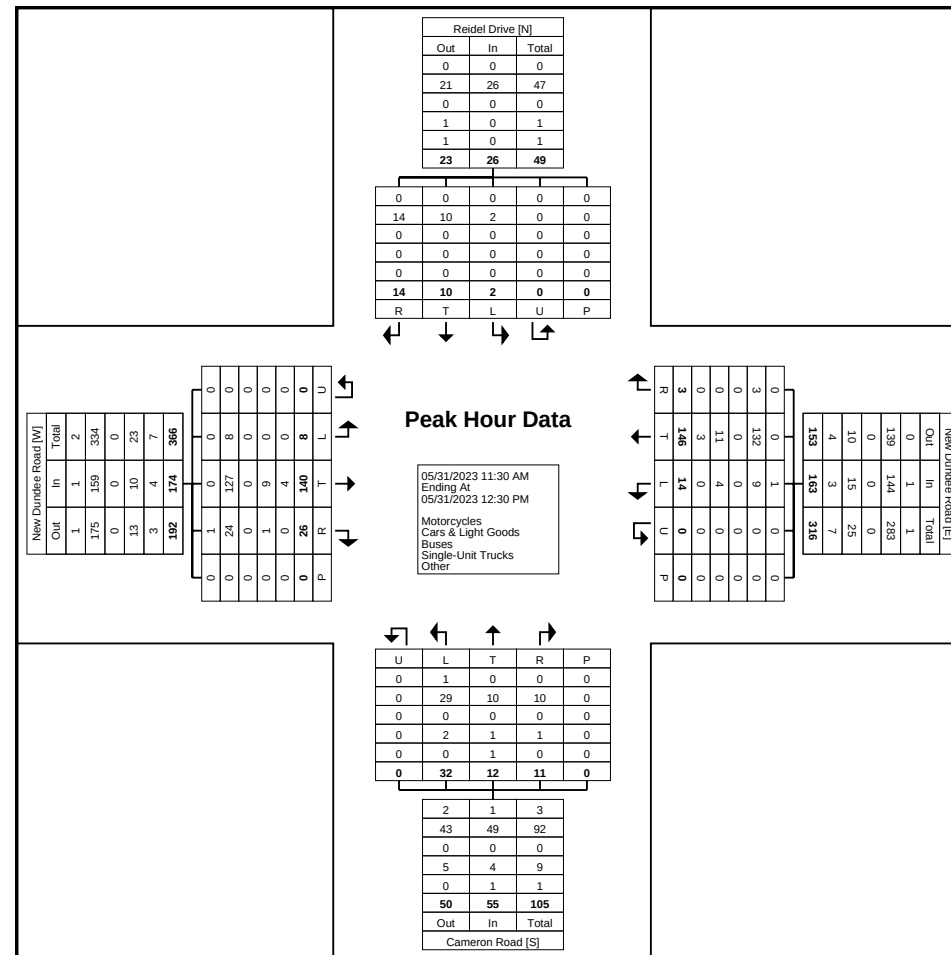




Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: New Dundee Road & Reidel Drive
Site Code: 230070
Start Date: 05/31/2023
Page No: 7



Turning Movement Peak Hour Data Plot (11:30 AM)

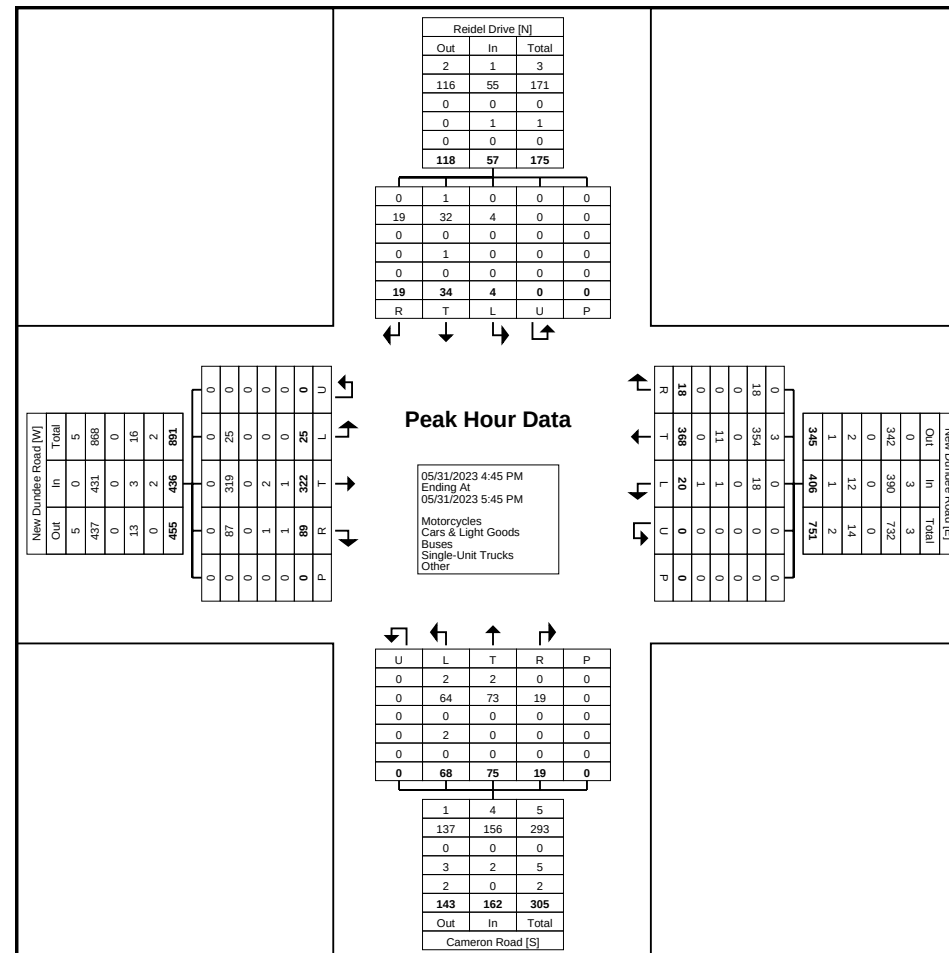
Start Time	New Dundee Road Eastbound						New Dundee Road Westbound						Cameron Road Northbound						Reidel Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	5	72	19	0	0	96	5	82	5	0	0	92	18	20	7	0	0	45	1	6	8	0	0	15	248
5:00 PM	10	98	23	0	0	131	2	100	8	0	0	110	11	15	3	0	0	29	0	13	2	0	0	15	285
5:15 PM	8	72	29	0	0	109	10	73	3	0	0	86	25	19	7	0	0	51	1	10	4	0	0	15	261
5:30 PM	2	80	18	0	0	100	3	113	2	0	0	118	14	21	2	0	0	37	2	5	5	0	0	12	267
Total	25	322	89	0	0	436	20	368	18	0	0	406	68	75	19	0	0	162	4	34	19	0	0	57	1061
Approach %	5.7	73.9	20.4	0.0	-	-	4.9	90.6	4.4	0.0	-	-	42.0	46.3	11.7	0.0	-	-	7.0	59.6	33.3	0.0	-	-	-
Total %	2.4	30.3	8.4	0.0	-	41.1	1.9	34.7	1.7	0.0	-	38.3	6.4	7.1	1.8	0.0	-	15.3	0.4	3.2	1.8	0.0	-	5.4	-
PHF	0.625	0.821	0.767	0.000	-	0.832	0.500	0.814	0.563	0.000	-	0.860	0.680	0.893	0.679	0.000	-	0.794	0.500	0.654	0.594	0.000	-	0.950	0.931
Motorcycles	0	0	0	0	-	0	0	3	0	0	-	3	2	2	0	0	-	4	0	1	0	0	-	1	8
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	2.9	2.7	0.0	-	-	2.5	0.0	2.9	0.0	-	-	1.8	0.8
Cars & Light Goods	25	319	87	0	-	431	18	354	18	0	-	390	64	73	19	0	-	156	4	32	19	0	-	55	1032
% Cars & Light Goods	100.0	99.1	97.8	-	-	98.9	90.0	96.2	100.0	-	-	96.1	94.1	97.3	100.0	-	-	96.3	100.0	94.1	100.0	-	-	96.5	97.3
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	2	1	0	-	3	1	11	0	0	-	12	2	0	0	0	-	2	0	1	0	0	-	1	18
% Single-Unit Trucks	0.0	0.6	1.1	-	-	0.7	5.0	3.0	0.0	-	-	3.0	2.9	0.0	0.0	-	-	1.2	0.0	2.9	0.0	-	-	1.8	1.7
Articulated Trucks	0	1	1	0	-	2	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.3	1.1	-	-	0.5	5.0	0.0	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: New Dundee Road & Reidel Drive
Site Code: 230070
Start Date: 05/31/2023
Page No: 9



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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive & South Creek Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Turning Movement Data

Start Time	Robert Ferrie Drive Eastbound				Robert Ferrie Drive Westbound					South Creek Drive Northbound			Evans Pond Cres Southbound					Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:30 AM	15	5	0	20	7	44	1	0	52	39	0	39	3	2	0	8	5	116
7:45 AM	11	11	1	22	5	45	0	1	51	32	1	32	3	0	0	0	3	108
Hourly Total	26	16	1	42	12	89	1	1	103	71	1	71	6	2	0	8	8	224
8:00 AM	20	10	0	30	2	44	0	1	47	31	0	31	1	0	1	4	2	110
8:15 AM	21	9	0	30	11	39	0	0	50	34	0	34	4	1	0	7	5	119
8:30 AM	12	14	0	26	10	35	3	0	48	29	0	29	5	0	0	5	5	108
8:45 AM	14	13	0	27	17	40	1	2	60	33	0	33	1	1	3	2	5	125
Hourly Total	67	46	0	113	40	158	4	3	205	127	0	127	11	2	4	18	17	462
9:00 AM	18	12	1	30	10	47	5	1	63	46	0	46	3	6	0	2	9	148
9:15 AM	13	4	0	17	6	37	4	1	48	33	0	33	3	0	0	0	3	101
9:30 AM	12	2	0	14	4	13	1	1	19	16	0	16	0	0	0	6	0	49
9:45 AM	14	4	0	18	7	21	0	1	29	23	0	23	0	0	0	4	0	70
Hourly Total	57	22	1	79	27	118	10	4	159	118	0	118	6	6	0	12	12	368
10:00 AM	11	4	0	15	6	16	0	2	24	12	0	12	0	0	0	4	0	51
10:15 AM	11	2	0	13	15	16	1	1	33	19	0	19	0	0	0	3	0	65
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	22	6	0	28	21	32	1	3	57	31	0	31	0	0	0	7	0	116
12:00 PM	9	1	0	10	9	18	1	1	29	17	0	17	0	0	1	4	1	57
12:15 PM	15	3	0	18	6	18	2	0	26	10	0	10	4	0	0	2	4	58
12:30 PM	5	5	0	10	7	25	2	1	35	23	0	23	1	0	1	8	2	70
12:45 PM	13	1	0	14	9	11	0	0	20	14	0	14	0	2	0	1	2	50
Hourly Total	42	10	0	52	31	72	5	2	110	64	0	64	5	2	2	15	9	235
1:00 PM	11	3	0	14	8	11	4	1	24	18	0	18	2	0	0	7	2	58
1:15 PM	10	9	0	19	9	14	1	0	24	15	0	15	0	1	0	1	1	59
1:30 PM	13	5	0	18	2	7	1	1	11	12	0	12	0	1	0	8	1	42
1:45 PM	10	5	0	15	13	18	2	0	33	22	0	22	2	0	0	2	2	72
Hourly Total	44	22	0	66	32	50	8	2	92	67	0	67	4	2	0	18	6	231
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	16	11	1	27	14	17	6	2	39	12	0	12	0	0	2	5	2	80
3:15 PM	15	9	0	24	12	25	4	1	42	19	0	19	2	1	2	4	5	90
3:30 PM	15	10	0	25	14	42	6	0	62	44	0	44	1	0	0	7	1	132
3:45 PM	22	13	0	35	17	24	1	1	43	23	0	23	2	1	0	6	3	104
Hourly Total	68	43	1	111	57	108	17	4	186	98	0	98	5	2	4	22	11	406
4:00 PM	27	16	0	43	12	40	5	3	60	24	0	24	1	0	0	0	1	128
4:15 PM	22	8	0	30	9	35	3	1	48	36	0	36	4	1	0	0	5	119
4:30 PM	18	11	0	29	16	35	1	1	53	22	0	22	1	0	0	0	1	105

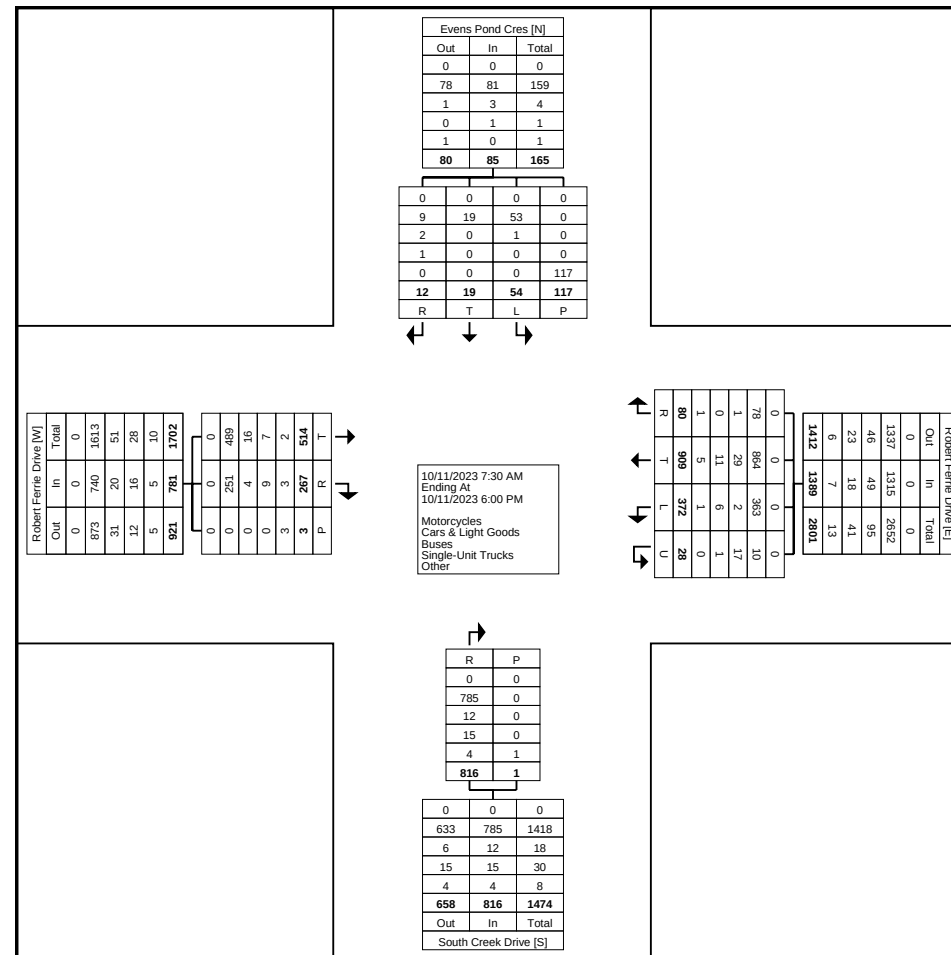
4:45 PM	29	15	0	44	17	28	3	1	49	26	0	26	2	0	1	0	3	122
Hourly Total	96	50	0	146	54	138	12	6	210	108	0	108	8	1	1	0	10	474
5:00 PM	26	13	0	39	28	47	6	0	81	45	0	45	1	0	0	7	1	166
5:15 PM	28	12	0	40	24	36	3	1	64	33	0	33	4	0	0	1	4	141
5:30 PM	19	13	0	32	28	26	1	2	57	21	0	21	2	0	1	2	3	113
5:45 PM	19	14	0	33	18	35	12	0	65	33	0	33	2	2	0	7	4	135
Hourly Total	92	52	0	144	98	144	22	3	267	132	0	132	9	2	1	17	12	555
Grand Total	514	267	3	781	372	909	80	28	1389	816	1	816	54	19	12	117	85	3071
Approach %	65.8	34.2	-	-	26.8	65.4	5.8	2.0	-	100.0	-	-	63.5	22.4	14.1	-	-	-
Total %	16.7	8.7	-	25.4	12.1	29.6	2.6	0.9	45.2	26.6	-	26.6	1.8	0.6	0.4	-	2.8	-
Motorcycles	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	489	251	-	740	363	864	78	10	1315	785	-	785	53	19	9	-	81	2921
% Cars & Light Goods	95.1	94.0	-	94.8	97.6	95.0	97.5	35.7	94.7	96.2	-	96.2	98.1	100.0	75.0	-	95.3	95.1
Buses	16	4	-	20	2	29	1	17	49	12	-	12	1	0	2	-	3	84
% Buses	3.1	1.5	-	2.6	0.5	3.2	1.3	60.7	3.5	1.5	-	1.5	1.9	0.0	16.7	-	3.5	2.7
Single-Unit Trucks	7	9	-	16	6	11	0	1	18	15	-	15	0	0	1	-	1	50
% Single-Unit Trucks	1.4	3.4	-	2.0	1.6	1.2	0.0	3.6	1.3	1.8	-	1.8	0.0	0.0	8.3	-	1.2	1.6
Articulated Trucks	0	1	-	1	0	3	0	0	3	1	-	1	0	0	0	-	0	5
% Articulated Trucks	0.0	0.4	-	0.1	0.0	0.3	0.0	0.0	0.2	0.1	-	0.1	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	2	2	-	4	1	2	1	0	4	3	-	3	0	0	0	-	0	11
% Bicycles on Road	0.4	0.7	-	0.5	0.3	0.2	1.3	0.0	0.3	0.4	-	0.4	0.0	0.0	0.0	-	0.0	0.4
Bicycles on Crosswalk	-	-	0	-	-	-	-	-	-	-	1	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	0.0	-	-	-	-	-	-	-	100.0	-	-	-	-	3.4	-	-
Pedestrians	-	-	3	-	-	-	-	-	-	-	0	-	-	-	-	113	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	0.0	-	-	-	-	96.6	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Robert Ferrie Drive & South Creek
Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive & South Creek Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 4

Turning Movement Peak Hour Data (8:15 AM)

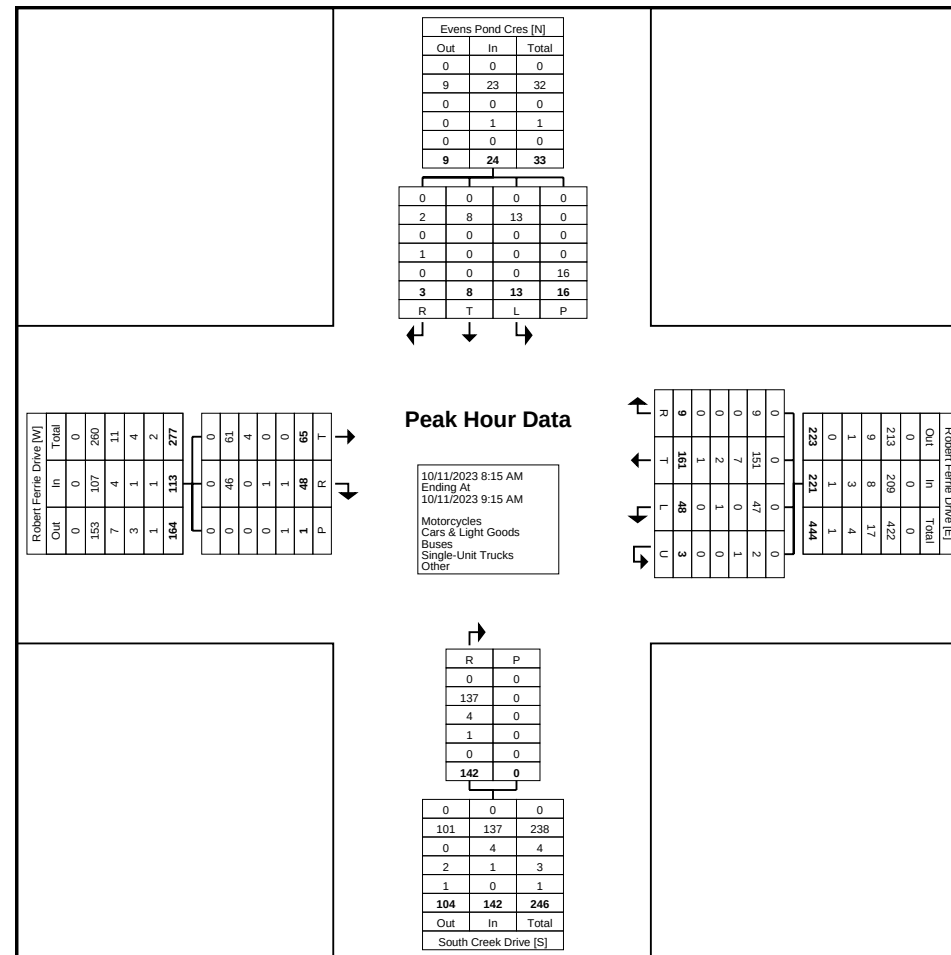
Start Time	Robert Ferrie Drive Eastbound				Robert Ferrie Drive Westbound					South Creek Drive Northbound			Evans Pond Cres Southbound					Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
8:15 AM	21	9	0	30	11	39	0	0	50	34	0	34	4	1	0	7	5	119
8:30 AM	12	14	0	26	10	35	3	0	48	29	0	29	5	0	0	5	5	108
8:45 AM	14	13	0	27	17	40	1	2	60	33	0	33	1	1	3	2	5	125
9:00 AM	18	12	1	30	10	47	5	1	63	46	0	46	3	6	0	2	9	148
Total	65	48	1	113	48	161	9	3	221	142	0	142	13	8	3	16	24	500
Approach %	57.5	42.5	-	-	21.7	72.9	4.1	1.4	-	100.0	-	-	54.2	33.3	12.5	-	-	-
Total %	13.0	9.6	-	22.6	9.6	32.2	1.8	0.6	44.2	28.4	-	28.4	2.6	1.6	0.6	-	4.8	-
PHF	0.774	0.857	-	0.942	0.706	0.856	0.450	0.375	0.877	0.772	-	0.772	0.650	0.333	0.250	-	0.667	0.845
Motorcycles	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	61	46	-	107	47	151	9	2	209	137	-	137	13	8	2	-	23	476
% Cars & Light Goods	93.8	95.8	-	94.7	97.9	93.8	100.0	66.7	94.6	96.5	-	96.5	100.0	100.0	66.7	-	95.8	95.2
Buses	4	0	-	4	0	7	0	1	8	4	-	4	0	0	0	-	0	16
% Buses	6.2	0.0	-	3.5	0.0	4.3	0.0	33.3	3.6	2.8	-	2.8	0.0	0.0	0.0	-	0.0	3.2
Single-Unit Trucks	0	1	-	1	1	2	0	0	3	1	-	1	0	0	1	-	1	6
% Single-Unit Trucks	0.0	2.1	-	0.9	2.1	1.2	0.0	0.0	1.4	0.7	-	0.7	0.0	0.0	33.3	-	4.2	1.2
Articulated Trucks	0	0	-	0	0	1	0	0	1	0	-	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	0.0	0.0	0.6	0.0	0.0	0.5	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Road	0	1	-	1	0	0	0	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	2.1	-	0.9	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Crosswalk	-	-	0	-	-	-	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	1	-	-	-	-	-	-	-	0	-	-	-	-	16	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Robert Ferrie Drive & South Creek
Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 5



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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive & South Creek Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

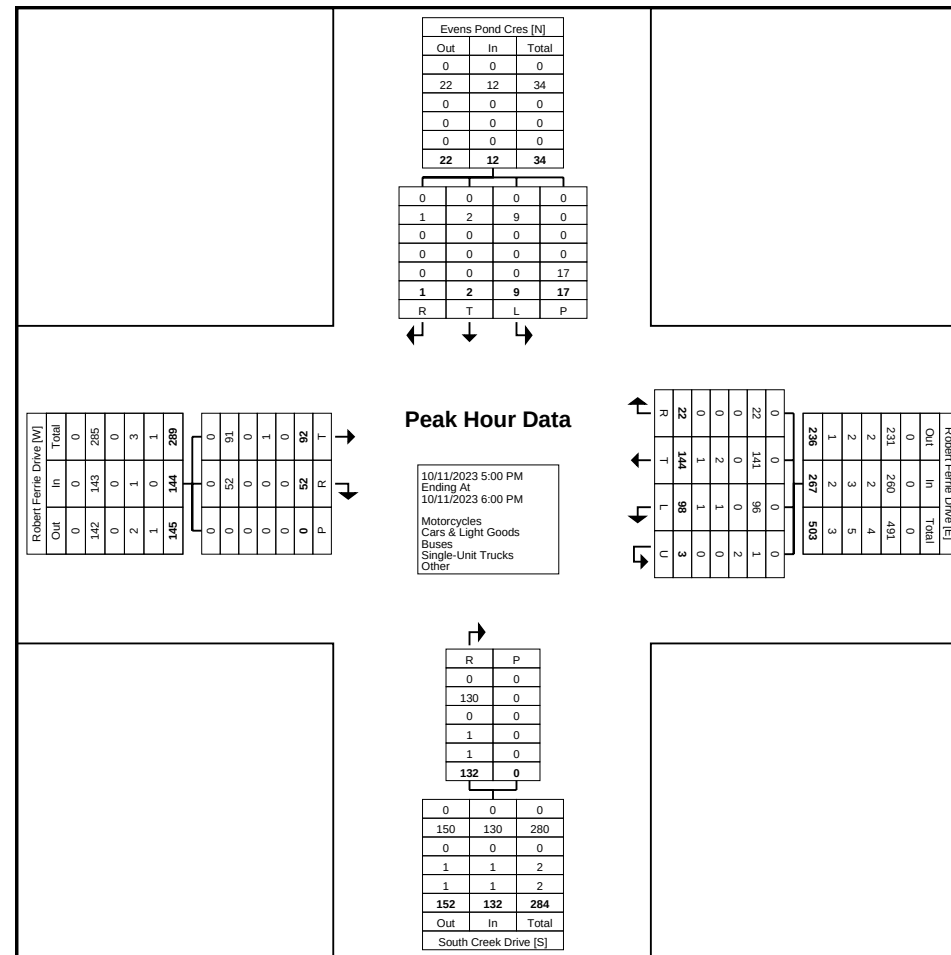
Start Time	Robert Ferrie Drive Eastbound				Robert Ferrie Drive Westbound					South Creek Drive Northbound			Evans Pond Cres Southbound					Int. Total
	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
12:30 PM	5	5	0	10	7	25	2	1	35	23	0	23	1	0	1	8	2	70
12:45 PM	13	1	0	14	9	11	0	0	20	14	0	14	0	2	0	1	2	50
1:00 PM	11	3	0	14	8	11	4	1	24	18	0	18	2	0	0	7	2	58
1:15 PM	10	9	0	19	9	14	1	0	24	15	0	15	0	1	0	1	1	59
Total	39	18	0	57	33	61	7	2	103	70	0	70	3	3	1	17	7	237
Approach %	68.4	31.6	-	-	32.0	59.2	6.8	1.9	-	100.0	-	-	42.9	42.9	14.3	-	-	-
Total %	16.5	7.6	-	24.1	13.9	25.7	3.0	0.8	43.5	29.5	-	29.5	1.3	1.3	0.4	-	3.0	-
PHF	0.750	0.500	-	0.750	0.917	0.610	0.438	0.500	0.736	0.761	-	0.761	0.375	0.375	0.250	-	0.875	0.846
Motorcycles	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	38	16	-	54	33	59	7	0	99	67	-	67	3	3	1	-	7	227
% Cars & Light Goods	97.4	88.9	-	94.7	100.0	96.7	100.0	0.0	96.1	95.7	-	95.7	100.0	100.0	100.0	-	100.0	95.8
Buses	0	0	-	0	0	0	0	2	2	0	-	0	0	0	0	-	0	2
% Buses	0.0	0.0	-	0.0	0.0	0.0	0.0	100.0	1.9	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.8
Single-Unit Trucks	0	2	-	2	0	1	0	0	1	3	-	3	0	0	0	-	0	6
% Single-Unit Trucks	0.0	11.1	-	3.5	0.0	1.6	0.0	0.0	1.0	4.3	-	4.3	0.0	0.0	0.0	-	0.0	2.5
Articulated Trucks	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	1	0	-	1	0	1	0	0	1	0	-	0	0	0	0	-	0	2
% Bicycles on Road	2.6	0.0	-	1.8	0.0	1.6	0.0	0.0	1.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.8
Bicycles on Crosswalk	-	-	0	-	-	-	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	0	-	-	-	-	-	-	-	0	-	-	-	-	17	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Robert Ferrie Drive & South Creek
Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 9



Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Doon Mills Road & Apple Ridge Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Turning Movement Data

Start Time	Doon Mills Drive Eastbound					Doon Mills Drive Westbound					Apple Ridge Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	21	15	0	4	36	3	66	0	0	69	59	11	0	2	70	175
7:45 AM	34	22	0	0	56	2	68	0	0	70	61	13	0	2	74	200
Hourly Total	55	37	0	4	92	5	134	0	0	139	120	24	0	4	144	375
8:00 AM	35	31	0	0	66	3	63	0	0	66	59	11	0	2	70	202
8:15 AM	41	33	0	4	74	8	68	0	1	76	67	20	0	1	87	237
8:30 AM	37	38	0	0	75	10	73	0	0	83	42	11	0	2	53	211
8:45 AM	32	41	0	2	73	11	89	0	0	100	53	10	0	0	63	236
Hourly Total	145	143	0	6	288	32	293	0	1	325	221	52	0	5	273	886
9:00 AM	36	35	0	3	71	12	62	0	0	74	59	15	0	0	74	219
9:15 AM	30	26	0	1	56	1	53	0	0	54	42	13	0	5	55	165
9:30 AM	30	19	0	0	49	5	48	0	0	53	25	9	0	6	34	136
9:45 AM	15	25	0	0	40	4	42	0	0	46	36	5	0	1	41	127
Hourly Total	111	105	0	4	216	22	205	0	0	227	162	42	0	12	204	647
10:00 AM	25	14	0	0	39	5	36	0	1	41	37	8	0	2	45	125
10:15 AM	24	26	0	0	50	3	35	0	0	38	33	4	0	1	37	125
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	49	40	0	0	89	8	71	0	1	79	70	12	0	3	82	250
12:00 PM	41	28	0	0	69	5	44	0	0	49	31	4	0	0	35	153
12:15 PM	35	33	0	0	68	2	37	0	0	39	35	3	0	2	38	145
12:30 PM	33	36	0	0	69	3	31	0	0	34	33	4	0	2	37	140
12:45 PM	36	25	0	0	61	6	34	0	0	40	29	3	0	2	32	133
Hourly Total	145	122	0	0	267	16	146	0	0	162	128	14	0	6	142	571
1:00 PM	37	28	0	0	65	2	25	0	0	27	29	0	0	2	29	121
1:15 PM	23	36	0	0	59	1	32	0	0	33	42	2	0	0	44	136
1:30 PM	39	23	0	0	62	4	28	0	0	32	37	2	0	1	39	133
1:45 PM	33	32	0	2	65	3	45	0	0	48	25	3	0	0	28	141
Hourly Total	132	119	0	2	251	10	130	0	0	140	133	7	0	3	140	531
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	46	69	0	3	115	16	39	0	0	55	32	5	0	1	37	207
3:15 PM	61	69	0	3	130	19	41	0	0	60	43	6	0	3	49	239
3:30 PM	52	42	0	9	94	10	50	0	0	60	65	18	0	1	83	237
3:45 PM	65	55	0	3	120	8	62	0	0	70	35	9	0	3	44	234
Hourly Total	224	235	0	18	459	53	192	0	0	245	175	38	0	8	213	917
4:00 PM	58	41	0	1	99	6	48	0	0	54	37	2	0	1	39	192
4:15 PM	69	52	0	1	121	2	47	0	0	49	66	9	0	2	75	245
4:30 PM	68	51	0	0	119	12	56	0	0	68	47	3	0	2	50	237

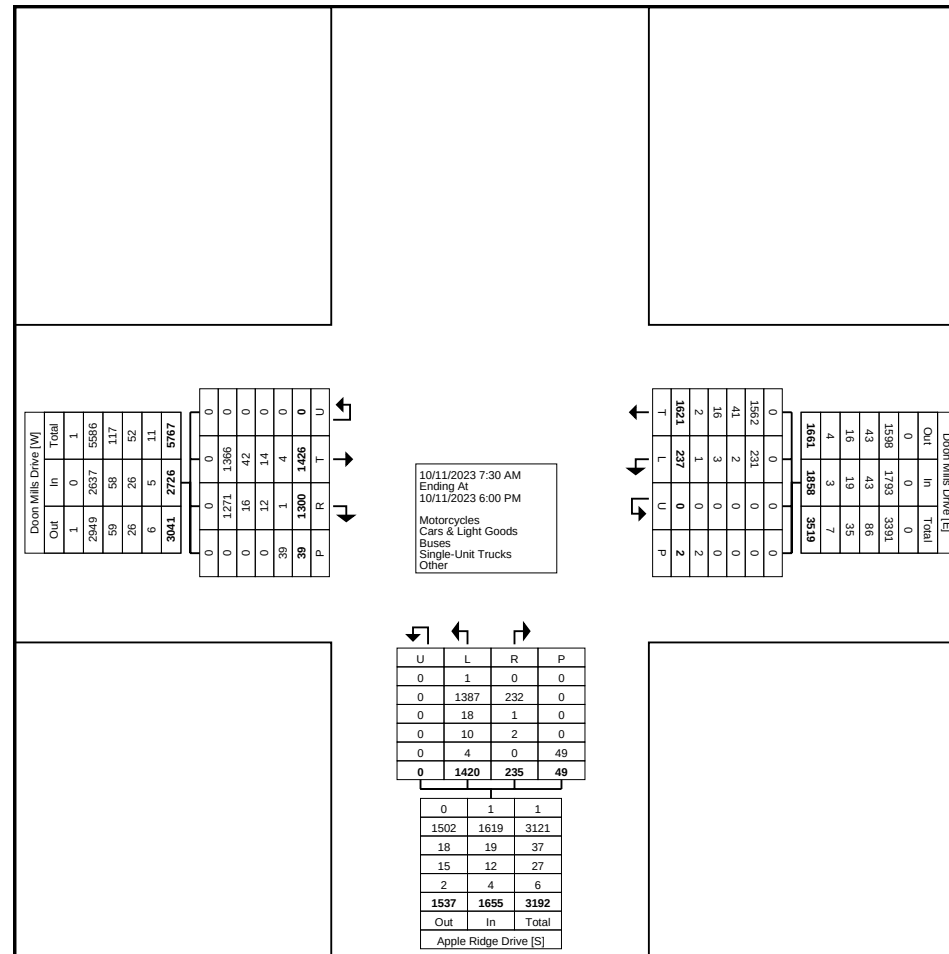
4:45 PM	58	64	0	1	122	21	73	0	0	94	46	2	0	2	48	264
Hourly Total	253	208	0	3	461	41	224	0	0	265	196	16	0	7	212	938
5:00 PM	80	79	0	0	159	13	53	0	0	66	57	6	0	0	63	288
5:15 PM	79	59	0	1	138	16	50	0	0	66	58	8	0	1	66	270
5:30 PM	86	72	0	0	158	10	64	0	0	74	46	10	0	0	56	288
5:45 PM	67	81	0	1	148	11	59	0	0	70	54	6	0	0	60	278
Hourly Total	312	291	0	2	603	50	226	0	0	276	215	30	0	1	245	1124
Grand Total	1426	1300	0	39	2726	237	1621	0	2	1858	1420	235	0	49	1655	6239
Approach %	52.3	47.7	0.0	-	-	12.8	87.2	0.0	-	-	85.8	14.2	0.0	-	-	-
Total %	22.9	20.8	0.0	-	43.7	3.8	26.0	0.0	-	29.8	22.8	3.8	0.0	-	26.5	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0
Cars & Light Goods	1366	1271	0	-	2637	231	1562	0	-	1793	1387	232	0	-	1619	6049
% Cars & Light Goods	95.8	97.8	-	-	96.7	97.5	96.4	-	-	96.5	97.7	98.7	-	-	97.8	97.0
Buses	42	16	0	-	58	2	41	0	-	43	18	1	0	-	19	120
% Buses	2.9	1.2	-	-	2.1	0.8	2.5	-	-	2.3	1.3	0.4	-	-	1.1	1.9
Single-Unit Trucks	14	12	0	-	26	3	16	0	-	19	10	2	0	-	12	57
% Single-Unit Trucks	1.0	0.9	-	-	1.0	1.3	1.0	-	-	1.0	0.7	0.9	-	-	0.7	0.9
Articulated Trucks	1	0	0	-	1	0	1	0	-	1	2	0	0	-	2	4
% Articulated Trucks	0.1	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	3	1	0	-	4	1	1	0	-	2	2	0	0	-	2	8
% Bicycles on Road	0.2	0.1	-	-	0.1	0.4	0.1	-	-	0.1	0.1	0.0	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	-	2	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	4.1	-
Pedestrians	-	-	-	39	-	-	-	-	2	-	-	-	-	-	47	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	95.9	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon Mills Road & Apple Ridge
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Site Code: 230376
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon Mills Road & Apple Ridge Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 4

Turning Movement Peak Hour Data (8:15 AM)

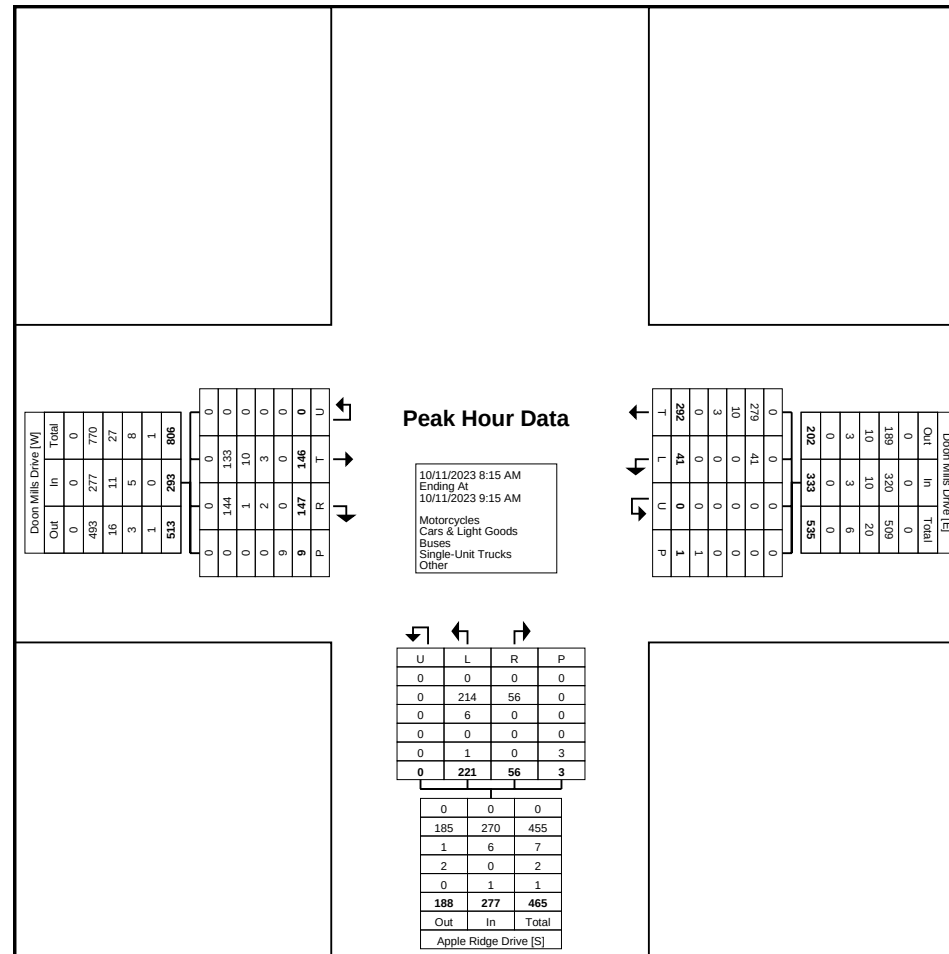
Start Time	Doon Mills Drive Eastbound					Doon Mills Drive Westbound					Apple Ridge Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
8:15 AM	41	33	0	4	74	8	68	0	1	76	67	20	0	1	87	237
8:30 AM	37	38	0	0	75	10	73	0	0	83	42	11	0	2	53	211
8:45 AM	32	41	0	2	73	11	89	0	0	100	53	10	0	0	63	236
9:00 AM	36	35	0	3	71	12	62	0	0	74	59	15	0	0	74	219
Total	146	147	0	9	293	41	292	0	1	333	221	56	0	3	277	903
Approach %	49.8	50.2	0.0	-	-	12.3	87.7	0.0	-	-	79.8	20.2	0.0	-	-	-
Total %	16.2	16.3	0.0	-	32.4	4.5	32.3	0.0	-	36.9	24.5	6.2	0.0	-	30.7	-
PHF	0.890	0.896	0.000	-	0.977	0.854	0.820	0.000	-	0.833	0.825	0.700	0.000	-	0.796	0.953
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	133	144	0	-	277	41	279	0	-	320	214	56	0	-	270	867
% Cars & Light Goods	91.1	98.0	-	-	94.5	100.0	95.5	-	-	96.1	96.8	100.0	-	-	97.5	96.0
Buses	10	1	0	-	11	0	10	0	-	10	6	0	0	-	6	27
% Buses	6.8	0.7	-	-	3.8	0.0	3.4	-	-	3.0	2.7	0.0	-	-	2.2	3.0
Single-Unit Trucks	3	2	0	-	5	0	3	0	-	3	0	0	0	-	0	8
% Single-Unit Trucks	2.1	1.4	-	-	1.7	0.0	1.0	-	-	0.9	0.0	0.0	-	-	0.0	0.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.4	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	9	-	-	-	-	1	-	-	-	-	3	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



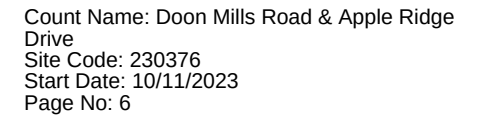
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon Mills Road & Apple Ridge
Drive
Site Code: 230376
Start Date: 10/11/2023
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Turning Movement Peak Hour Data Plot (8:15 AM)



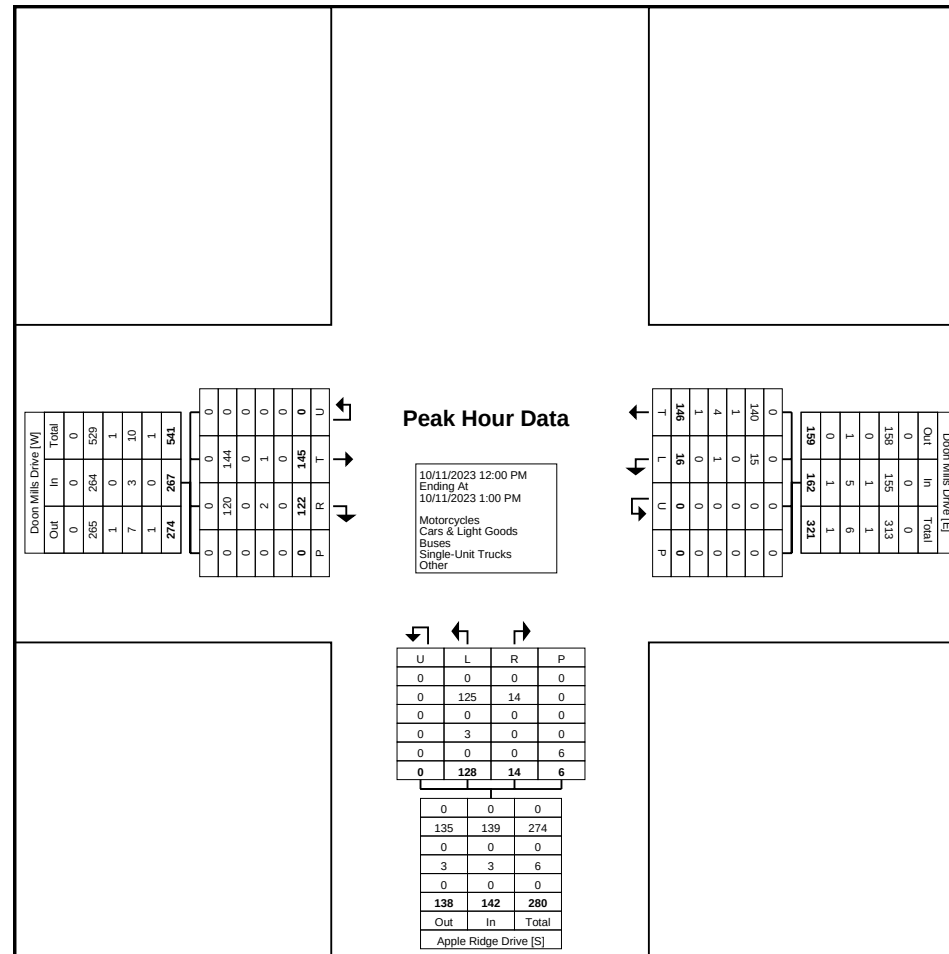
Start Time	Doon Mills Drive Eastbound					Doon Mills Drive Westbound					Apple Ridge Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 PM	41	28	0	0	69	5	44	0	0	49	31	4	0	0	35	153
12:15 PM	35	33	0	0	68	2	37	0	0	39	35	3	0	2	38	145
12:30 PM	33	36	0	0	69	3	31	0	0	34	33	4	0	2	37	140
12:45 PM	36	25	0	0	61	6	34	0	0	40	29	3	0	2	32	133
Total	145	122	0	0	267	16	146	0	0	162	128	14	0	6	142	571
Approach %	54.3	45.7	0.0	-	-	9.9	90.1	0.0	-	-	90.1	9.9	0.0	-	-	-
Total %	25.4	21.4	0.0	-	46.8	2.8	25.6	0.0	-	28.4	22.4	2.5	0.0	-	24.9	-
PHF	0.884	0.847	0.000	-	0.967	0.667	0.830	0.000	-	0.827	0.914	0.875	0.000	-	0.934	0.933
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	144	120	0	-	264	15	140	0	-	155	125	14	0	-	139	558
% Cars & Light Goods	99.3	98.4	-	-	98.9	93.8	95.9	-	-	95.7	97.7	100.0	-	-	97.9	97.7
Buses	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Buses	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.6	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	1	2	0	-	3	1	4	0	-	5	3	0	0	-	3	11
% Single-Unit Trucks	0.7	1.6	-	-	1.1	6.3	2.7	-	-	3.1	2.3	0.0	-	-	2.1	1.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.6	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	16.7	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	83.3	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Doon Mills Road & Apple Ridge
Drive
Site Code: 230376
Start Date: 10/11/2023
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Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Doon Mills Road & Apple Ridge Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

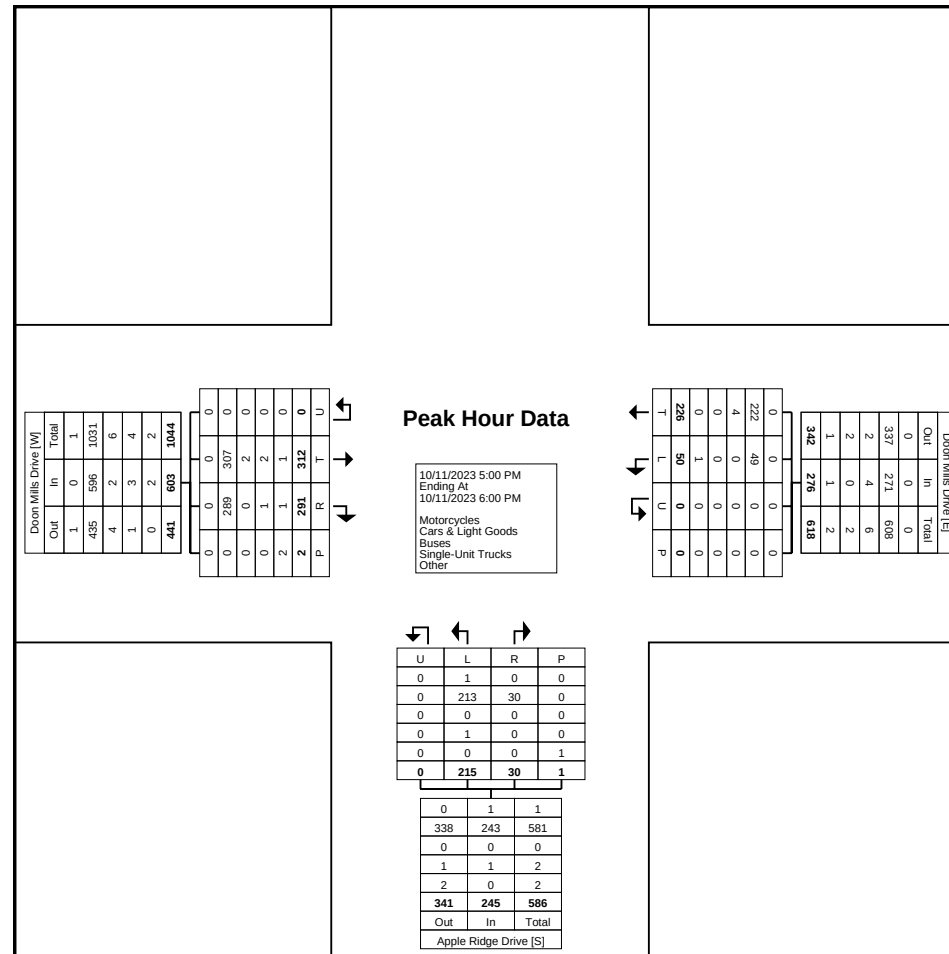
Start Time	Doon Mills Drive Eastbound					Doon Mills Drive Westbound					Apple Ridge Drive Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	80	79	0	0	159	13	53	0	0	66	57	6	0	0	63	288
5:15 PM	79	59	0	1	138	16	50	0	0	66	58	8	0	1	66	270
5:30 PM	86	72	0	0	158	10	64	0	0	74	46	10	0	0	56	288
5:45 PM	67	81	0	1	148	11	59	0	0	70	54	6	0	0	60	278
Total	312	291	0	2	603	50	226	0	0	276	215	30	0	1	245	1124
Approach %	51.7	48.3	0.0	-	-	18.1	81.9	0.0	-	-	87.8	12.2	0.0	-	-	-
Total %	27.8	25.9	0.0	-	53.6	4.4	20.1	0.0	-	24.6	19.1	2.7	0.0	-	21.8	-
PHF	0.907	0.898	0.000	-	0.948	0.781	0.883	0.000	-	0.932	0.927	0.750	0.000	-	0.928	0.976
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.4	0.1
Cars & Light Goods	307	289	0	-	596	49	222	0	-	271	213	30	0	-	243	1110
% Cars & Light Goods	98.4	99.3	-	-	98.8	98.0	98.2	-	-	98.2	99.1	100.0	-	-	99.2	98.8
Buses	2	0	0	-	2	0	4	0	-	4	0	0	0	-	0	6
% Buses	0.6	0.0	-	-	0.3	0.0	1.8	-	-	1.4	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	2	1	0	-	3	0	0	0	-	0	1	0	0	-	1	4
% Single-Unit Trucks	0.6	0.3	-	-	0.5	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.4	0.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	1	1	0	-	2	1	0	0	-	1	0	0	0	-	0	3
% Bicycles on Road	0.3	0.3	-	-	0.3	2.0	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon Mills Road & Apple Ridge
Drive
Site Code: 230376
Start Date: 10/11/2023
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Turning Movement Peak Hour Data Plot (5:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Turning Movement Data

Start Time	Carndale Drive Westbound					Biehn Drive Northbound					Biehn Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	2	57	0	1	59	8	2	0	1	10	21	0	0	0	21	90
7:45 AM	1	97	0	1	98	2	1	0	1	3	44	0	0	0	44	145
Hourly Total	3	154	0	2	157	10	3	0	2	13	65	0	0	0	65	235
8:00 AM	0	71	0	4	71	3	2	0	4	5	40	2	0	1	42	118
8:15 AM	2	64	0	3	66	4	0	0	3	4	34	1	0	1	35	105
8:30 AM	1	73	0	1	74	5	1	0	0	6	46	2	0	0	48	128
8:45 AM	0	58	0	0	58	2	0	0	4	2	26	1	0	0	27	87
Hourly Total	3	266	0	8	269	14	3	0	11	17	146	6	0	2	152	438
9:00 AM	0	53	0	2	53	1	4	0	14	5	41	1	0	3	42	100
9:15 AM	1	74	0	11	75	2	2	0	28	4	54	2	0	0	56	135
9:30 AM	0	52	0	0	52	1	2	0	6	3	25	1	0	1	26	81
9:45 AM	0	35	0	2	35	2	1	0	0	3	18	1	0	0	19	57
Hourly Total	1	214	0	15	215	6	9	0	48	15	138	5	0	4	143	373
10:00 AM	1	26	0	0	27	5	0	0	0	5	14	2	0	0	16	48
10:15 AM	0	29	0	0	29	1	0	0	0	1	14	0	0	0	14	44
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	55	0	0	56	6	0	0	0	6	28	2	0	0	30	92
12:00 PM	2	39	0	2	41	2	0	0	1	2	24	5	0	0	29	72
12:15 PM	1	26	0	0	27	6	1	0	0	7	17	1	0	0	18	52
12:30 PM	0	31	0	0	31	2	0	0	0	2	20	4	0	0	24	57
12:45 PM	1	24	0	1	25	1	1	0	0	2	23	4	0	5	27	54
Hourly Total	4	120	0	3	124	11	2	0	1	13	84	14	0	5	98	235
1:00 PM	0	24	1	0	25	1	1	0	0	2	27	2	0	0	29	56
1:15 PM	0	25	0	2	25	0	2	0	0	2	28	3	0	0	31	58
1:30 PM	0	26	0	0	26	0	5	0	3	5	32	2	0	1	34	65
1:45 PM	2	27	0	1	29	0	1	0	1	1	22	4	0	1	26	56
Hourly Total	2	102	1	3	105	1	9	0	4	10	109	11	0	2	120	235
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	41	0	2	42	3	2	0	4	5	43	8	0	2	51	98
3:15 PM	2	32	0	7	34	2	1	0	3	3	50	1	0	1	51	88
3:30 PM	0	49	0	3	49	3	0	0	15	3	57	3	0	0	60	112
3:45 PM	3	86	0	3	89	6	0	0	31	6	56	5	0	0	61	156
Hourly Total	6	208	0	15	214	14	3	0	53	17	206	17	0	3	223	454
4:00 PM	3	63	0	1	66	2	2	0	0	4	50	4	0	0	54	124
4:15 PM	1	71	0	0	72	3	0	0	3	3	45	1	0	0	46	121
4:30 PM	1	52	0	1	53	1	2	0	1	3	52	1	0	0	53	109

4:45 PM	1	69	0	0	70	1	1	0	4	2	66	3	0	0	69	141
Hourly Total	6	255	0	2	261	7	5	0	8	12	213	9	0	0	222	495
5:00 PM	2	68	0	2	70	3	1	0	2	4	53	1	0	0	54	128
5:15 PM	0	52	0	3	52	3	1	0	0	4	66	3	0	1	69	125
5:30 PM	4	49	0	1	53	1	2	0	0	3	58	2	0	1	60	116
5:45 PM	1	45	0	3	46	1	0	0	4	1	42	3	0	2	45	92
Hourly Total	7	214	0	9	221	8	4	0	6	12	219	9	0	4	228	461
Grand Total	33	1588	1	57	1622	77	38	0	133	115	1208	73	0	20	1281	3018
Approach %	2.0	97.9	0.1	-	-	67.0	33.0	0.0	-	-	94.3	5.7	0.0	-	-	-
Total %	1.1	52.6	0.0	-	53.7	2.6	1.3	0.0	-	3.8	40.0	2.4	0.0	-	42.4	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0
Cars & Light Goods	29	1525	1	-	1555	71	36	0	-	107	1168	69	0	-	1237	2899
% Cars & Light Goods	87.9	96.0	100.0	-	95.9	92.2	94.7	-	-	93.0	96.7	94.5	-	-	96.6	96.1
Buses	0	41	0	-	41	0	0	0	-	0	21	0	0	-	21	62
% Buses	0.0	2.6	0.0	-	2.5	0.0	0.0	-	-	0.0	1.7	0.0	-	-	1.6	2.1
Single-Unit Trucks	1	19	0	-	20	3	2	0	-	5	14	3	0	-	17	42
% Single-Unit Trucks	3.0	1.2	0.0	-	1.2	3.9	5.3	-	-	4.3	1.2	4.1	-	-	1.3	1.4
Articulated Trucks	1	0	0	-	1	0	0	0	-	0	1	0	0	-	1	2
% Articulated Trucks	3.0	0.0	0.0	-	0.1	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	2	3	0	-	5	3	0	0	-	3	3	1	0	-	4	12
% Bicycles on Road	6.1	0.2	0.0	-	0.3	3.9	0.0	-	-	2.6	0.2	1.4	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	10	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	7.5	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	57	-	-	-	-	123	-	-	-	-	20	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	92.5	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

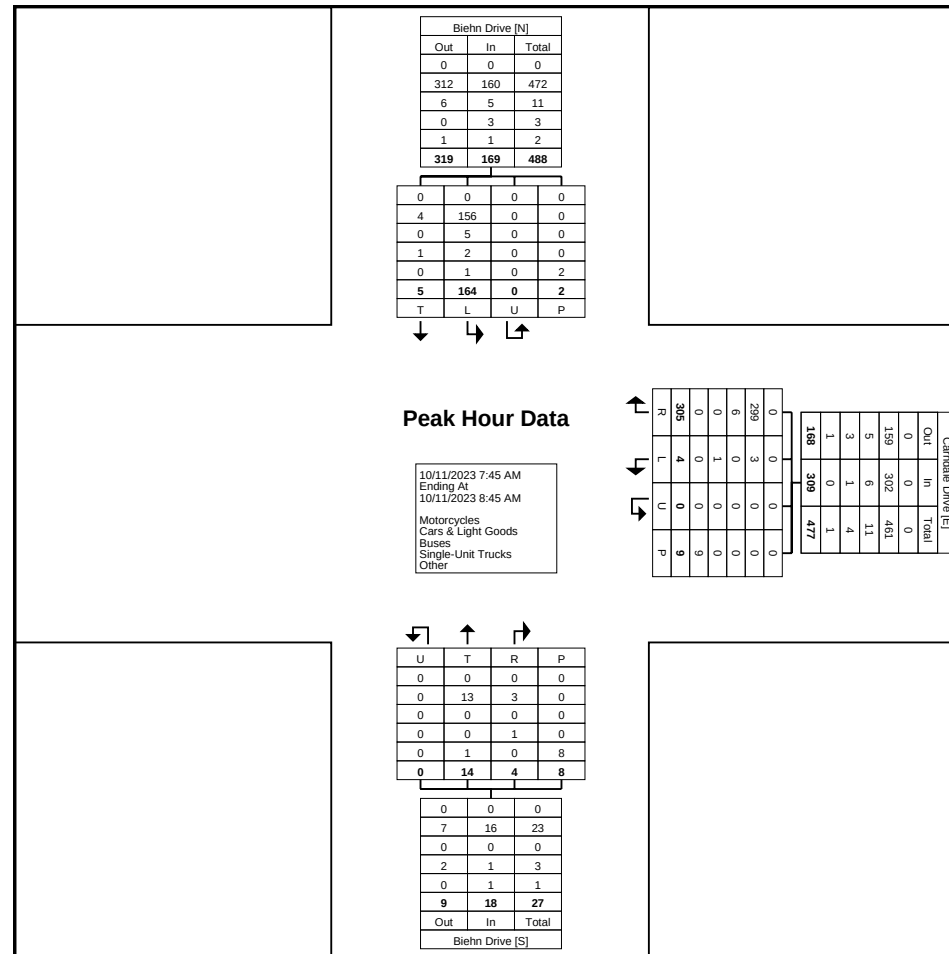
Start Time	Carndale Drive Westbound					Biehn Drive Northbound					Biehn Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:45 AM	1	97	0	1	98	2	1	0	1	3	44	0	0	0	44	145
8:00 AM	0	71	0	4	71	3	2	0	4	5	40	2	0	1	42	118
8:15 AM	2	64	0	3	66	4	0	0	3	4	34	1	0	1	35	105
8:30 AM	1	73	0	1	74	5	1	0	0	6	46	2	0	0	48	128
Total	4	305	0	9	309	14	4	0	8	18	164	5	0	2	169	496
Approach %	1.3	98.7	0.0	-	-	77.8	22.2	0.0	-	-	97.0	3.0	0.0	-	-	-
Total %	0.8	61.5	0.0	-	62.3	2.8	0.8	0.0	-	3.6	33.1	1.0	0.0	-	34.1	-
PHF	0.500	0.786	0.000	-	0.788	0.700	0.500	0.000	-	0.750	0.891	0.625	0.000	-	0.880	0.855
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	3	299	0	-	302	13	3	0	-	16	156	4	0	-	160	478
% Cars & Light Goods	75.0	98.0	-	-	97.7	92.9	75.0	-	-	88.9	95.1	80.0	-	-	94.7	96.4
Buses	0	6	0	-	6	0	0	0	-	0	5	0	0	-	5	11
% Buses	0.0	2.0	-	-	1.9	0.0	0.0	-	-	0.0	3.0	0.0	-	-	3.0	2.2
Single-Unit Trucks	1	0	0	-	1	0	1	0	-	1	2	1	0	-	3	5
% Single-Unit Trucks	25.0	0.0	-	-	0.3	0.0	25.0	-	-	5.6	1.2	20.0	-	-	1.8	1.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	-	-	0.0	7.1	0.0	-	-	5.6	0.6	0.0	-	-	0.6	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	12.5	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	9	-	-	-	-	7	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	87.5	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

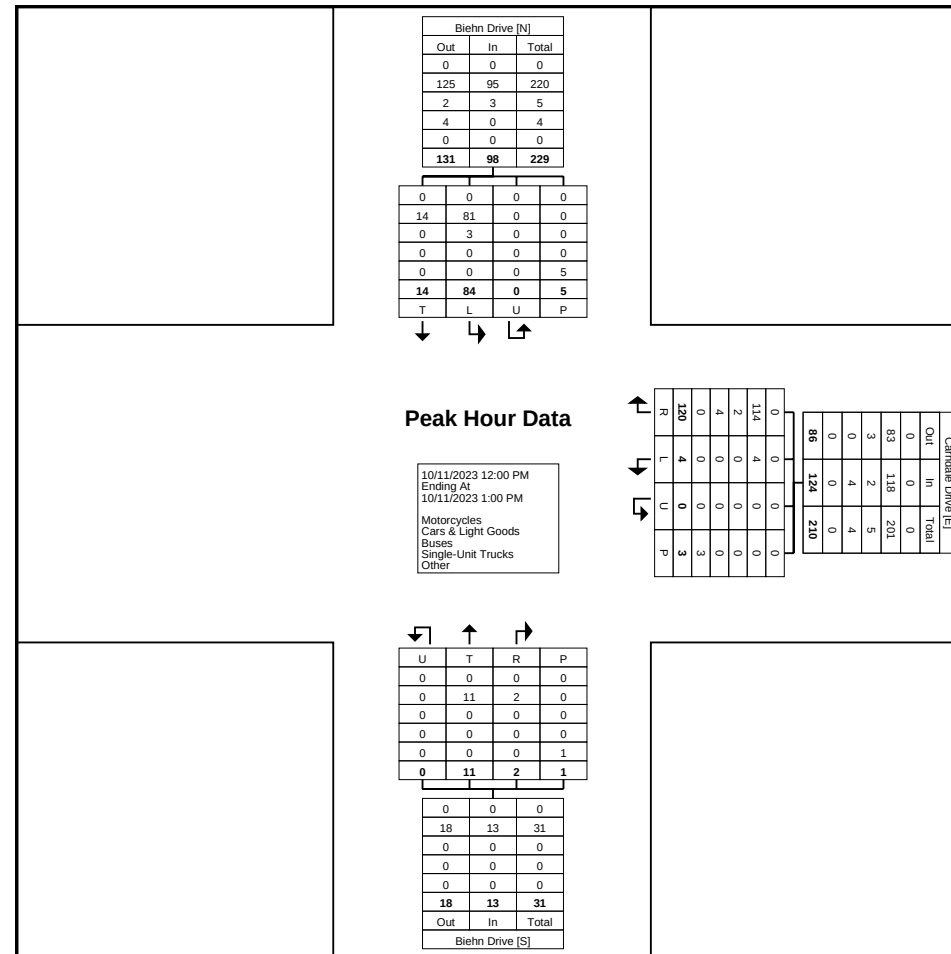
Start Time	Carndale Drive Westbound					Biehn Drive Northbound					Biehn Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:00 PM	2	39	0	2	41	2	0	0	1	2	24	5	0	0	29	72
12:15 PM	1	26	0	0	27	6	1	0	0	7	17	1	0	0	18	52
12:30 PM	0	31	0	0	31	2	0	0	0	2	20	4	0	0	24	57
12:45 PM	1	24	0	1	25	1	1	0	0	2	23	4	0	5	27	54
Total	4	120	0	3	124	11	2	0	1	13	84	14	0	5	98	235
Approach %	3.2	96.8	0.0	-	-	84.6	15.4	0.0	-	-	85.7	14.3	0.0	-	-	-
Total %	1.7	51.1	0.0	-	52.8	4.7	0.9	0.0	-	5.5	35.7	6.0	0.0	-	41.7	-
PHF	0.500	0.769	0.000	-	0.756	0.458	0.500	0.000	-	0.464	0.875	0.700	0.000	-	0.845	0.816
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	4	114	0	-	118	11	2	0	-	13	81	14	0	-	95	226
% Cars & Light Goods	100.0	95.0	-	-	95.2	100.0	100.0	-	-	100.0	96.4	100.0	-	-	96.9	96.2
Buses	0	2	0	-	2	0	0	0	-	0	3	0	0	-	3	5
% Buses	0.0	1.7	-	-	1.6	0.0	0.0	-	-	0.0	3.6	0.0	-	-	3.1	2.1
Single-Unit Trucks	0	4	0	-	4	0	0	0	-	0	0	0	0	-	0	4
% Single-Unit Trucks	0.0	3.3	-	-	3.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	1	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 7





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 8

Turning Movement Peak Hour Data (3:30 PM)

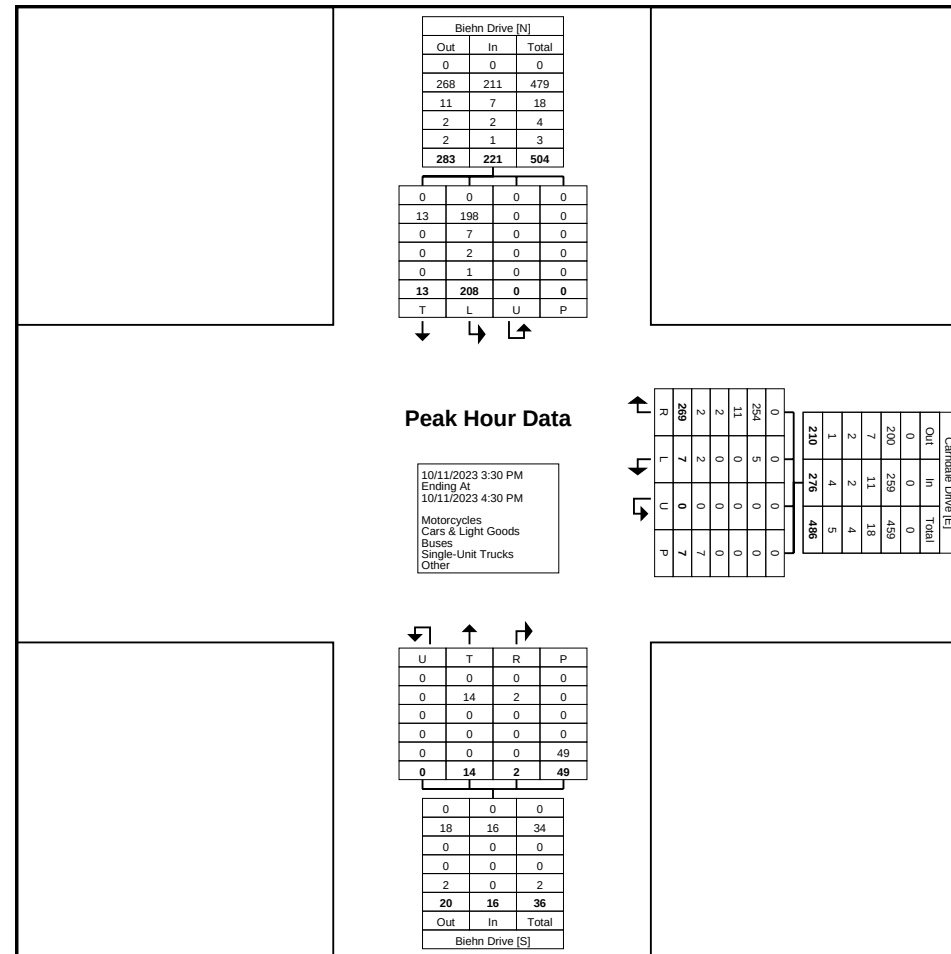
Start Time	Carndale Drive Westbound					Biehn Drive Northbound					Biehn Drive Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
3:30 PM	0	49	0	3	49	3	0	0	15	3	57	3	0	0	60	112
3:45 PM	3	86	0	3	89	6	0	0	31	6	56	5	0	0	61	156
4:00 PM	3	63	0	1	66	2	2	0	0	4	50	4	0	0	54	124
4:15 PM	1	71	0	0	72	3	0	0	3	3	45	1	0	0	46	121
Total	7	269	0	7	276	14	2	0	49	16	208	13	0	0	221	513
Approach %	2.5	97.5	0.0	-	-	87.5	12.5	0.0	-	-	94.1	5.9	0.0	-	-	-
Total %	1.4	52.4	0.0	-	53.8	2.7	0.4	0.0	-	3.1	40.5	2.5	0.0	-	43.1	-
PHF	0.583	0.782	0.000	-	0.775	0.583	0.250	0.000	-	0.667	0.912	0.650	0.000	-	0.906	0.822
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	5	254	0	-	259	14	2	0	-	16	198	13	0	-	211	486
% Cars & Light Goods	71.4	94.4	-	-	93.8	100.0	100.0	-	-	100.0	95.2	100.0	-	-	95.5	94.7
Buses	0	11	0	-	11	0	0	0	-	0	7	0	0	-	7	18
% Buses	0.0	4.1	-	-	4.0	0.0	0.0	-	-	0.0	3.4	0.0	-	-	3.2	3.5
Single-Unit Trucks	0	2	0	-	2	0	0	0	-	0	2	0	0	-	2	4
% Single-Unit Trucks	0.0	0.7	-	-	0.7	0.0	0.0	-	-	0.0	1.0	0.0	-	-	0.9	0.8
Articulated Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Articulated Trucks	14.3	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	1	2	0	-	3	0	0	0	-	0	1	0	0	-	1	4
% Bicycles on Road	14.3	0.7	-	-	1.1	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.5	0.8
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	6.1	-	-	-	-	-	-	-
Pedestrians	-	-	-	7	-	-	-	-	46	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	93.9	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Biehn Drive & Caryndale Drive
Site Code: 230376
Start Date: 10/11/2023
Page No: 9



Turning Movement Peak Hour Data Plot (3:30 PM)

Region of Waterloo

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 = 1,099
Example 2:	Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn Therefore, vehicles entering from the west = 187

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

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

Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Kitchener
Intersection: Doon Village Rd @ Pioneer Dr
Control: Signalized
Major Road: Doon Village Rd

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

GeoID: 21941
Count Date: Tuesday, 18-Oct-22

North Leg Total:	780	% Trks	2%	2%	8%	
North Entering:	385	Heavys	1	2	4	7
North Peds:	4	Trucks	0	4	3	7
Peds Cross:	✕	Cars	52	236	83	371
		Total	53	242	90	

Heavys	7
Trucks	5
Cars	383
Total	395

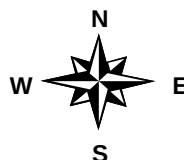
East Leg Total:	284
East Entering:	140
East Peds:	3
Peds Cross:	✕

Heavys	1
Trucks	0
Cars	116
Total	117

Pioneer Dr

% Trks	0%	Heavys	0	Trucks	0	Cars	50	Total	50
	4%		1		1		44		46
	14%		1		0		6		7
			2		1		100		

Doon Village Rd



Total	6	269	8
Cars	6	263	8
Trucks	0	3	0
Heavys	0	3	0
% Trks	0%	2%	0%

Total	6	269	8	277
Cars	6	263	8	
Trucks	0	3	0	3
Heavys	0	3	0	3
% Trks	0%	2%	0%	

Peds Cross:	✕
West Peds:	8
West Entering:	103
West leg Total:	220

Heavys	3
Trucks	4
Cars	248
Total	255

Total	76	Cars	70	Trucks	2	Heavys	4	% Trks	8%
	58		58		0		0		0%
	6		6		0		0		0%
	134				2		4		

Pioneer Dr

Cars	135	Trucks	4	Heavys	5	Total	144
------	-----	--------	---	--------	---	-------	-----

Peds Cross:	✕
South Peds:	3
South Entering:	283
South leg Total:	538

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 = **911**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **103**

Region of Waterloo

Comments

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

$$\text{Total Entering} = \text{West leg total entering} + \text{South leg total entering} + \text{East leg total entering} + \text{North leg total entering}$$

Example 1: Therefore, total vehicles entering intersection = **1,369**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **149**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Kitchener
Intersection: Doon Village Rd @ Pioneer Dr
Control: Signalized
Major Road: Doon Village Rd

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

GeoID: 21941
Count Date: Tuesday, 18-Oct-22

North Leg Total: 7,200
North Entering: 3,622
North Peds: 76
Peds Cross: ✕
Bicycles Entering: 4
Buggies Entering: 0

% Trks	2%	3%	6%	
Heavys	7	43	37	87
Trucks	4	29	5	38
Cars	467	2,372	658	3,497
Total	478	2,444	700	

Heavys	89
Trucks	30
Cars	3,459
Total	3,578

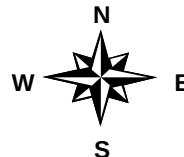
East Leg Total: 2,405
East Entering: 1,243
East Peds: 48
Peds Cross: ✕
Bicycles Entering: 2
Buggies Entering: 0

Heavys	20
Trucks	6
Cars	1,061
Total	1,087

Pioneer Dr

% Trks	2%	Heavys	7	Trucks	2	Cars	478	Total	487
	2%		6		3		396		405
	10%		8		2		95		105
			21		7		969		

Doon Village Rd



Total	657	Cars	613	Trucks	8	Heavys	36	% Trks	7%
	500		495		2		3		1%
	86		84		1		1		2%
			1,192		11		40		

Pioneer Dr

Cars	1,108	Trucks	11	Heavys	43	Total	1,162
------	-------	--------	----	--------	----	-------	-------

Peds Cross: ✕
West Peds: 90
West Entering: 997
West leg Total: 2,084
Bicycles Entering: 1
Buggies Entering: 0

Heavys	52
Trucks	32
Cars	2,551
Total	2,635

Total	109	2,434	57	
Cars	99	2,368	54	2,521
Trucks	0	20	3	23
Heavys	10	46	0	56
% Trks	9%	3%	5%	

Peds Cross: ✕
South Peds: 67
South Entering: 2,600
South leg Total: 5,235
Bicycles Entering: 2
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 = **8,462**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **997**

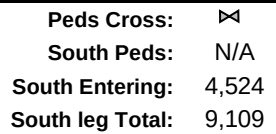
Notes: None

Region of Waterloo

Total Factor =	Monthly Factor	1	x	Daily Factor	1	x	24 Hour Factor	1.74	=	1.740000
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GeolD: 21941
Count Date: Tuesday, 18-Oct-22

East Leg Total:	4,185
East Entering:	2,163
East Peds:	N/A
Peds Cross:	X



Example:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 14,724

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Kitchener
Intersection: Doon Village Rd @ Pioneer Dr
Control: Signalized
Major Road: Doon Village Rd

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

GeoID: 21941
Count Date: Tuesday, 18-Oct-22

North Approach PHF

AM Peak: 0.91
 Mid-day Peak: 0.92
 PM Peak: 0.89

East Approach PHF

AM Peak: 0.82
 Mid-day Peak: 0.88
 PM Peak: 0.90

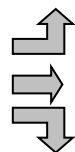
	Movement		
PM	0.78	0.91	0.87
MID	0.88	0.90	0.80
AM	0.85	0.85	0.82

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

Pioneer Dr

Movement	PM	MID	AM
	0.75	0.83	0.74
	0.67	0.61	0.69
	0.58	0.58	0.44

Doon Village Rd



Doon Village Rd



AM	MID	PM	Movement
0.71	0.86	0.84	
0.89	0.91	0.84	
0.63	0.75	0.42	

Pioneer Dr



0.65	0.89	0.38	AM
0.75	0.88	0.67	MID
0.41	0.88	0.38	PM
Movement			

South Approach PHF

AM Peak: 0.94
 Mid-day Peak: 0.90
 PM Peak: 0.86

West Approach PHF

AM Peak: 0.67
 Mid-day Peak: 0.70
 PM Peak: 0.75

Comments

Intersection: Doon Village Rd @ Pioneer Dr
GeoID: 21941
Municipality: Kitchener
Major Road: Doon Village Rd

Intersection Control: Signalized
Date: Tuesday, 18-Oct-22
Name: Cam
Weather: Cloudy/Wet

Approach Control	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Signalized			Signalized			Signalized			Signalized				
7:30 to 7:45	16	12	2	0	8	18	3	119	0	15	38	10	241	1,060 1,099 1,080 1,051 990 889 819 743 670
7:45 to 8:00	16	16	2	1	9	26	5	107	2	17	47	18	266	
8:00 to 8:15	19	14	3	1	9	19	9	102	0	10	68	21	275	
8:15 to 8:30	24	18	5	1	11	15	17	86	1	15	62	23	278	
8:30 to 8:45	30	27	13	2	10	14	13	87	0	14	54	16	280	
8:45 to 9:00	13	14	3	12	10	19	3	75	6	19	62	11	247	
9:00 to 9:15	13	10	3	3	14	27	4	101	4	15	39	13	246	
9:15 to 9:30	21	16	2	5	12	13	3	82	0	14	40	9	217	
9:30 to 9:45	11	11	2	0	6	20	2	72	2	11	34	8	179	
9:45 to 10:00	10	11	0	0	6	20	0	66	0	18	40	6	177	
10:00 to 10:15	12	6	3	3	5	22	4	47	1	16	39	12	170	743
10:15 to 10:30	12	3	1	0	9	13	0	46	0	18	35	7	144	670
AM Peak Hour														
7:45 to 8:45	89	75	23	5	39	74	44	382	3	56	231	78	1,099	
# of trucks in peak	0	0	0	0	2	1	0	1	0	1	10	0	15	
# of heavies in peak	4	2	3	1	1	6	5	6	0	5	12	2	47	
% heavies (Total)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%	6%	
12:00 to 12:15	12	6	2	2	13	22	2	71	2	24	67	14	237	911 879 888 857 829
12:15 to 12:30	15	19	3	2	16	22	1	56	3	17	59	13	226	
12:30 to 12:45	15	10	2	2	13	18	1	66	2	28	54	11	222	
12:45 to 13:00	8	11	0	0	16	14	2	76	1	21	62	15	226	
13:00 to 13:15	11	9	2	0	9	14	1	57	0	16	68	18	205	
13:15 to 13:30	15	10	1	0	9	21	0	60	0	29	78	12	235	
13:30 to 13:45	9	12	1	2	13	15	2	59	2	13	58	5	191	
13:45 to 14:00	10	7	0	2	6	13	0	53	4	21	71	11	198	
Midday Peak Hour														
12:00 to 13:00	50	46	7	6	58	76	6	269	8	90	242	53	911	
# of trucks in peak	0	1	0	0	0	2	0	3	0	3	4	0	13	
# of heavies in peak	0	1	1	0	0	4	0	3	0	4	2	1	16	
% heavies (Total)	0%	4%	14%	0%	0%	8%	0%	2%	0%	8%	2%	2%	3%	
15:00 to 15:15	26	20	18	6	19	26	8	77	5	11	98	12	326	1,340 1,340 1,369 1,356 1,323 1,352 1,359 1,336 1,339
15:15 to 15:30	15	11	8	3	21	26	2	66	2	27	114	21	316	
15:30 to 15:45	21	15	4	15	17	30	2	93	8	28	97	10	340	
15:45 to 16:00	17	27	6	8	29	18	8	82	4	38	103	18	358	
16:00 to 16:15	14	16	4	2	29	26	2	65	0	30	119	19	326	
16:15 to 16:30	11	14	0	0	23	27	1	88	0	39	120	22	345	
16:30 to 16:45	13	10	2	3	22	23	4	94	1	23	118	14	327	
16:45 to 17:00	10	11	1	2	19	25	3	79	2	30	114	29	325	
17:00 to 17:15	16	8	2	2	26	37	3	81	1	41	116	22	355	
17:15 to 17:30	19	8	3	3	42	27	1	62	2	31	135	19	352	
17:30 to 17:45	10	13	3	2	23	16	2	71	0	29	106	29	304	
17:45 to 18:00	23	10	4	2	26	11	1	88	2	22	129	10	328	
PM Peak Hour														
15:30 to 16:30	63	72	14	25	98	101	13	328	12	135	439	69	1,369	
# of trucks in peak	0	0	0	0	0	0	0	1	0	0	0	0	1	
# of heavies in peak	1	1	0	0	1	4	0	11	0	5	7	3	33	
% heavies (Total)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%	2%	

Intersection: Doon Village Rd @ Pioneer Dr
GeoID: 21941
Municipality: Kitchener
Major Road: Doon Village Rd

Intersection Control: Signalized
Date: Tuesday, 18-Oct-22
Name: Cam
Weather: Cloudy/Wet

PEDESTRIAN CROSSING									
Time			Crossing Approach						
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR	
7:30	to	7:45	3	1	1	4	9	36 41 52 65 60 50 37 25 17	
7:45	to	8:00	1	4	1	0	6		
8:00	to	8:15	1	3	1	0	5		
8:15	to	8:30	2	5	4	5	16		
8:30	to	8:45	1	3	4	6	14		
8:45	to	9:00	1	8	6	2	17		
9:00	to	9:15	2	9	4	3	18		
9:15	to	9:30	2	3	1	5	11		
9:30	to	9:45	1	3	0	0	4		
9:45	to	10:00	1	1	1	1	4		
10:00	to	10:15	0	3	3	0	6		
10:15	to	10:30	0	2	1	0	3		
AM Peak Hour							113		
7:45	to	8:45	5	15	10	11	41		
12:00	to	12:15	1	0	2	2	5	18 18 18 20 16	
12:15	to	12:30	1	3	0	0	4		
12:30	to	12:45	0	3	0	0	3		
12:45	to	13:00	1	2	2	1	6		
13:00	to	13:15	2	0	1	2	5		
13:15	to	13:30	1	0	1	2	4		
13:30	to	13:45	1	0	2	2	5		
13:45	to	14:00	1	0	0	1	2		
Midday Peak Hour							34		
12:00	to	13:00	3	8	4	3	18		
15:00	to	15:15	1	4	7	5	17	82 77 63 52 34 28 25 26 18	
15:15	to	15:30	3	6	4	7	20		
15:30	to	15:45	2	5	5	2	14		
15:45	to	16:00	2	12	11	6	31		
16:00	to	16:15	3	4	4	1	12		
16:15	to	16:30	2	0	3	1	6		
16:30	to	16:45	0	2	1	0	3		
16:45	to	17:00	6	1	2	4	13		
17:00	to	17:15	2	0	1	3	6		
17:15	to	17:30	2	0	0	1	3		
17:30	to	17:45	0	1	2	1	4		
17:45	to	18:00	2	2	1	0	5		
PM Peak Hour							134		
15:30	to	16:30	9	21	23	10	63		



CURRENT TRAFFIC SIGNAL TIMING

INT #	763	HOMER WATSON BLVD @ Manitou Dr/Doon Village Dr	T08-50/ 74K
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Date Prepared: October 13, 2023

Mode of Control Pre-timed running SEMI-ACTUATED

<u>Left Info</u>	Actuated	WB	LT	-	HOMER WATSON BLVD
	Actuated	EB	LT	-	HOMER WATSON BLVD
	Actuated	SB	LT	-	MANITOU DRIVE(Dual LT)
	Actuated	NB	LT	-	DOON VILLAGE

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

<u>Max 1</u>		05:30-10:00 & 14:00-19:00 Monday-Friday									
HOMER WATSON BLVD											
EBL	Green Arrow	Min	5.0	seconds	WBL	Green Arrow	Min	5.0	seconds		
		Ext	3.0	seconds			Ext	3.0	seconds		
		Max	25.0	seconds			Max	6.0	seconds		
EBL	Amber Arrow		3.0	seconds	WBL	Amber Arrow		3.0	seconds		
All Red			1.0	seconds	All Red			1.0	seconds		
Green			40.0	seconds							
Amber			4.2	seconds	Walk		22.0	seconds			
All Red			2.9	seconds	FDW		18.0	seconds			
Manitou Dr/Doon Village Dr											
SBL	Green Arrow	Min	5.0	seconds	NBL	Green Arrow	Min	5.0	seconds		
		Ext	5.0	seconds			Ext	3.0	seconds		
		Max	30.0	seconds			Max	25.0	seconds		
SBL	Amber Arrow		4.0	seconds	NBL	Amber Arrow		3.0	seconds		
All Red			2.0	seconds	All Red			1.0	seconds		
<u>Pedestrian Call</u>											
Green		Min	15.0	seconds	Green/Walk		10.0	seconds			
		Ext	3.0	seconds	Green/FDW		19.0	seconds			
		Max	20.0	seconds	Green/SDW		0.0	seconds			
Amber			3.7	seconds	Amber		3.7	seconds			
All Red			3.6	seconds	All Red		3.6	seconds			
TOTAL			139.4	seconds							

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

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

Max 2		10:00-14:00 & 19:00-22:00 M-F, 8:00-22:00 Sat, 9:00-20:00 Sun										
HOMER WATSON BLVD												
EBL	Green Arrow	Min	5.0	seconds	WBL	Green Arrow				Min	5.0	seconds
		Ext	3.0	seconds			Ext	3.0	seconds			
		Max	14.0	seconds			Max	6.0	seconds			
EBL	Amber Arrow		3.0	seconds	WBL	Amber Arrow					3.0	seconds
All Red			1.0	seconds	All Red						1.0	seconds
Green			30.0	seconds								
Amber			4.2	seconds	Walk		12.0	seconds				
All Red			2.9	seconds	FDW		18.0	seconds				
Manitou Dr/Doon Village Dr												
SBL	Green Arrow	Min	5.0	seconds	NBL	Green Arrow				Min	5.0	seconds
		Ext	5.0	seconds			Ext	3.0	seconds			
		Max	30.0	seconds			Max	15.0	seconds			
SBL	Amber Arrow		4.0	seconds	NBL	Amber Arrow					3.0	seconds
All Red			2.0	seconds	All Red						1.0	seconds
					<u>Pedestrian Call</u>							
Green		Min	15.0	seconds	Green/Walk		10.0	seconds				
		Ext	3.0	seconds	Green/FDW		19.0	seconds				
		Max	25.0	seconds	Green/SDW		0.0	seconds				
Amber			3.7	seconds	Amber		3.7	seconds				
All Red			3.6	seconds	All Red		3.6	seconds				
TOTAL			123.4	seconds								
Max 3		All Other Times										
HOMER WATSON BLVD												
Green			30.0	seconds								
Amber			4.2	seconds	Walk		12.0	seconds				
All Red			2.9	seconds	FDW		18.0	seconds				
Manitou Dr/Doon Village Dr												
SBL	Green Arrow	Min	5.0	seconds								
		Ext	5.0	seconds								
		Max	15.0	seconds								
SBL	Amber Arrow		4.0	seconds								
All Red			2.0	seconds								
					<u>Pedestrian Call</u>							
Green		Min	15.0	seconds	Green/Walk		10.0	seconds				
		Ext	3.0	seconds	Green/FDW		19.0	seconds				
		Max	15.0	seconds	Green/SDW		0.0	seconds				
Amber			3.7	seconds	Amber		3.7	seconds				
All Red			3.6	seconds	All Red		3.6	seconds				
TOTAL			80.4	seconds								

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

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



CURRENT TRAFFIC SIGNAL TIMING

INT #	765	HOMER WATSON BLVD @ Doon South Dr-Monarch Trail	T08-50/ 177K
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Date Prepared: October 13, 2023

Mode of Control FULLY-ACTUATED

Left Info Actuated - Fully Protected NB LT - HOMER WATSON BLVD

Max 1 06:00-10:00, 14:00-19:00 Monday to Friday

HOMER WATSON BLVD

NBL	Green Arrow		Min	10.0	seconds
			Ext	3.0	seconds
			Max	20.0	seconds
NBL	Amber Arrow			3.0	seconds
All Red				2.0	seconds

Pedestrian Call

Green		Min	20.0	seconds		Green/Walk	7.0	seconds
		Ext	5.0	seconds		Green/FDW	13.0	seconds
		Max	45.0	seconds		Green/SDW	25.0	seconds
Amber			4.2	seconds		Amber	4.2	seconds
All Red			2.4	seconds		All Red	2.4	seconds

Doon South Dr-Monarch Trail

Pedestrian Call

Green		Min	8.0	seconds		Green/Walk	8.0	seconds
		Ext	3.0	seconds		Green/FDW	15.0	seconds
		Max	35.0	seconds		Green/SDW	12.0	seconds
Amber			4.0	seconds		Amber	4.0	seconds
All Red			2.0	seconds		All Red	2.0	seconds
TOTAL				116.6	seconds			

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

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

Max 2
HOMER WATSON BLVD

All Other Times

NBL	Green Arrow	Min	10.0	seconds
		Ext	3.0	seconds
		Max	15.0	seconds
NBL	Amber Arrow		3.0	seconds
All Red			2.0	seconds

Green	Min	20.0	seconds
	Ext	5.0	seconds
	Max	30.0	seconds
Amber		4.2	seconds
All Red		2.4	seconds

Pedestrian Call

Green/Walk	7.0	seconds
Green/FDW	13.0	seconds
Green/SDW	10.0	seconds
Amber	4.2	seconds
All Red	2.4	seconds

Doon South Dr-Monarch Trail

Green	Min	8.0	seconds
	Ext	3.0	seconds
	Max	25.0	seconds
Amber		4.0	seconds
All Red		2.0	seconds
TOTAL		86.6	seconds

Pedestrian Call

Green/Walk	8.0	seconds
Green/FDW	15.0	seconds
Green/SDW	2.0	seconds
Amber	4.0	seconds
All Red	2.0	seconds



CURRENT TRAFFIC SIGNAL TIMING

INT #	914	HOMER WATSON BOULEVARD @ Conestoga College Boulevard	T08-50/ 181K
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Date Prepared: October 13, 2023

Mode of Control FULLY-ACTUATED

<u>Left Info</u>	Actuated	NB	LT	-	HOMER WATSON BOULEVARD
	Actuated (Dual)	SB	LT	-	HOMER WATSON BOULEVARD
	Actuated	EB	LT	-	CONESTOGA COLLEGE BOULEVAF
	Actuated	WB	LT	-	CONESTOGA COLLEGE BOULEVAF

Max 2 06:00-20:00 Monday to Friday, 07:00-18:00 Saturday, 09:00-18:00 Sunday

HOMER WATSON BOULEVARD

SBL	Green Arrow	Min	10.0	seconds	NBL	Green Arrow	Min	5.0	seconds
		Ext	3.0	seconds			Ext	3.0	seconds
		Max	25.0	seconds			Max	15.0	seconds
SBL	Amber Arrow		4.0	seconds	NBL	Amber Arrow		3.0	seconds
All Red			2.0	seconds	All Red			1.0	seconds
						<u>Pedestrian Call</u>			
Green		Min	20.0	seconds	Green/Walk		7.0	seconds	
		Ext	4.0	seconds	Green/FDW		19.0	seconds	
		Max	40.0	seconds	Green/SDW		14.0	seconds	
Amber			4.2	seconds	Amber		4.2	seconds	
All Red			2.2	seconds	All Red		2.2	seconds	

Conestoga College Boulevard

EBL	Green Arrow	Min	5.0	seconds	WBL	Green Arrow	Min	5.0	seconds
		Ext	3.0	seconds			Ext	0.0	seconds
		Max	7.0	seconds			Max	25.0	seconds
EBL	Amber Arrow		3.0	seconds	WBL	Amber Arrow		3.0	seconds
All Red			1.0	seconds	All Red			1.0	seconds
						<u>Pedestrian Call</u>			
Green		Min	10.0	seconds	Green/Walk		10.0	seconds	
		Ext	3.0	seconds	Green/FDW		24.0	seconds	
		Max	25.0	seconds	Green/SDW		0.0	seconds	
Amber			3.7	seconds	Amber		3.7	seconds	
All Red			2.7	seconds	All Red		2.7	seconds	
TOTAL			137.8	seconds					

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

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

<u>Max 1</u>		All other times							
HOMER WATSON BOULEVARD									
SBL	Green Arrow	Min	10.0	seconds	NBL	Green Arrow	Min	5.0	seconds
		Ext	3.0	seconds			Ext	3.0	seconds
		Max	7.0	seconds			Max	15.0	seconds
SBL	Amber Arrow		4.0	seconds	NBL	Amber Arrow		3.0	seconds
All Red			2.0	seconds	All Red			1.0	seconds
<u>Pedestrian Call</u>									
Green		Min	20.0	seconds	Green/Walk	7.0	seconds		
		Ext	4.0	seconds	Green/FDW	19.0	seconds		
		Max	35.0	seconds	Green/SDW	9.0	seconds		
Amber			4.2	seconds	Amber	4.2	seconds		
All Red			2.2	seconds	All Red	2.2	seconds		
Conestoga College Boulevard									
<u>Pedestrian Call</u>									
Green		Min	10.0	seconds	Green/Walk	10.0	seconds		
		Ext	3.0	seconds	Green/FDW	24.0	seconds		
		Max	25.0	seconds	Green/SDW	0.0	seconds		
Amber			3.7	seconds	Amber	3.7	seconds		
All Red			2.7	seconds	All Red	2.7	seconds		
TOTAL			91.8	seconds					

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

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



CURRENT TRAFFIC SIGNAL TIMING

INT #	916	HOMER WATSON @ HWY 401 WB Ramp/New Dundee Road	T08-50/ 182K
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Date Prepared: October 13, 2023

Mode of Control FULLY-ACTUATED

<u>Left Info</u>	Actuated	NB	LT	-	HOMER WATSON
	Actuated	WB	LT	-	HWY 401 WB RAMP/NEW DUNDEE

Max 1 06:00-20:00 Mon to Fri, 7:00-19:00 Sat, 09:00-18:00 Sun

HOMER WATSON

				NBL	Green Arrow	Min	5.0	seconds
						Ext	3.0	seconds
						Max	10.0	seconds
				NBL	Amber Arrow		3.0	seconds
					All Red		1.0	seconds
				<u>Pedestrian Call</u>				
Green	Min	20.0	seconds	Green/Walk	15.0	seconds		
	Ext	5.0	seconds	Green/FDW	5.0	seconds		
	Max	55.0	seconds	Green/SDW	35.0	seconds		
Amber		4.2	seconds	Amber	4.2	seconds		
All Red		2.7	seconds	All Red	2.7	seconds		

HWY 401 WB Ramp/New Dundee

				WBL	Green Arrow	Min	5.0	seconds
						Ext	5.0	seconds
						Max	10.0	seconds
				WBL	Amber Arrow		3.0	seconds
					All Red		1.0	seconds
				<u>Pedestrian Call</u>				
Green	Min	10.0	seconds	Green/Walk	7.0	seconds		
	Ext	5.0	seconds	Green/FDW	19.0	seconds		
	Max	30.0	seconds	Green/SDW	4.0	seconds		
Amber		3.7	seconds	Amber	3.7	seconds		
All Red		3.5	seconds	All Red	3.5	seconds		
TOTAL		127.1	seconds					

Max 2 All Other Times

HOMER WATSON

				<u>Pedestrian Call</u>				
Green	Min	20.0	seconds	Green/Walk	15.0	seconds		
	Ext	5.0	seconds	Green/FDW	5.0	seconds		
	Max	40.0	seconds	Green/SDW	20.0	seconds		
Amber		4.2	seconds	Amber	4.2	seconds		
All Red		2.7	seconds	All Red	2.7	seconds		

HWY 401 WB Ramp/New Dundee

Green	Min	10.0	seconds	Green/Walk	7.0	seconds
	Ext	5.0	seconds	Green/FDW	19.0	seconds
	Max	30.0	seconds	Green/SDW	4.0	seconds
Amber		3.7	seconds	Amber	3.7	seconds
All Red		3.5	seconds	All Red	3.5	seconds
TOTAL		84.1	seconds			

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

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

CURRENT TRAFFIC SIGNAL TIMING

INT # **854**

DOON VILLIAGE ROAD @ Pioneer Drive

T08-50/ **254K**

Date Prepared: **October 13, 2023**

Mode of Control **Fixed Time**

LPI **5 second LPI Monday-Friday (Sept-June), 8:30-9:05 & 15:25-15:55, all legs.**

Max 1

All Other Times

DOON VILLAGE ROAD

Green	30.0	seconds			
Amber	4.0	seconds	Walk	16.0	seconds
All Red	2.0	seconds	FDW	14.0	seconds

Pioneer Drive

Green	20.0	seconds			
Amber	4.0	seconds	Walk	9.0	seconds
All Red	2.0	seconds	FDW	11.0	seconds
TOTAL	62.0	seconds			

Max 1 (Timing Plan 2)

LPI: 8:30-9:05 & 15:25-15:55 Monday-Friday (Sept-June)

DOON VILLAGE ROAD

Green	35.0	seconds			
Amber	4.0	seconds	Walk	21.0	seconds
All Red	2.0	seconds	FDW	14.0	seconds

Pioneer Drive

Green	25.0	seconds			
Amber	4.0	seconds	Walk	14.0	seconds
All Red	2.0	seconds	FDW	11.0	seconds
TOTAL	72.0	seconds			

Appendix B

ATR Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Apple Ridge Drive (Forest Creek
Drive to Doon Mills Rd)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	14	0	0	0	0	14
7:15 AM	0	16	1	0	0	0	17
7:30 AM	0	15	1	0	0	0	16
7:45 AM	0	23	0	2	0	0	25
8:00 AM	0	39	0	1	0	0	40
8:15 AM	0	43	1	1	0	0	45
8:30 AM	0	29	1	1	0	0	31
8:45 AM	0	35	1	0	0	0	36
9:00 AM	0	22	1	2	0	0	25
9:15 AM	0	18	3	0	0	0	21
9:30 AM	0	28	1	0	0	0	29
9:45 AM	0	19	0	1	0	0	20
10:00 AM	0	21	0	1	0	0	22
10:15 AM	0	23	0	0	0	0	23
10:30 AM	0	28	1	1	0	0	30
10:45 AM	0	16	0	0	0	0	16
11:00 AM	0	24	0	2	0	0	26
11:15 AM	0	13	0	0	0	0	13
11:30 AM	0	28	0	0	0	0	28
11:45 AM	0	38	0	0	0	0	38
12:00 PM	0	28	0	0	0	0	28
12:15 PM	0	26	0	0	0	0	26
12:30 PM	0	25	0	0	0	0	25
12:45 PM	0	33	0	1	0	1	35
1:00 PM	0	27	0	1	0	0	28
1:15 PM	0	41	0	0	0	0	41
1:30 PM	0	27	0	0	0	0	27
1:45 PM	0	34	0	0	0	0	34
2:00 PM	0	35	1	0	0	0	36
2:15 PM	0	38	0	0	0	0	38
2:30 PM	0	34	0	0	0	0	34
2:45 PM	0	47	2	0	0	0	49
3:00 PM	0	51	2	0	0	0	53
3:15 PM	0	41	1	0	0	0	42
3:30 PM	0	53	1	0	0	0	54
3:45 PM	0	49	2	0	0	0	51
4:00 PM	0	57	0	0	0	0	57
4:15 PM	0	76	1	0	0	0	77
4:30 PM	0	55	0	0	0	0	55

4:45 PM	0	71	0	0	0	0	71
5:00 PM	0	54	0	0	0	0	54
5:15 PM	0	83	0	0	0	0	83
5:30 PM	0	81	0	1	0	0	82
5:45 PM	0	63	0	0	0	0	63
Total	0	1621	21	15	0	1	1658
Total %	0.0	97.8	1.3	0.9	0.0	0.1	100.0
AM Times	7:00 AM	7:30 AM	8:15 AM	9:00 AM	7:00 AM	7:00 AM	7:30 AM
AM Peaks	0	120	4	3	0	0	126
PM Times	12:00 PM	4:00 PM	2:45 PM	12:45 PM	12:00 PM	12:00 PM	3:30 PM
PM Peaks	0	259	6	2	0	1	239



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Apple Ridge Drive (Forest Creek
Drive to Doon Mills Rd)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	34	1	0	0	1	36
7:15 AM	0	39	2	0	0	0	41
7:30 AM	0	67	3	0	0	0	70
7:45 AM	0	81	0	1	0	0	82
8:00 AM	0	74	1	0	0	0	75
8:15 AM	0	63	4	1	0	0	68
8:30 AM	0	51	1	0	0	0	52
8:45 AM	0	50	0	1	0	0	51
9:00 AM	0	63	2	1	0	0	66
9:15 AM	0	51	2	2	0	0	55
9:30 AM	0	23	0	1	0	0	24
9:45 AM	0	32	0	1	0	0	33
10:00 AM	0	33	0	1	0	0	34
10:15 AM	0	25	0	0	0	0	25
10:30 AM	0	25	0	0	0	0	25
10:45 AM	0	29	0	1	0	0	30
11:00 AM	0	35	0	0	0	0	35
11:15 AM	0	30	0	0	0	0	30
11:30 AM	0	44	0	0	0	0	44
11:45 AM	0	36	0	1	0	0	37
12:00 PM	0	34	0	0	0	0	34
12:15 PM	0	42	0	0	0	0	42
12:30 PM	0	24	0	0	0	0	24
12:45 PM	0	33	0	1	0	0	34
1:00 PM	0	33	0	0	0	0	33
1:15 PM	0	33	0	0	0	0	33
1:30 PM	0	33	1	1	0	0	35
1:45 PM	0	30	0	1	0	0	31
2:00 PM	0	35	0	0	0	0	35
2:15 PM	0	30	0	0	0	0	30
2:30 PM	0	30	0	0	0	0	30
2:45 PM	0	41	2	0	0	0	43
3:00 PM	0	42	0	1	0	0	43
3:15 PM	0	26	2	1	0	0	29
3:30 PM	0	67	2	0	0	0	69
3:45 PM	0	60	1	0	0	0	61
4:00 PM	0	53	0	2	0	0	55
4:15 PM	0	64	0	0	0	0	64
4:30 PM	0	55	0	0	0	1	56

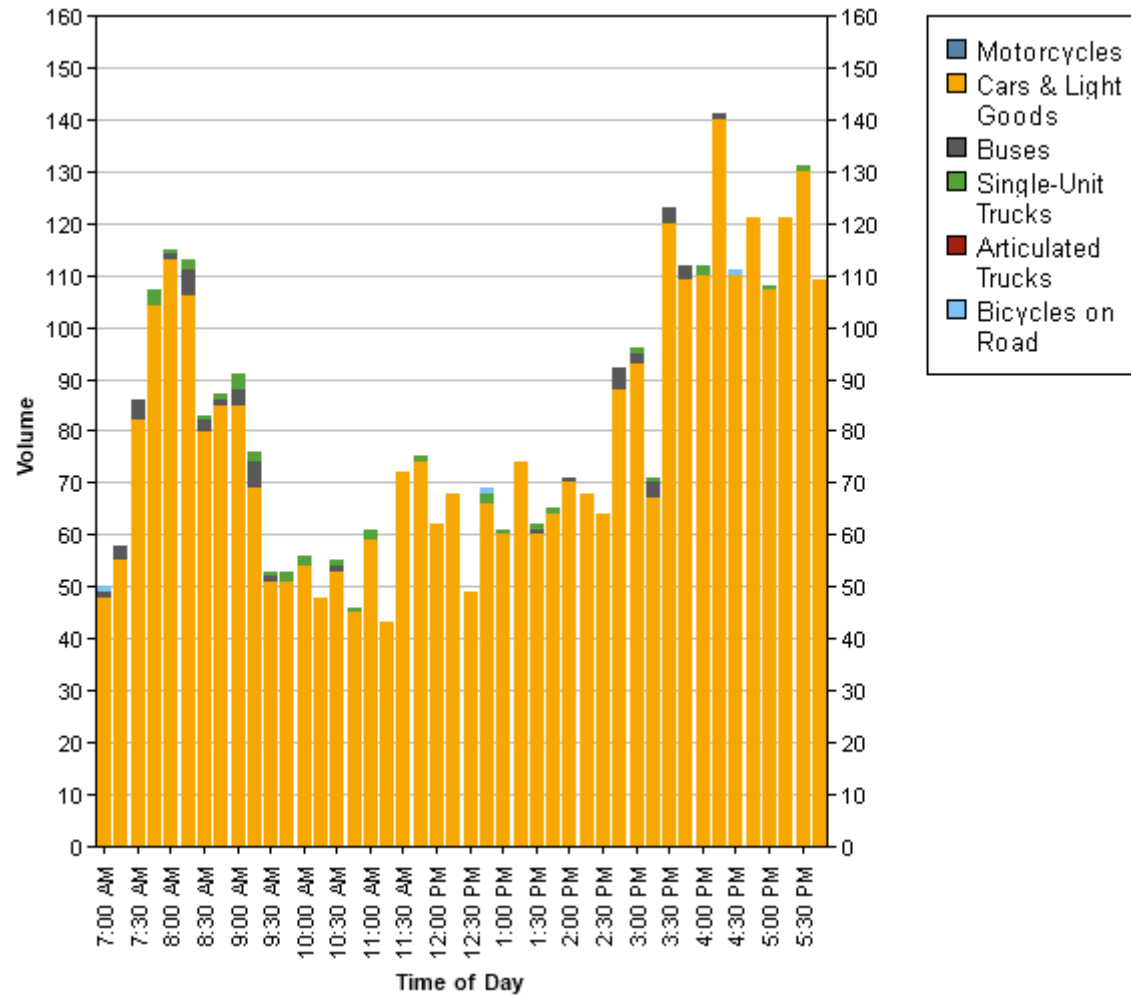
4:45 PM	0	50	0	0	0	0	50
5:00 PM	0	53	0	1	0	0	54
5:15 PM	0	38	0	0	0	0	38
5:30 PM	0	49	0	0	0	0	49
5:45 PM	0	46	0	0	0	0	46
Total	0	1886	24	19	0	2	1931
Total %	0.0	97.7	1.2	1.0	0.0	0.1	100.0
AM Times	7:00 AM	7:30 AM	8:15 AM	9:00 AM	7:00 AM	7:00 AM	7:30 AM
AM Peaks	0	285	7	5	0	1	295
PM Times	12:00 PM	4:00 PM	2:45 PM	12:45 PM	12:00 PM	12:00 PM	3:30 PM
PM Peaks	0	222	6	2	0	0	249



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Apple Ridge Drive (Forest Creek
Drive to Doon Mills Rd)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive (Caryndale Drive to
Black Walnut Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	18	1	0	0	1	20
7:15 AM	0	24	3	0	0	0	27
7:30 AM	0	25	0	0	0	0	25
7:45 AM	0	48	3	0	0	1	52
8:00 AM	0	50	0	0	0	0	50
8:15 AM	0	36	2	1	0	0	39
8:30 AM	0	54	0	0	0	0	54
8:45 AM	0	31	0	0	0	0	31
9:00 AM	0	47	1	0	0	0	48
9:15 AM	0	58	1	0	0	2	61
9:30 AM	0	28	1	1	0	0	30
9:45 AM	0	24	0	2	0	0	26
10:00 AM	0	15	0	1	0	1	17
10:15 AM	0	21	0	1	0	0	22
10:30 AM	0	25	0	2	0	0	27
10:45 AM	0	21	0	3	0	1	25
11:00 AM	0	33	0	1	1	0	35
11:15 AM	0	27	0	1	0	0	28
11:30 AM	0	32	0	0	0	0	32
11:45 AM	0	24	0	2	0	0	26
12:00 PM	0	36	3	0	0	0	39
12:15 PM	0	29	0	0	0	0	29
12:30 PM	0	32	0	0	0	0	32
12:45 PM	0	39	0	0	0	0	39
1:00 PM	0	44	0	2	0	0	46
1:15 PM	0	37	0	2	0	0	39
1:30 PM	0	43	0	0	0	0	43
1:45 PM	1	31	1	0	0	0	33
2:00 PM	0	30	0	1	0	0	31
2:15 PM	0	27	2	0	0	0	29
2:30 PM	0	45	0	2	0	0	47
2:45 PM	0	76	9	0	0	0	85
3:00 PM	0	69	0	0	0	1	70
3:15 PM	0	56	1	0	0	0	57
3:30 PM	0	77	2	1	0	1	81
3:45 PM	0	67	4	0	0	0	71
4:00 PM	0	66	1	1	0	0	68
4:15 PM	0	65	0	0	0	0	65
4:30 PM	0	67	1	0	0	0	68

4:45 PM	0	79	0	2	0	0	81
5:00 PM	0	67	0	1	0	1	69
5:15 PM	0	85	0	1	0	0	86
5:30 PM	0	85	0	0	0	0	85
5:45 PM	0	51	0	1	0	0	52
Total	1	1944	36	29	1	9	2020
Total %	0.0	96.2	1.8	1.4	0.0	0.4	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	10:00 AM	10:15 AM	9:15 AM	7:45 AM
AM Peaks	0	188	7	7	1	3	195
PM Times	1:00 PM	4:45 PM	3:15 PM	2:00 PM	3:15 PM	3:00 PM	3:30 PM
PM Peaks	1	316	8	3	0	2	285



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Biehn Drive (Caryndale Drive to
Black Walnut Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	40	0	0	0	1	41
7:15 AM	0	42	0	0	0	0	42
7:30 AM	0	69	6	0	0	0	75
7:45 AM	0	116	4	0	0	0	120
8:00 AM	0	94	1	0	0	0	95
8:15 AM	0	81	1	0	0	0	82
8:30 AM	0	95	0	0	0	0	95
8:45 AM	0	67	2	1	0	0	70
9:00 AM	0	60	3	0	0	0	63
9:15 AM	0	83	5	0	0	1	89
9:30 AM	0	71	0	1	0	0	72
9:45 AM	0	37	0	2	0	1	40
10:00 AM	0	46	0	2	0	0	48
10:15 AM	0	31	0	3	0	0	34
10:30 AM	0	21	0	2	0	1	24
10:45 AM	0	54	0	2	0	0	56
11:00 AM	0	32	0	1	0	0	33
11:15 AM	0	35	0	0	0	0	35
11:30 AM	0	37	0	0	0	1	38
11:45 AM	0	45	0	3	0	0	48
12:00 PM	0	42	2	0	0	0	44
12:15 PM	0	41	0	3	0	0	44
12:30 PM	0	42	0	1	0	0	43
12:45 PM	0	33	0	1	0	0	34
1:00 PM	0	37	0	0	0	0	37
1:15 PM	0	40	1	0	0	0	41
1:30 PM	0	31	0	1	0	0	32
1:45 PM	0	38	1	0	0	0	39
2:00 PM	0	57	1	2	0	0	60
2:15 PM	0	56	0	3	0	1	60
2:30 PM	0	48	1	1	0	0	50
2:45 PM	0	48	0	2	0	0	50
3:00 PM	0	50	1	0	0	0	51
3:15 PM	0	43	0	0	0	0	43
3:30 PM	0	60	1	0	0	0	61
3:45 PM	0	100	4	1	0	1	106
4:00 PM	0	65	5	0	1	0	71
4:15 PM	0	77	0	1	0	1	79
4:30 PM	0	63	1	1	0	0	65

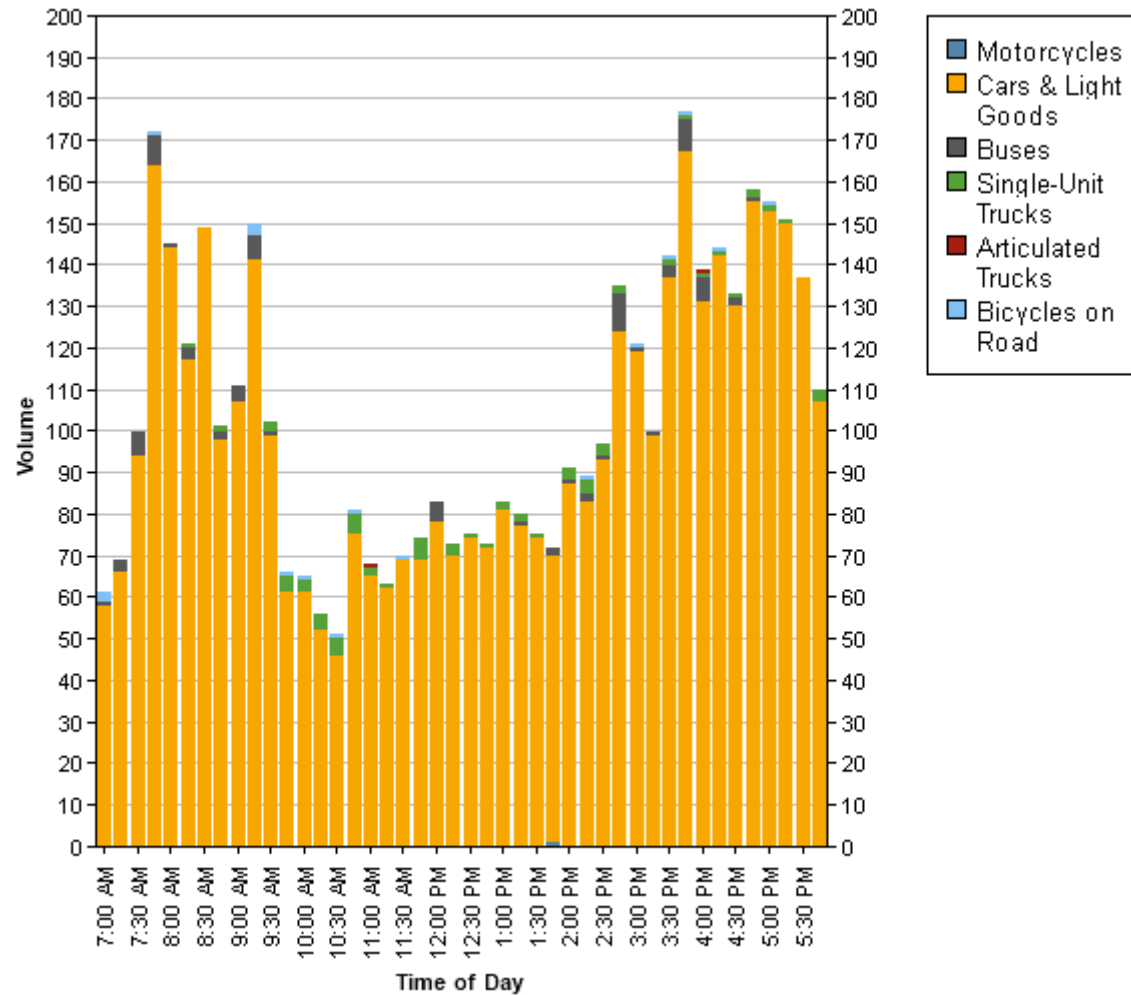
4:45 PM	0	76	1	0	0	0	77
5:00 PM	0	86	0	0	0	0	86
5:15 PM	0	65	0	0	0	0	65
5:30 PM	0	52	0	0	0	0	52
5:45 PM	0	56	0	2	0	0	58
Total	0	2462	41	36	1	8	2548
Total %	0.0	96.6	1.6	1.4	0.0	0.3	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	10:00 AM	10:15 AM	9:15 AM	7:45 AM
AM Peaks	0	386	10	9	0	2	392
PM Times	1:00 PM	4:45 PM	3:15 PM	2:00 PM	3:15 PM	3:00 PM	3:30 PM
PM Peaks	0	279	10	8	1	1	317



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbovness@ptsil.com

Count Name: Biehn Drive (Caryndale Drive to
Black Walnut Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Caryndale Drive (Evenstone
Avenue to Chapel Hill Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	13	1	0	0	1	15
7:15 AM	0	21	1	0	0	0	22
7:30 AM	0	13	1	0	0	0	14
7:45 AM	0	32	3	0	0	0	35
8:00 AM	0	20	0	0	0	0	20
8:15 AM	0	25	1	0	1	0	27
8:30 AM	0	31	0	0	0	0	31
8:45 AM	0	19	0	0	0	0	19
9:00 AM	0	20	0	0	0	0	20
9:15 AM	0	41	0	0	0	1	42
9:30 AM	0	21	0	1	0	0	22
9:45 AM	0	16	0	0	0	0	16
10:00 AM	0	11	0	0	0	0	11
10:15 AM	0	8	0	1	0	0	9
10:30 AM	0	11	0	1	0	0	12
10:45 AM	0	16	0	2	0	0	18
11:00 AM	0	11	0	1	1	0	13
11:15 AM	0	9	0	1	0	0	10
11:30 AM	0	19	0	0	0	0	19
11:45 AM	0	17	0	3	0	0	20
12:00 PM	0	16	1	1	0	0	18
12:15 PM	0	9	0	0	0	0	9
12:30 PM	0	10	0	0	0	0	10
12:45 PM	0	15	0	0	0	0	15
1:00 PM	0	20	0	0	0	1	21
1:15 PM	0	21	0	0	0	1	22
1:30 PM	0	29	0	1	0	0	30
1:45 PM	0	14	0	0	0	1	15
2:00 PM	0	17	0	0	0	0	17
2:15 PM	0	10	1	1	0	0	12
2:30 PM	0	18	1	0	0	0	19
2:45 PM	0	40	9	0	0	0	49
3:00 PM	0	21	0	0	0	0	21
3:15 PM	0	27	3	0	0	0	30
3:30 PM	0	30	1	1	0	0	32
3:45 PM	0	64	4	1	0	0	69
4:00 PM	0	49	2	1	0	0	52
4:15 PM	0	31	0	0	0	0	31
4:30 PM	0	39	0	0	0	0	39

4:45 PM	0	49	0	1	0	0	50
5:00 PM	0	45	0	2	0	0	47
5:15 PM	0	49	0	1	0	0	50
5:30 PM	0	41	0	0	0	0	41
5:45 PM	0	28	0	2	0	0	30
Total	0	1066	29	22	2	5	1124
Total %	0.0	94.8	2.6	2.0	0.2	0.4	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	10:00 AM	7:30 AM	7:00 AM	7:45 AM
AM Peaks	0	108	6	4	1	1	113
PM Times	12:00 PM	4:45 PM	3:15 PM	5:00 PM	1:45 PM	1:00 PM	3:45 PM
PM Peaks	0	184	10	5	0	3	191



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Caryndale Drive (Evenstone
Avenue to Chapel Hill Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	16	0	0	0	0	16
7:15 AM	0	22	0	0	0	2	24
7:30 AM	0	41	7	0	0	0	48
7:45 AM	0	72	4	0	0	0	76
8:00 AM	0	49	0	0	0	0	49
8:15 AM	0	57	0	0	0	0	57
8:30 AM	0	53	1	0	0	0	54
8:45 AM	0	43	2	0	0	0	45
9:00 AM	0	48	4	1	0	0	53
9:15 AM	0	52	2	0	0	0	54
9:30 AM	0	21	0	0	0	0	21
9:45 AM	0	26	0	0	0	0	26
10:00 AM	0	16	0	2	0	0	18
10:15 AM	0	19	0	2	0	0	21
10:30 AM	0	16	0	2	0	1	19
10:45 AM	0	21	0	2	0	0	23
11:00 AM	0	18	0	0	0	0	18
11:15 AM	0	19	0	0	0	0	19
11:30 AM	0	15	0	0	0	0	15
11:45 AM	0	32	0	3	0	0	35
12:00 PM	0	27	0	0	0	0	27
12:15 PM	0	15	0	3	0	0	18
12:30 PM	0	26	0	1	0	0	27
12:45 PM	0	14	0	1	0	0	15
1:00 PM	0	18	0	0	0	0	18
1:15 PM	0	17	0	0	0	3	20
1:30 PM	0	22	0	0	0	0	22
1:45 PM	0	27	0	1	0	0	28
2:00 PM	0	37	0	1	1	0	39
2:15 PM	0	30	0	1	0	0	31
2:30 PM	0	26	2	1	1	0	30
2:45 PM	0	26	0	2	0	0	28
3:00 PM	0	32	0	0	0	0	32
3:15 PM	0	30	0	1	0	0	31
3:30 PM	0	40	4	0	0	0	44
3:45 PM	0	47	3	1	0	0	51
4:00 PM	0	43	3	1	0	1	48
4:15 PM	0	57	1	1	0	0	59
4:30 PM	0	42	0	0	0	0	42

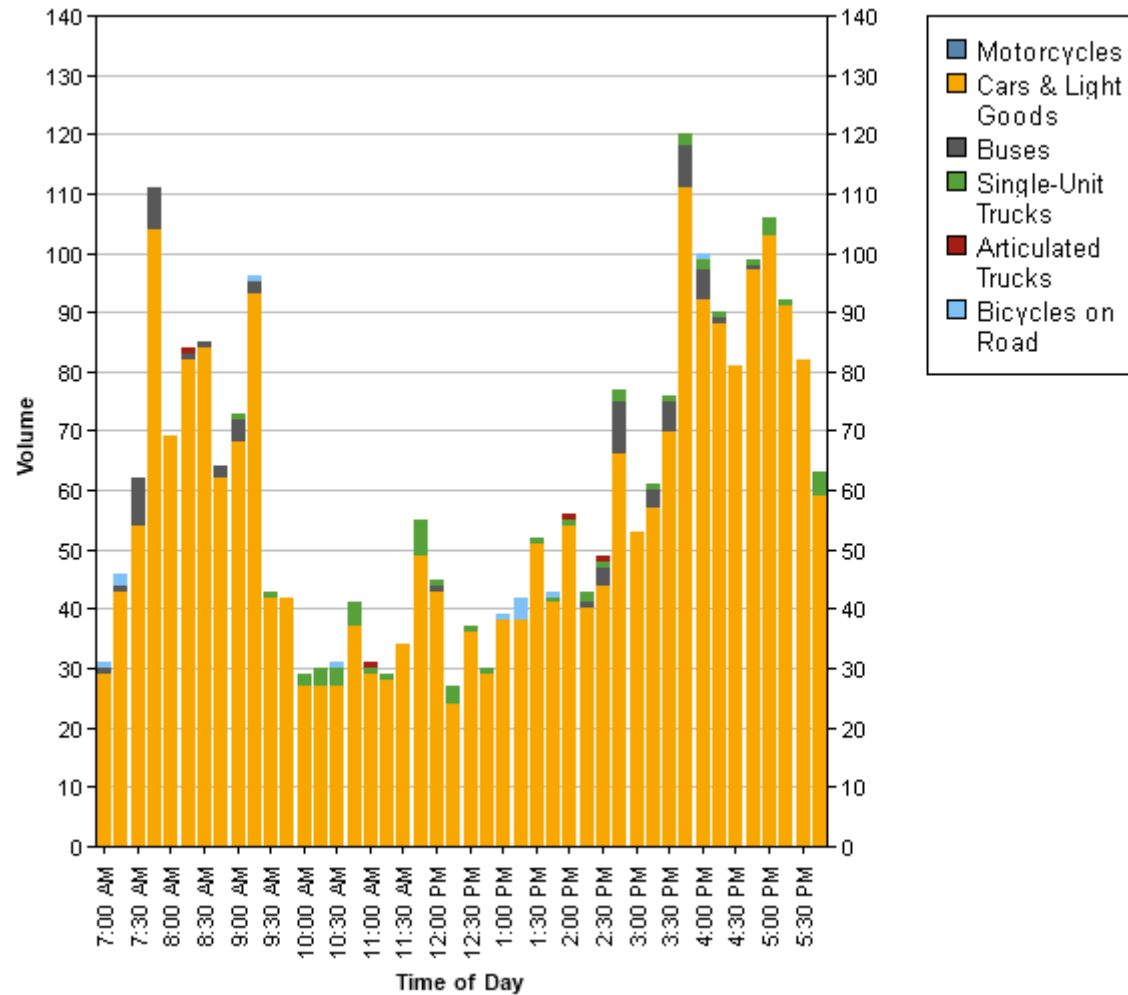
4:45 PM	0	48	1	0	0	0	49
5:00 PM	0	58	0	1	0	0	59
5:15 PM	0	42	0	0	0	0	42
5:30 PM	0	41	0	0	0	0	41
5:45 PM	0	31	0	2	0	0	33
Total	0	1452	34	30	2	7	1525
Total %	0.0	95.2	2.2	2.0	0.1	0.5	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	10:00 AM	7:30 AM	7:00 AM	7:45 AM
AM Peaks	0	231	11	8	0	2	236
PM Times	12:00 PM	4:45 PM	3:15 PM	5:00 PM	1:45 PM	1:00 PM	3:45 PM
PM Peaks	0	189	10	3	2	3	200



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Caryndale Drive (Evenstone
Avenue to Chapel Hill Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Caryndale Drive (Evenstone
Avenue to Stauffer Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	9	0	0	0	0	9
7:15 AM	0	25	0	0	0	0	25
7:30 AM	0	13	0	0	0	0	13
7:45 AM	0	20	0	0	0	0	20
8:00 AM	0	15	0	0	0	0	15
8:15 AM	0	14	0	2	0	0	16
8:30 AM	0	17	0	1	0	0	18
8:45 AM	0	15	0	0	0	0	15
9:00 AM	0	10	0	0	0	0	10
9:15 AM	0	6	0	0	0	1	7
9:30 AM	0	4	0	0	0	0	4
9:45 AM	0	6	0	0	0	0	6
10:00 AM	0	5	0	0	0	0	5
10:15 AM	0	4	0	0	0	0	4
10:30 AM	0	2	0	0	0	0	2
10:45 AM	0	7	1	0	0	0	8
11:00 AM	0	6	0	0	0	0	6
11:15 AM	0	4	0	0	0	0	4
11:30 AM	0	1	0	0	0	0	1
11:45 AM	0	6	0	1	0	0	7
12:00 PM	0	9	0	0	0	0	9
12:15 PM	0	4	0	0	0	0	4
12:30 PM	0	4	0	0	0	0	4
12:45 PM	0	5	0	0	0	0	5
1:00 PM	0	5	0	0	0	0	5
1:15 PM	0	3	0	0	0	0	3
1:30 PM	0	11	0	1	0	1	13
1:45 PM	1	7	0	1	0	0	9
2:00 PM	0	7	0	0	0	0	7
2:15 PM	0	5	0	0	0	0	5
2:30 PM	0	7	0	0	0	0	7
2:45 PM	0	4	1	0	0	0	5
3:00 PM	0	13	0	0	0	0	13
3:15 PM	0	14	0	0	0	0	14
3:30 PM	0	10	0	0	0	0	10
3:45 PM	0	12	0	0	0	0	12
4:00 PM	0	16	0	0	0	0	16
4:15 PM	0	17	1	0	0	0	18
4:30 PM	0	10	0	0	0	0	10

4:45 PM	0	19	0	0	0	0	19
5:00 PM	0	19	0	1	0	0	20
5:15 PM	0	15	0	0	0	0	15
5:30 PM	0	11	0	0	0	0	11
5:45 PM	0	4	0	0	0	0	4
Total	1	420	3	7	0	2	433
Total %	0.2	97.0	0.7	1.6	0.0	0.5	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	7:45 AM	7:00 AM	8:30 AM	7:45 AM
AM Peaks	0	66	0	3	0	1	69
PM Times	1:00 PM	4:15 PM	2:30 PM	1:30 PM	12:00 PM	1:00 PM	4:15 PM
PM Peaks	1	65	1	2	0	1	67



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Caryndale Drive (Evenstone
Avenue to Stauffer Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	2	0	0	0	0	2
7:15 AM	0	3	2	0	0	0	5
7:30 AM	0	6	2	0	0	0	8
7:45 AM	0	16	1	1	0	0	18
8:00 AM	0	16	0	0	0	0	16
8:15 AM	0	23	1	1	0	0	25
8:30 AM	0	10	0	0	0	0	10
8:45 AM	0	14	1	1	0	0	16
9:00 AM	0	16	0	0	0	0	16
9:15 AM	0	6	0	0	0	0	6
9:30 AM	0	5	0	0	0	0	5
9:45 AM	0	8	0	1	0	0	9
10:00 AM	0	5	0	0	0	0	5
10:15 AM	0	10	0	1	0	0	11
10:30 AM	0	4	0	0	0	1	5
10:45 AM	0	8	0	0	0	0	8
11:00 AM	0	7	0	0	0	0	7
11:15 AM	0	2	0	0	0	0	2
11:30 AM	0	5	0	0	0	0	5
11:45 AM	0	11	0	2	0	0	13
12:00 PM	0	7	0	0	0	0	7
12:15 PM	0	6	0	0	0	0	6
12:30 PM	0	8	0	0	0	0	8
12:45 PM	0	9	0	0	0	0	9
1:00 PM	0	6	0	0	0	0	6
1:15 PM	0	5	0	0	0	0	5
1:30 PM	0	13	0	0	0	0	13
1:45 PM	0	11	0	1	0	1	13
2:00 PM	0	20	0	0	0	0	20
2:15 PM	0	20	0	1	0	0	21
2:30 PM	0	14	0	0	0	0	14
2:45 PM	0	13	0	0	0	0	13
3:00 PM	0	16	1	0	0	0	17
3:15 PM	0	18	1	0	0	0	19
3:30 PM	0	21	0	0	0	0	21
3:45 PM	0	19	1	0	0	0	20
4:00 PM	0	32	1	0	0	0	33
4:15 PM	0	41	0	0	0	0	41
4:30 PM	0	26	0	0	0	0	26

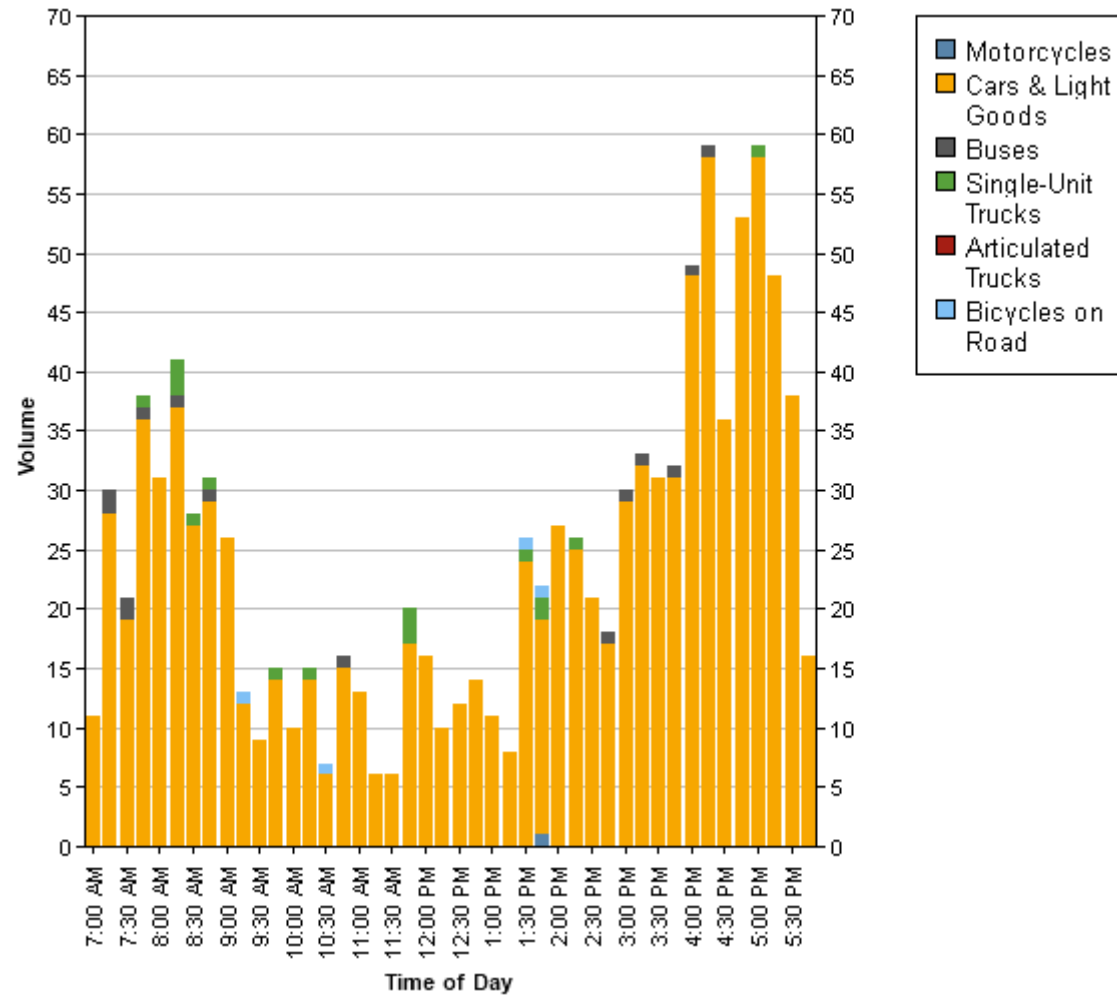
4:45 PM	0	34	0	0	0	0	34
5:00 PM	0	39	0	0	0	0	39
5:15 PM	0	33	0	0	0	0	33
5:30 PM	0	27	0	0	0	0	27
5:45 PM	0	12	0	0	0	0	12
Total	0	627	11	9	0	2	649
Total %	0.0	96.6	1.7	1.4	0.0	0.3	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	7:45 AM	7:00 AM	8:30 AM	7:45 AM
AM Peaks	0	65	5	2	0	0	69
PM Times	1:00 PM	4:15 PM	2:30 PM	1:30 PM	12:00 PM	1:00 PM	4:15 PM
PM Peaks	0	140	2	2	0	1	140



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Caryndale Drive (Evenstone
Avenue to Stauffer Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Mills Drive (Anvil Street to
Tilt Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	27	5	1	0	0	33
7:15 AM	0	28	4	0	0	0	32
7:30 AM	0	44	9	2	0	0	55
7:45 AM	0	55	3	0	0	0	58
8:00 AM	0	85	4	1	0	0	90
8:15 AM	0	61	5	0	0	0	66
8:30 AM	0	72	3	1	0	0	76
8:45 AM	0	66	2	0	0	0	68
9:00 AM	0	56	3	1	0	0	60
9:15 AM	0	41	3	0	0	0	44
9:30 AM	0	43	2	1	0	1	47
9:45 AM	0	44	0	2	0	0	46
10:00 AM	0	40	1	1	0	0	42
10:15 AM	0	42	0	0	0	0	42
10:30 AM	0	63	2	0	0	0	65
10:45 AM	0	43	0	1	0	0	44
11:00 AM	0	52	0	2	0	0	54
11:15 AM	0	51	1	0	0	0	52
11:30 AM	0	63	0	0	0	0	63
11:45 AM	0	62	0	0	0	0	62
12:00 PM	0	73	0	1	0	0	74
12:15 PM	0	59	0	0	0	0	59
12:30 PM	0	61	0	1	0	0	62
12:45 PM	1	66	0	0	0	1	68
1:00 PM	0	58	0	2	0	0	60
1:15 PM	1	76	0	1	0	0	78
1:30 PM	0	72	0	0	0	0	72
1:45 PM	0	65	0	0	0	0	65
2:00 PM	0	72	1	0	0	1	74
2:15 PM	0	68	0	0	0	0	68
2:30 PM	0	75	1	0	0	0	76
2:45 PM	0	98	5	0	0	0	103
3:00 PM	1	114	5	0	0	0	120
3:15 PM	1	104	4	1	0	0	110
3:30 PM	0	111	3	1	0	0	115
3:45 PM	0	125	2	0	0	1	128
4:00 PM	1	144	3	0	0	1	149
4:15 PM	0	154	1	1	0	1	157
4:30 PM	0	138	2	0	0	0	140

4:45 PM	0	133	0	0	0	0	133
5:00 PM	0	153	1	0	0	1	155
5:15 PM	0	158	0	1	0	1	160
5:30 PM	0	152	1	1	0	0	154
5:45 PM	0	133	0	0	0	0	133
Total	5	3500	76	23	0	8	3612
Total %	0.1	96.9	2.1	0.6	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:15 AM	7:00 AM	8:45 AM	7:30 AM
AM Peaks	0	273	21	4	0	1	269
PM Times	12:45 PM	5:00 PM	2:45 PM	1:00 PM	12:00 PM	4:45 PM	5:00 PM
PM Peaks	2	596	17	3	0	2	602



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Mills Drive (Anvil Street to
Tilt Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	53	1	0	0	0	54
7:15 AM	0	88	4	0	0	0	92
7:30 AM	0	132	7	0	0	1	140
7:45 AM	0	141	1	3	0	0	145
8:00 AM	0	139	1	0	0	0	140
8:15 AM	0	134	6	1	0	0	141
8:30 AM	0	109	3	0	0	0	112
8:45 AM	0	96	3	1	0	2	102
9:00 AM	0	113	5	0	0	0	118
9:15 AM	0	99	3	2	0	0	104
9:30 AM	0	73	1	1	0	0	75
9:45 AM	0	70	1	0	0	1	72
10:00 AM	0	88	0	1	0	1	90
10:15 AM	0	66	0	1	0	0	67
10:30 AM	0	56	0	2	0	0	58
10:45 AM	0	55	0	1	0	0	56
11:00 AM	0	72	0	0	0	0	72
11:15 AM	0	69	0	1	0	0	70
11:30 AM	0	74	0	1	0	0	75
11:45 AM	0	74	0	1	0	0	75
12:00 PM	1	50	0	0	0	0	51
12:15 PM	0	89	0	1	0	0	90
12:30 PM	0	65	1	0	0	0	66
12:45 PM	0	71	0	0	0	0	71
1:00 PM	0	71	0	1	0	0	72
1:15 PM	0	56	0	1	0	0	57
1:30 PM	2	55	1	3	0	1	62
1:45 PM	0	65	0	1	0	0	66
2:00 PM	0	76	0	1	0	0	77
2:15 PM	0	63	2	0	0	1	66
2:30 PM	0	73	1	0	0	0	74
2:45 PM	0	80	3	0	0	0	83
3:00 PM	0	80	6	1	0	0	87
3:15 PM	0	84	5	1	0	0	90
3:30 PM	1	118	3	0	0	0	122
3:45 PM	0	131	3	1	0	0	135
4:00 PM	0	110	2	0	0	0	112
4:15 PM	0	110	1	0	0	0	111
4:30 PM	0	104	2	2	0	0	108

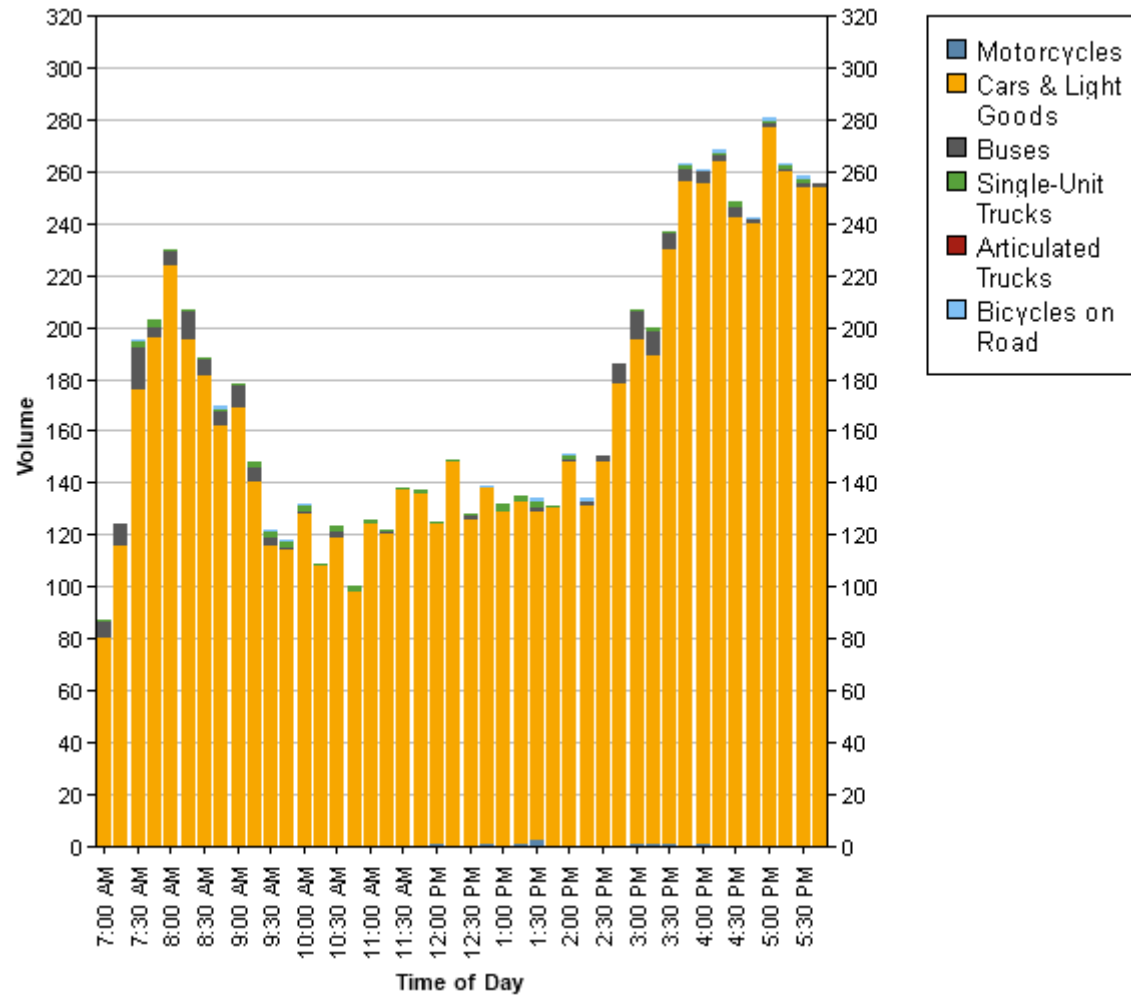
4:45 PM	0	107	1	0	0	1	109
5:00 PM	0	124	0	1	0	1	126
5:15 PM	0	102	1	0	0	0	103
5:30 PM	0	102	0	1	0	1	104
5:45 PM	0	121	1	0	0	0	122
Total	4	3908	69	31	0	10	4022
Total %	0.1	97.2	1.7	0.8	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:15 AM	7:00 AM	8:45 AM	7:30 AM
AM Peaks	0	523	15	4	0	2	566
PM Times	12:45 PM	5:00 PM	2:45 PM	1:00 PM	12:00 PM	4:45 PM	5:00 PM
PM Peaks	2	449	17	6	0	3	455



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon Mills Drive (Anvil Street to
Tilt Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Doon Mills Drive (Pine Valley Drive
to Doon South Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	25	0	0	0	0	25
7:15 AM	0	46	3	0	0	0	49
7:30 AM	0	44	4	0	0	0	48
7:45 AM	0	58	1	1	0	0	60
8:00 AM	0	57	0	0	0	0	57
8:15 AM	0	68	2	0	0	0	70
8:30 AM	0	67	2	0	0	0	69
8:45 AM	0	46	5	0	0	1	52
9:00 AM	0	51	1	1	0	0	53
9:15 AM	0	44	1	0	0	0	45
9:30 AM	0	45	1	0	0	0	46
9:45 AM	0	33	1	0	0	0	34
10:00 AM	0	42	0	0	0	0	42
10:15 AM	0	33	0	0	0	0	33
10:30 AM	0	25	0	1	0	0	26
10:45 AM	0	26	0	1	0	0	27
11:00 AM	0	37	0	0	0	0	37
11:15 AM	0	37	0	1	0	0	38
11:30 AM	0	28	0	0	0	0	28
11:45 AM	0	39	0	0	0	0	39
12:00 PM	1	16	0	1	0	0	18
12:15 PM	0	44	0	1	0	0	45
12:30 PM	0	38	1	0	0	0	39
12:45 PM	0	32	0	0	0	0	32
1:00 PM	0	34	0	0	0	0	34
1:15 PM	0	29	0	0	0	0	29
1:30 PM	2	22	0	1	0	0	25
1:45 PM	0	43	0	0	0	0	43
2:00 PM	0	35	0	0	0	1	36
2:15 PM	0	46	1	0	0	0	47
2:30 PM	0	43	1	0	0	0	44
2:45 PM	0	53	2	0	0	0	55
3:00 PM	0	44	7	0	0	0	51
3:15 PM	0	63	4	0	0	0	67
3:30 PM	1	49	0	0	0	0	50
3:45 PM	0	69	3	0	0	0	72
4:00 PM	0	60	2	0	0	1	63
4:15 PM	0	64	1	0	0	0	65
4:30 PM	0	52	3	0	0	0	55

4:45 PM	0	70	0	0	0	0	70
5:00 PM	1	73	0	0	0	0	74
5:15 PM	0	78	1	0	0	0	79
5:30 PM	0	60	0	1	0	0	61
5:45 PM	0	79	1	0	0	0	80
Total	5	2047	48	9	0	3	2112
Total %	0.2	96.9	2.3	0.4	0.0	0.1	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	10:30 AM	7:00 AM	8:00 AM	7:45 AM
AM Peaks	0	250	7	3	0	1	256
PM Times	3:15 PM	4:45 PM	3:00 PM	1:00 PM	12:00 PM	12:00 PM	4:45 PM
PM Peaks	1	281	14	1	0	0	284



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Mills Drive (Pine Valley Drive
to Doon South Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	28	3	1	0	0	32
7:15 AM	0	24	4	0	0	0	28
7:30 AM	0	50	7	0	0	0	57
7:45 AM	0	43	1	0	0	0	44
8:00 AM	0	48	3	0	0	0	51
8:15 AM	0	48	6	0	0	0	54
8:30 AM	0	42	3	0	0	0	45
8:45 AM	0	48	1	0	0	0	49
9:00 AM	0	44	3	1	0	0	48
9:15 AM	0	33	0	0	0	0	33
9:30 AM	0	20	1	1	0	0	22
9:45 AM	0	28	0	1	0	0	29
10:00 AM	0	23	1	1	0	0	25
10:15 AM	0	27	0	0	0	0	27
10:30 AM	0	28	1	1	0	0	30
10:45 AM	0	29	0	1	0	0	30
11:00 AM	0	24	0	1	0	1	26
11:15 AM	0	21	1	1	0	0	23
11:30 AM	0	34	0	0	0	0	34
11:45 AM	0	34	0	0	0	0	34
12:00 PM	0	33	0	0	0	0	33
12:15 PM	0	42	0	0	0	0	42
12:30 PM	0	32	0	0	0	2	34
12:45 PM	1	36	0	0	0	0	37
1:00 PM	0	27	0	0	0	0	27
1:15 PM	0	41	0	1	0	0	42
1:30 PM	0	44	0	0	0	0	44
1:45 PM	0	45	0	1	0	0	46
2:00 PM	0	39	0	0	0	0	39
2:15 PM	0	35	0	0	0	0	35
2:30 PM	0	39	1	0	0	0	40
2:45 PM	0	62	2	0	0	0	64
3:00 PM	1	56	5	1	0	0	63
3:15 PM	1	55	4	1	0	0	61
3:30 PM	0	69	4	0	0	0	73
3:45 PM	0	60	2	0	0	0	62
4:00 PM	2	76	2	2	0	0	82
4:15 PM	0	63	0	0	0	0	63
4:30 PM	0	70	2	0	0	0	72

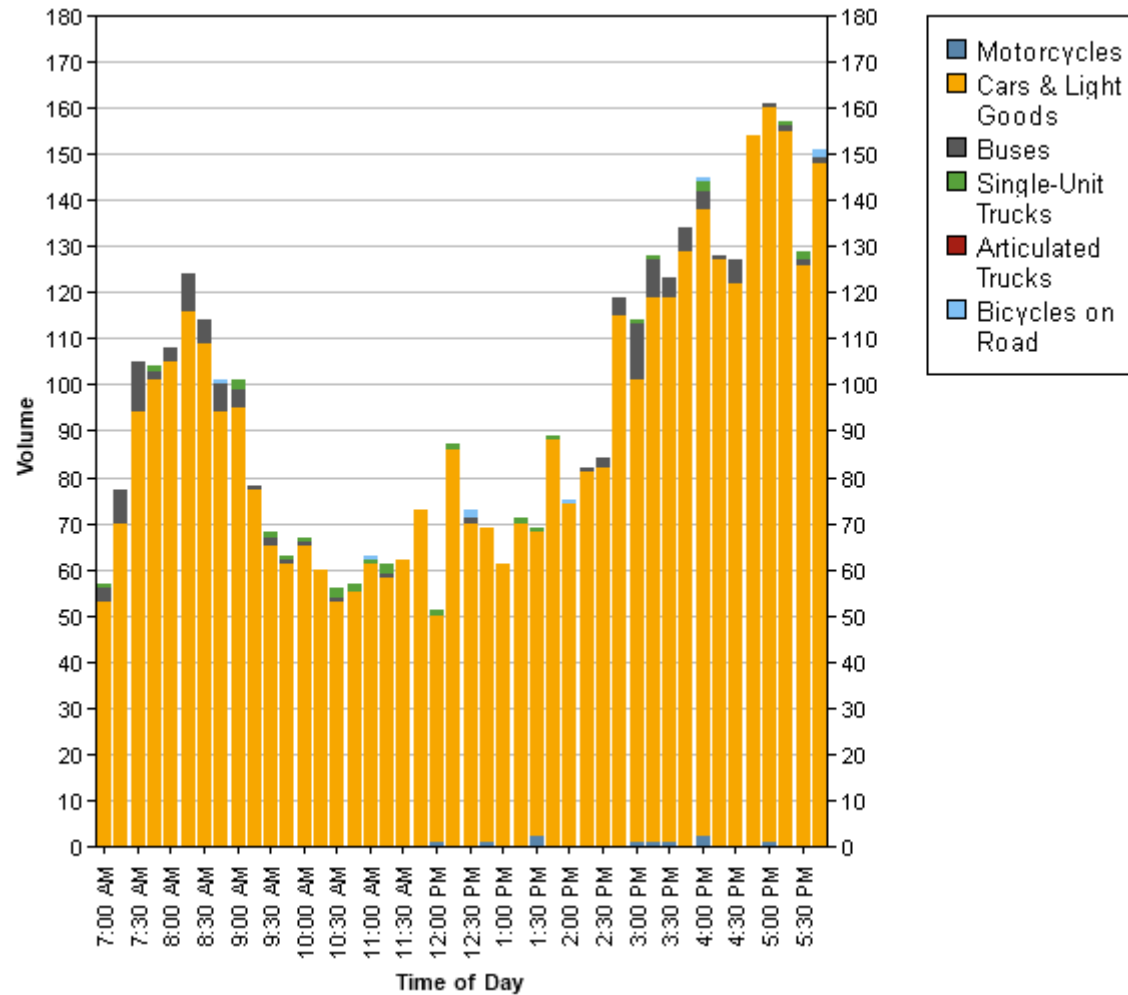
4:45 PM	0	84	0	0	0	0	84
5:00 PM	0	86	1	0	0	0	87
5:15 PM	0	77	0	1	0	0	78
5:30 PM	0	66	1	1	0	0	68
5:45 PM	0	69	0	0	0	2	71
Total	5	1982	59	17	0	5	2068
Total %	0.2	95.8	2.9	0.8	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	10:30 AM	7:00 AM	8:00 AM	7:45 AM
AM Peaks	0	181	17	4	0	0	194
PM Times	3:15 PM	4:45 PM	3:00 PM	1:00 PM	12:00 PM	12:00 PM	4:45 PM
PM Peaks	3	313	15	2	0	2	317



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon Mills Drive (Pine Valley Drive
to Doon South Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Mills Drive (Tilt Drive to
Apple Ridge Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	23	4	1	0	0	28
7:15 AM	0	24	4	0	0	0	28
7:30 AM	0	38	9	0	0	0	47
7:45 AM	0	47	2	2	0	0	51
8:00 AM	0	77	4	1	0	0	82
8:15 AM	0	63	6	0	0	0	69
8:30 AM	0	63	3	1	0	0	67
8:45 AM	0	62	2	0	0	0	64
9:00 AM	0	59	5	0	0	0	64
9:15 AM	0	36	3	0	0	0	39
9:30 AM	0	42	2	2	0	0	46
9:45 AM	0	34	0	2	0	0	36
10:00 AM	0	42	1	1	0	0	44
10:15 AM	0	40	0	0	0	0	40
10:30 AM	0	59	2	0	0	0	61
10:45 AM	0	41	0	1	0	0	42
11:00 AM	0	50	0	2	0	0	52
11:15 AM	0	43	0	1	0	0	44
11:30 AM	0	56	0	0	0	0	56
11:45 AM	0	62	0	0	0	0	62
12:00 PM	0	64	0	1	0	0	65
12:15 PM	0	55	0	1	0	0	56
12:30 PM	0	59	0	0	0	0	59
12:45 PM	1	61	0	0	0	1	63
1:00 PM	0	55	0	2	0	0	57
1:15 PM	0	77	0	1	0	0	78
1:30 PM	0	61	0	0	0	0	61
1:45 PM	0	72	0	0	0	0	72
2:00 PM	0	72	1	0	0	0	73
2:15 PM	0	63	0	0	0	0	63
2:30 PM	0	71	1	0	0	0	72
2:45 PM	0	96	5	0	0	0	101
3:00 PM	1	116	5	0	0	0	122
3:15 PM	1	104	4	1	0	0	110
3:30 PM	0	108	3	1	0	0	112
3:45 PM	0	119	2	0	0	0	121
4:00 PM	2	135	3	1	0	0	141
4:15 PM	0	138	2	1	0	0	141
4:30 PM	0	128	2	1	0	0	131

4:45 PM	0	140	0	0	0	0	140
5:00 PM	0	142	1	0	0	0	143
5:15 PM	0	158	0	1	0	0	159
5:30 PM	0	147	1	1	0	0	149
5:45 PM	0	132	0	0	0	0	132
Total	5	3334	77	26	0	1	3443
Total %	0.1	96.8	2.2	0.8	0.0	0.0	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:15 AM	7:00 AM	7:00 AM	7:45 AM
AM Peaks	0	250	21	5	0	0	269
PM Times	3:15 PM	5:00 PM	2:45 PM	12:15 PM	2:45 PM	12:00 PM	5:00 PM
PM Peaks	3	579	17	3	0	1	583



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Mills Drive (Tilt Drive to
Apple Ridge Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	57	1	0	0	1	59
7:15 AM	0	89	4	0	0	0	93
7:30 AM	0	124	7	0	0	0	131
7:45 AM	0	140	1	2	0	0	143
8:00 AM	0	140	1	0	0	0	141
8:15 AM	0	121	6	1	0	0	128
8:30 AM	0	111	3	1	0	0	115
8:45 AM	0	90	2	1	0	0	93
9:00 AM	0	106	5	0	0	0	111
9:15 AM	0	94	4	2	0	0	100
9:30 AM	0	75	1	1	0	0	77
9:45 AM	0	63	1	0	0	1	65
10:00 AM	0	85	0	1	0	0	86
10:15 AM	0	61	0	1	0	0	62
10:30 AM	0	51	0	1	0	0	52
10:45 AM	0	51	0	1	0	0	52
11:00 AM	0	71	0	0	0	0	71
11:15 AM	0	63	0	1	0	0	64
11:30 AM	0	69	0	0	0	0	69
11:45 AM	0	70	0	1	0	0	71
12:00 PM	1	52	0	0	0	0	53
12:15 PM	0	83	0	3	0	0	86
12:30 PM	0	66	1	0	0	0	67
12:45 PM	0	68	0	0	0	0	68
1:00 PM	0	64	0	1	0	0	65
1:15 PM	0	55	0	0	0	0	55
1:30 PM	2	51	1	2	0	0	56
1:45 PM	0	64	0	1	0	0	65
2:00 PM	0	73	0	0	0	0	73
2:15 PM	0	60	2	0	0	1	63
2:30 PM	0	66	1	1	0	0	68
2:45 PM	0	80	3	0	0	0	83
3:00 PM	0	69	6	0	0	0	75
3:15 PM	0	77	5	0	0	0	82
3:30 PM	1	120	3	0	1	0	125
3:45 PM	0	122	3	1	0	0	126
4:00 PM	0	103	2	0	0	0	105
4:15 PM	0	106	1	0	0	0	107
4:30 PM	0	97	2	1	0	0	100

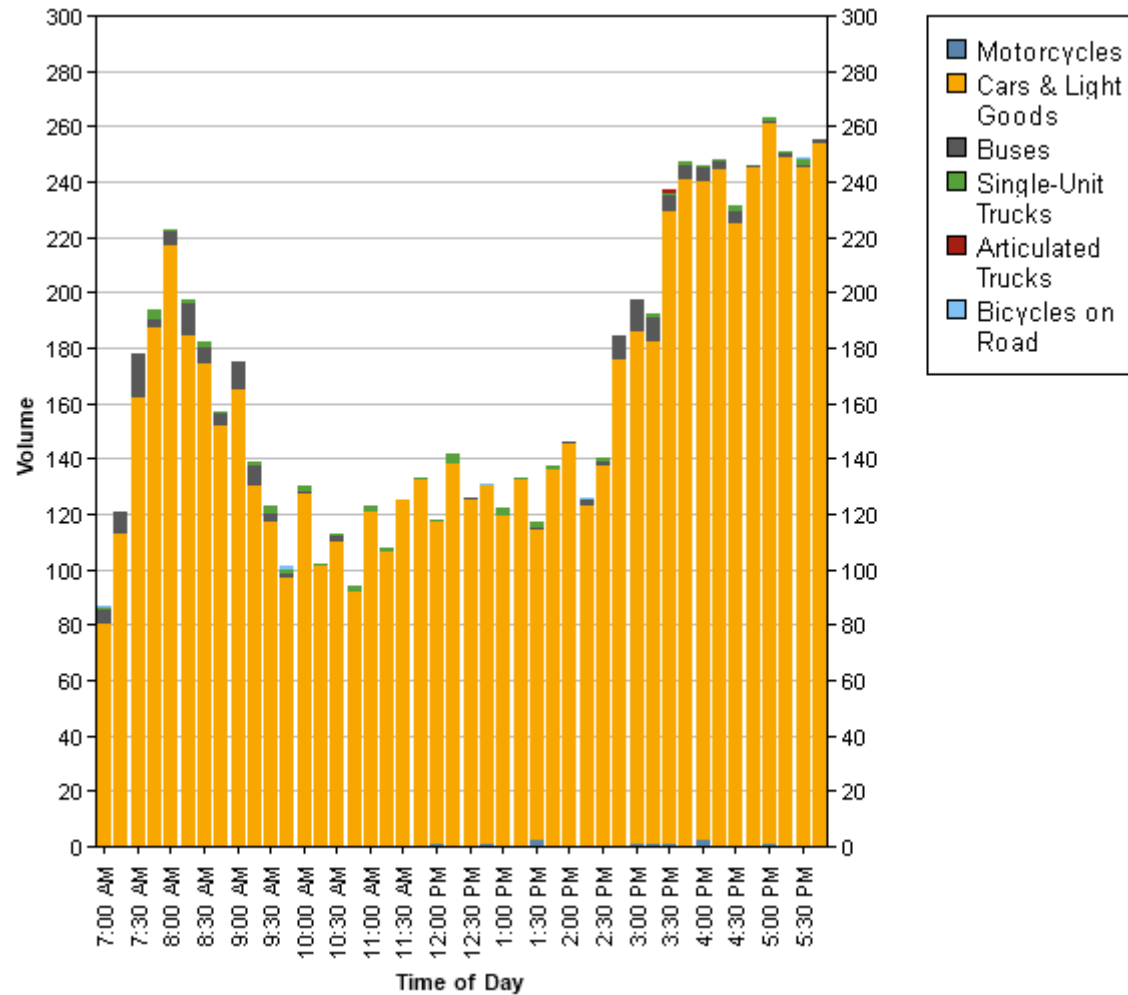
4:45 PM	0	105	1	0	0	0	106
5:00 PM	1	118	0	1	0	0	120
5:15 PM	0	91	1	0	0	0	92
5:30 PM	0	98	0	1	0	1	100
5:45 PM	0	122	1	0	0	0	123
Total	5	3741	69	26	1	4	3846
Total %	0.1	97.3	1.8	0.7	0.0	0.1	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:15 AM	7:00 AM	7:00 AM	7:45 AM
AM Peaks	0	512	15	4	0	1	527
PM Times	3:15 PM	5:00 PM	2:45 PM	12:15 PM	2:45 PM	12:00 PM	5:00 PM
PM Peaks	1	429	17	4	1	0	435



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon Mills Drive (Tilt Drive to
Apple Ridge Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon South Drive (Doon Mills
Drive to Forest Edge Trail)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	6	0	0	0	0	6
7:15 AM	0	9	3	0	0	0	12
7:30 AM	0	13	1	0	0	0	14
7:45 AM	0	14	1	2	0	0	17
8:00 AM	0	22	0	1	0	0	23
8:15 AM	0	28	1	0	0	0	29
8:30 AM	0	39	6	0	0	0	45
8:45 AM	0	26	1	0	0	0	27
9:00 AM	0	19	2	1	0	0	22
9:15 AM	0	32	1	0	0	0	33
9:30 AM	0	29	0	1	0	0	30
9:45 AM	0	16	1	0	0	0	17
10:00 AM	0	19	0	0	0	0	19
10:15 AM	0	15	0	2	0	0	17
10:30 AM	0	13	0	0	0	0	13
10:45 AM	0	13	0	0	0	0	13
11:00 AM	0	20	0	0	0	0	20
11:15 AM	0	17	0	0	0	0	17
11:30 AM	0	20	0	0	0	0	20
11:45 AM	0	30	0	1	0	0	31
12:00 PM	0	28	0	0	0	0	28
12:15 PM	1	22	0	0	0	0	23
12:30 PM	0	22	0	0	0	0	22
12:45 PM	0	23	0	0	0	0	23
1:00 PM	0	30	0	0	0	0	30
1:15 PM	2	23	0	0	1	0	26
1:30 PM	0	24	0	0	0	0	24
1:45 PM	0	27	0	0	0	0	27
2:00 PM	0	29	0	0	0	1	30
2:15 PM	0	27	1	0	0	0	28
2:30 PM	0	35	1	0	0	1	37
2:45 PM	0	42	3	0	0	0	45
3:00 PM	0	50	5	0	0	0	55
3:15 PM	0	33	2	0	0	0	35
3:30 PM	1	42	2	0	0	0	45
3:45 PM	0	52	2	0	0	1	55
4:00 PM	0	59	2	0	0	1	62
4:15 PM	1	46	2	0	0	0	49
4:30 PM	0	60	0	0	0	0	60

4:45 PM	0	61	1	0	0	0	62
5:00 PM	0	69	0	0	0	0	69
5:15 PM	0	68	1	0	0	0	69
5:30 PM	0	57	0	0	0	0	57
5:45 PM	0	57	1	0	0	0	58
Total	5	1386	40	8	1	4	1444
Total %	0.3	96.0	2.8	0.6	0.1	0.3	100.0
AM Times	7:00 AM	7:30 AM	8:15 AM	7:15 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	0	77	10	3	0	0	114
PM Times	12:30 PM	4:30 PM	2:45 PM	1:15 PM	12:30 PM	1:45 PM	4:30 PM
PM Peaks	2	258	12	0	1	2	260



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon South Drive (Doon Mills
Drive to Forest Edge Trail)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	35	0	0	0	0	35
7:15 AM	0	37	0	0	0	0	37
7:30 AM	0	88	2	0	0	1	91
7:45 AM	0	64	1	0	0	0	65
8:00 AM	0	54	1	2	0	1	58
8:15 AM	0	64	4	0	0	0	68
8:30 AM	0	60	4	0	0	0	64
8:45 AM	0	42	1	0	0	0	43
9:00 AM	0	28	1	0	0	0	29
9:15 AM	0	50	0	0	0	1	51
9:30 AM	0	27	0	1	0	0	28
9:45 AM	0	29	0	0	0	0	29
10:00 AM	0	28	0	0	0	0	28
10:15 AM	0	26	0	1	0	0	27
10:30 AM	0	27	0	0	0	0	27
10:45 AM	0	30	0	1	0	0	31
11:00 AM	0	28	0	0	0	0	28
11:15 AM	0	26	0	0	0	0	26
11:30 AM	0	32	0	0	0	0	32
11:45 AM	0	28	0	1	0	0	29
12:00 PM	0	30	0	0	0	0	30
12:15 PM	0	28	0	0	0	0	28
12:30 PM	0	23	0	0	0	0	23
12:45 PM	2	24	0	0	0	0	26
1:00 PM	0	25	0	0	0	0	25
1:15 PM	0	31	0	0	0	0	31
1:30 PM	0	35	0	2	0	0	37
1:45 PM	0	32	0	0	0	0	32
2:00 PM	0	36	1	1	0	1	39
2:15 PM	0	22	0	0	0	0	22
2:30 PM	0	29	1	0	0	1	31
2:45 PM	0	29	4	1	0	0	34
3:00 PM	0	34	4	1	0	0	39
3:15 PM	0	24	0	0	0	1	25
3:30 PM	0	35	4	0	0	0	39
3:45 PM	0	43	2	0	0	0	45
4:00 PM	2	27	3	2	0	0	34
4:15 PM	0	38	0	0	0	0	38
4:30 PM	0	39	0	0	0	0	39

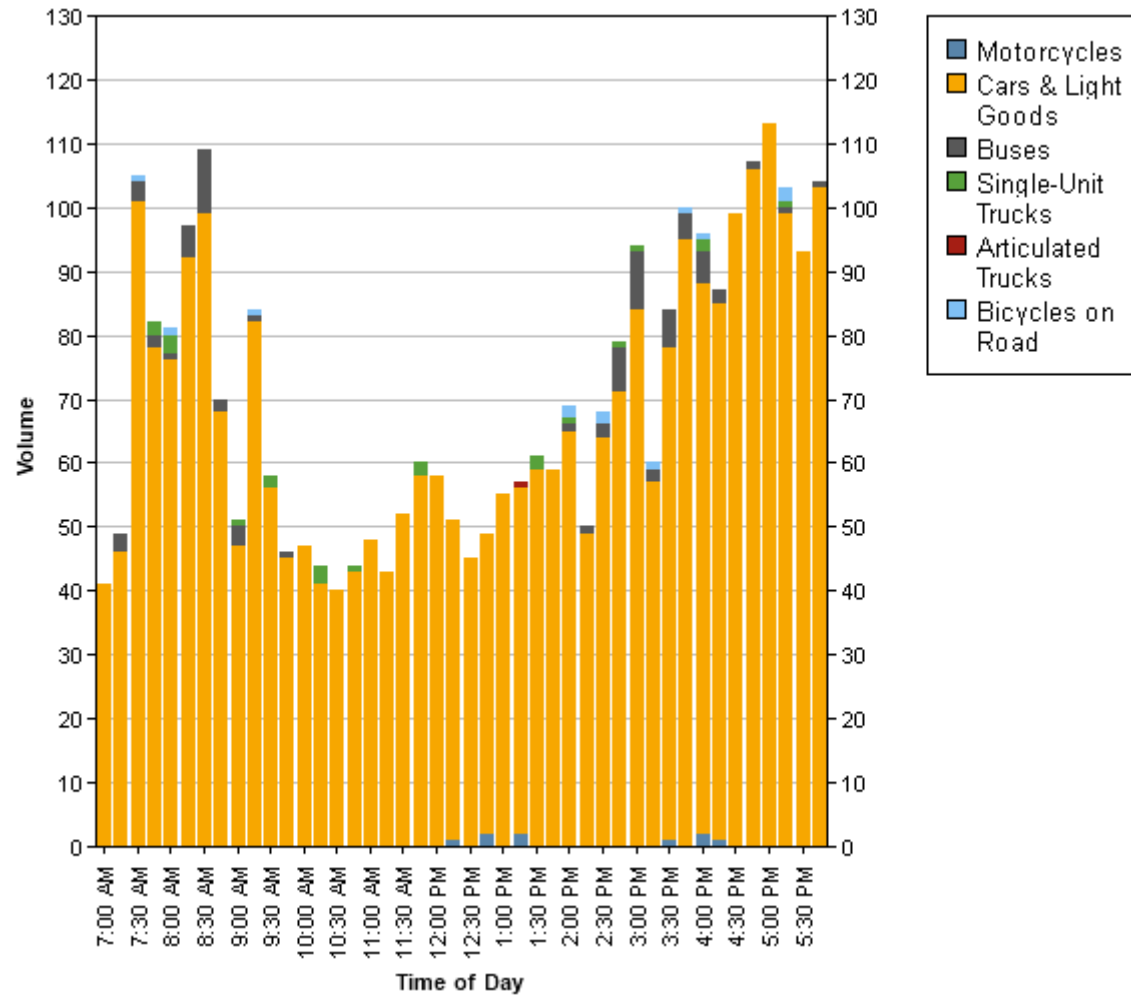
4:45 PM	0	45	0	0	0	0	45
5:00 PM	0	44	0	0	0	0	44
5:15 PM	0	31	0	1	0	2	34
5:30 PM	0	36	0	0	0	0	36
5:45 PM	0	46	0	0	0	0	46
Total	4	1589	33	14	0	8	1648
Total %	0.2	96.4	2.0	0.8	0.0	0.5	100.0
AM Times	7:00 AM	7:30 AM	8:15 AM	7:15 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	0	270	10	2	0	2	255
PM Times	12:30 PM	4:30 PM	2:45 PM	1:15 PM	12:30 PM	1:45 PM	4:30 PM
PM Peaks	2	159	12	3	0	2	162



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Doon South Drive (Doon Mills
Drive to Forest Edge Trail)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon South Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	13	1	1	0	0	15
7:15 AM	0	19	2	0	0	0	21
7:30 AM	0	22	8	0	0	0	30
7:45 AM	0	31	1	0	0	0	32
8:00 AM	0	28	2	1	0	0	31
8:15 AM	0	40	2	0	0	0	42
8:30 AM	0	38	7	0	0	0	45
8:45 AM	0	41	1	0	0	0	42
9:00 AM	0	30	4	0	0	0	34
9:15 AM	0	34	0	0	0	0	34
9:30 AM	0	33	0	2	0	0	35
9:45 AM	0	26	0	0	0	0	26
10:00 AM	0	23	0	0	0	0	23
10:15 AM	0	22	0	2	0	0	24
10:30 AM	0	26	1	1	0	0	28
10:45 AM	0	24	0	1	0	0	25
11:00 AM	0	25	0	0	0	0	25
11:15 AM	0	25	1	1	0	0	27
11:30 AM	0	32	0	0	0	0	32
11:45 AM	0	39	0	0	0	0	39
12:00 PM	0	43	0	0	0	0	43
12:15 PM	1	31	0	0	0	0	32
12:30 PM	0	35	0	0	0	0	35
12:45 PM	0	34	0	0	0	0	34
1:00 PM	0	31	0	0	0	0	31
1:15 PM	2	32	0	0	1	0	35
1:30 PM	0	42	0	0	0	1	43
1:45 PM	0	42	0	0	0	0	42
2:00 PM	0	43	0	0	0	1	44
2:15 PM	0	39	0	0	0	0	39
2:30 PM	0	43	0	0	0	1	44
2:45 PM	0	65	3	0	0	0	68
3:00 PM	0	62	4	0	0	0	66
3:15 PM	1	63	3	1	0	0	68
3:30 PM	0	70	4	0	0	0	74
3:45 PM	0	70	1	0	0	1	72
4:00 PM	0	86	2	0	0	0	88
4:15 PM	1	65	1	0	0	0	67
4:30 PM	0	84	1	0	0	0	85

4:45 PM	0	94	0	0	0	0	94
5:00 PM	0	110	0	0	0	0	110
5:15 PM	0	97	0	0	0	0	97
5:30 PM	0	81	0	1	0	0	82
5:45 PM	0	79	0	0	0	0	79
Total	5	2012	49	11	1	4	2082
Total %	0.2	96.6	2.4	0.5	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	8:15 AM	10:00 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	0	137	14	4	0	0	150
PM Times	12:45 PM	4:45 PM	2:45 PM	1:15 PM	12:30 PM	1:15 PM	4:45 PM
PM Peaks	2	382	14	0	1	2	383



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon South Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	35	0	0	0	0	35
7:15 AM	0	65	1	0	0	1	67
7:30 AM	0	84	6	0	0	0	90
7:45 AM	0	84	2	0	0	0	86
8:00 AM	0	82	0	0	0	1	83
8:15 AM	0	91	6	0	0	0	97
8:30 AM	0	88	3	0	0	0	91
8:45 AM	0	51	5	0	0	0	56
9:00 AM	0	52	1	1	0	0	54
9:15 AM	0	63	0	0	0	1	64
9:30 AM	0	48	1	1	0	0	50
9:45 AM	0	49	0	0	0	0	49
10:00 AM	0	47	0	0	0	0	47
10:15 AM	0	34	0	0	0	0	34
10:30 AM	0	40	0	1	0	0	41
10:45 AM	0	35	0	2	0	0	37
11:00 AM	0	44	0	0	0	0	44
11:15 AM	0	43	0	0	0	0	43
11:30 AM	0	33	0	0	0	0	33
11:45 AM	0	46	0	1	0	0	47
12:00 PM	1	30	0	0	0	0	31
12:15 PM	0	36	0	1	0	0	37
12:30 PM	0	44	1	0	0	0	45
12:45 PM	0	39	0	0	0	0	39
1:00 PM	0	37	0	0	0	0	37
1:15 PM	0	34	0	1	0	1	36
1:30 PM	2	28	0	1	0	0	31
1:45 PM	0	53	0	0	0	0	53
2:00 PM	0	39	1	1	0	0	41
2:15 PM	0	35	0	0	0	0	35
2:30 PM	0	47	0	0	0	1	48
2:45 PM	0	51	4	1	0	0	56
3:00 PM	0	41	8	0	0	0	49
3:15 PM	0	56	2	0	0	0	58
3:30 PM	0	47	3	0	0	0	50
3:45 PM	0	68	3	0	0	0	71
4:00 PM	0	55	4	0	0	0	59
4:15 PM	0	63	0	0	0	0	63
4:30 PM	0	51	2	0	0	0	53

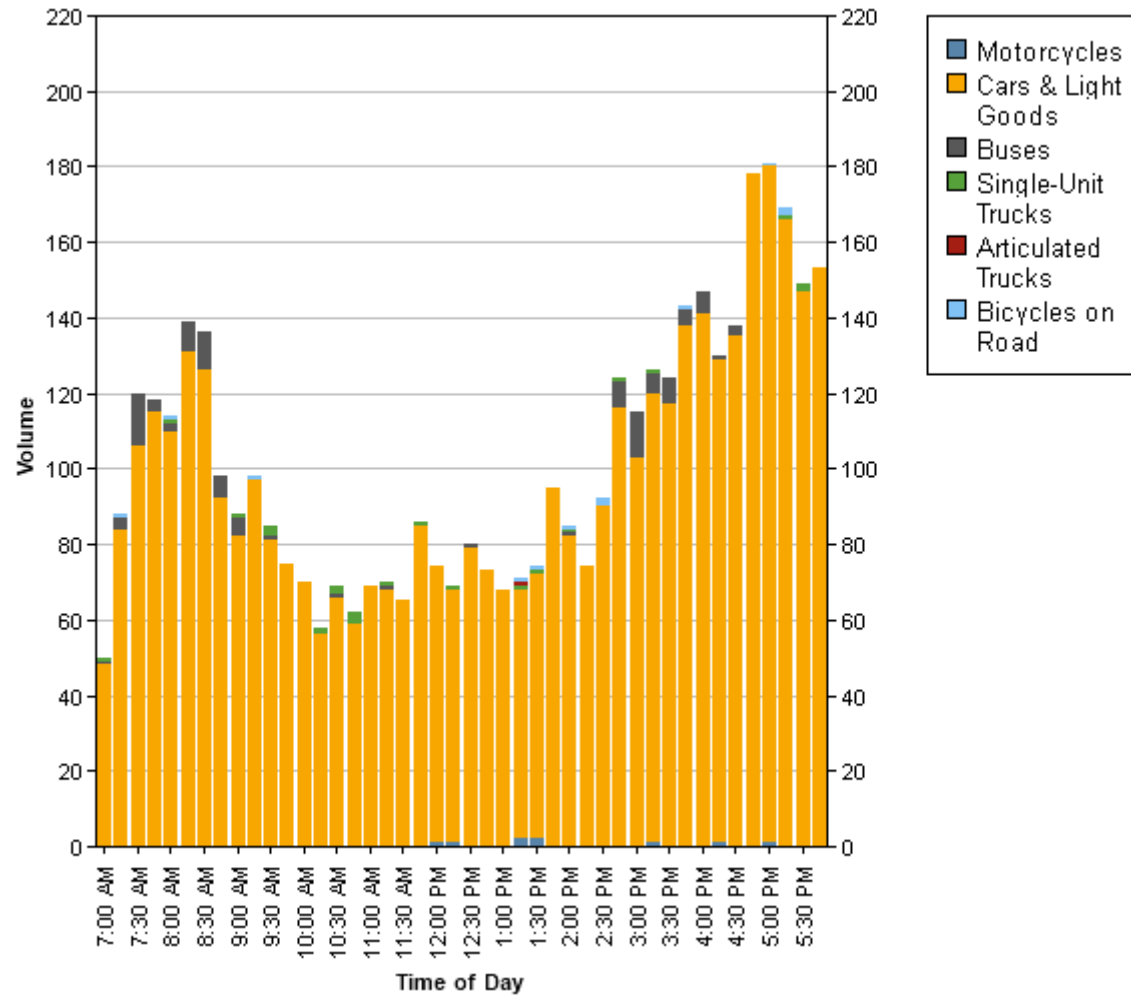
4:45 PM	0	84	0	0	0	0	84
5:00 PM	1	69	0	0	0	1	71
5:15 PM	0	69	0	1	0	2	72
5:30 PM	0	66	0	1	0	0	67
5:45 PM	0	74	0	0	0	0	74
Total	4	2330	53	13	0	8	2408
Total %	0.2	96.8	2.2	0.5	0.0	0.3	100.0
AM Times	7:00 AM	7:45 AM	8:15 AM	10:00 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	0	345	15	3	0	2	357
PM Times	12:45 PM	4:45 PM	2:45 PM	1:15 PM	12:30 PM	1:15 PM	4:45 PM
PM Peaks	2	288	17	3	0	1	294



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon South Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon South Drive (Homer Watson
Boulevard to Doon Village Road)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	10	0	0	0	0	10
7:15 AM	0	10	2	0	0	0	12
7:30 AM	0	18	2	0	0	0	20
7:45 AM	0	22	1	1	0	0	24
8:00 AM	0	51	0	1	0	0	52
8:15 AM	0	60	3	0	0	0	63
8:30 AM	0	40	3	0	0	0	43
8:45 AM	0	31	2	0	0	0	33
9:00 AM	0	29	0	1	0	0	30
9:15 AM	0	47	1	1	0	0	49
9:30 AM	0	29	0	1	0	0	30
9:45 AM	0	32	1	0	0	0	33
10:00 AM	0	24	0	0	0	0	24
10:15 AM	0	34	0	2	0	0	36
10:30 AM	0	26	0	0	0	0	26
10:45 AM	0	31	0	0	0	0	31
11:00 AM	0	26	0	1	0	0	27
11:15 AM	0	28	0	0	0	0	28
11:30 AM	0	47	0	0	0	0	47
11:45 AM	0	48	0	1	0	0	49
12:00 PM	1	45	0	0	0	0	46
12:15 PM	1	49	0	0	0	0	50
12:30 PM	0	45	0	0	0	0	45
12:45 PM	0	37	0	1	0	0	38
1:00 PM	0	55	0	1	0	0	56
1:15 PM	0	46	0	0	0	0	46
1:30 PM	0	38	0	0	0	0	38
1:45 PM	0	41	0	0	0	0	41
2:00 PM	0	42	0	0	0	1	43
2:15 PM	0	46	1	1	0	0	48
2:30 PM	0	50	0	0	0	0	50
2:45 PM	0	79	4	0	0	0	83
3:00 PM	0	67	2	1	0	0	70
3:15 PM	0	81	3	0	0	0	84
3:30 PM	0	77	2	0	0	0	79
3:45 PM	0	78	2	0	0	0	80
4:00 PM	1	95	1	0	0	0	97
4:15 PM	0	86	2	0	0	0	88
4:30 PM	0	95	0	0	0	0	95

4:45 PM	0	96	1	0	0	0	97
5:00 PM	0	115	0	0	0	0	115
5:15 PM	0	96	1	0	0	0	97
5:30 PM	1	92	0	0	0	0	93
5:45 PM	0	104	1	0	0	0	105
Total	4	2298	35	13	0	1	2351
Total %	0.2	97.7	1.5	0.6	0.0	0.0	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:00 AM	7:00 AM	10:45 AM	7:45 AM
AM Peaks	0	173	6	3	0	0	182
PM Times	12:00 PM	4:15 PM	2:45 PM	12:45 PM	12:00 PM	1:45 PM	5:00 PM
PM Peaks	2	392	11	2	0	1	410



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Doon South Drive (Homer Watson
Boulevard to Doon Village Road)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	67	1	0	0	0	68
7:15 AM	0	69	0	0	0	0	69
7:30 AM	0	121	5	0	0	0	126
7:45 AM	0	130	3	0	0	0	133
8:00 AM	0	107	1	1	0	0	109
8:15 AM	0	104	3	0	0	0	107
8:30 AM	0	101	3	0	0	0	104
8:45 AM	0	77	3	0	0	0	80
9:00 AM	0	64	1	2	0	0	67
9:15 AM	0	79	0	0	0	0	79
9:30 AM	0	58	1	1	0	0	60
9:45 AM	0	53	0	1	0	0	54
10:00 AM	0	55	1	0	0	0	56
10:15 AM	0	43	0	2	0	0	45
10:30 AM	0	52	0	0	0	0	52
10:45 AM	0	50	0	1	0	0	51
11:00 AM	0	52	0	1	0	0	53
11:15 AM	0	44	0	0	0	0	44
11:30 AM	0	51	0	0	0	1	52
11:45 AM	0	55	0	1	0	0	56
12:00 PM	0	50	0	1	0	0	51
12:15 PM	0	36	0	0	0	0	36
12:30 PM	1	31	0	0	0	0	32
12:45 PM	0	45	0	0	0	0	45
1:00 PM	0	43	0	0	0	0	43
1:15 PM	1	54	0	1	0	0	56
1:30 PM	0	54	0	1	0	0	55
1:45 PM	0	43	0	0	0	0	43
2:00 PM	0	45	1	1	0	0	47
2:15 PM	0	46	0	0	0	0	46
2:30 PM	0	54	1	0	0	1	56
2:45 PM	0	42	2	0	0	0	44
3:00 PM	0	63	5	0	0	0	68
3:15 PM	0	44	3	2	0	0	49
3:30 PM	0	66	4	0	0	0	70
3:45 PM	0	65	0	0	0	0	65
4:00 PM	1	41	3	1	0	0	46
4:15 PM	0	71	1	1	0	0	73
4:30 PM	0	57	1	0	0	0	58

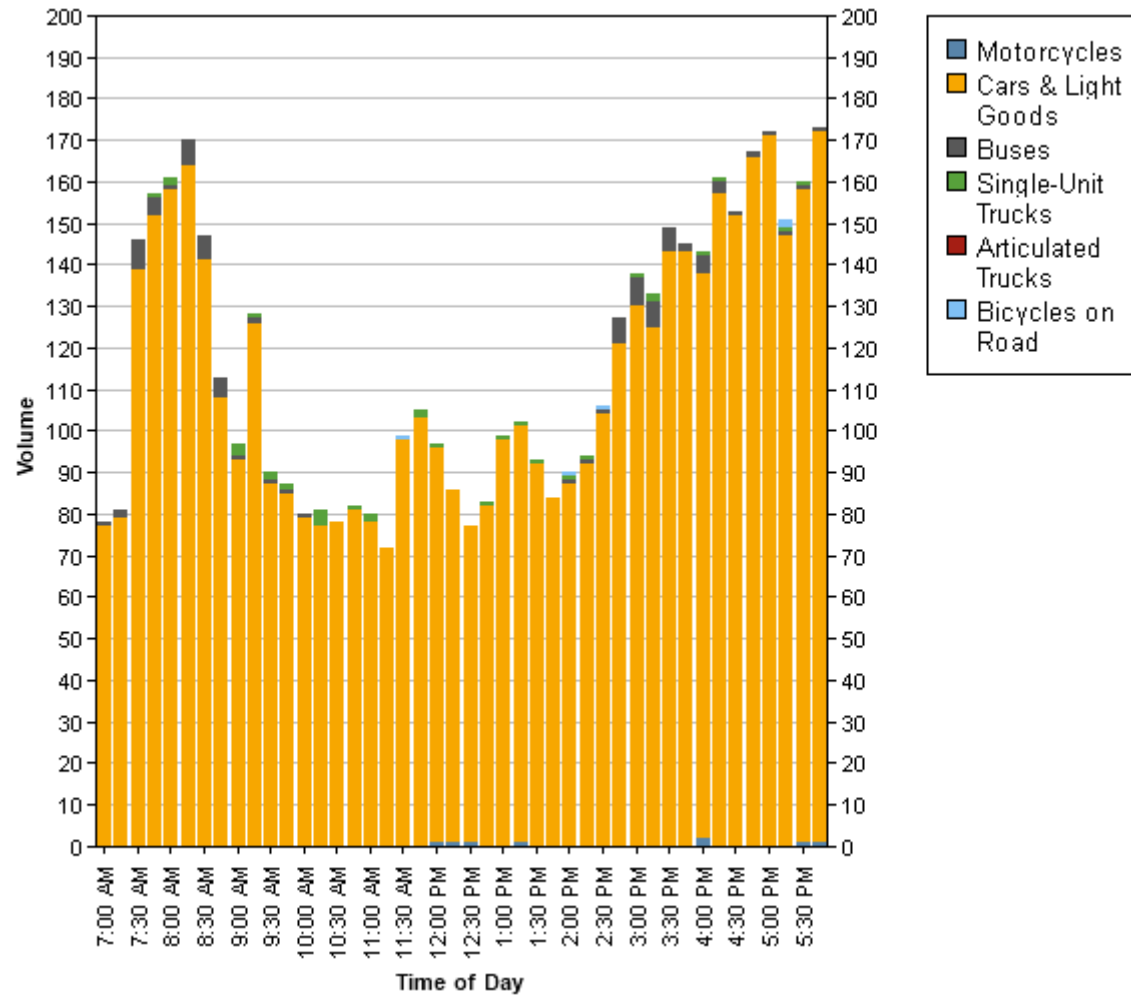
4:45 PM	0	70	0	0	0	0	70
5:00 PM	0	56	1	0	0	0	57
5:15 PM	0	51	0	1	0	2	54
5:30 PM	0	65	1	1	0	0	67
5:45 PM	1	67	0	0	0	0	68
Total	4	2691	45	20	0	4	2764
Total %	0.1	97.4	1.6	0.7	0.0	0.1	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	9:00 AM	7:00 AM	10:45 AM	7:45 AM
AM Peaks	0	442	12	4	0	1	453
PM Times	12:00 PM	4:15 PM	2:45 PM	12:45 PM	12:00 PM	1:45 PM	5:00 PM
PM Peaks	1	254	14	2	0	1	246



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Doon South Drive (Homer Watson
Boulevard to Doon Village Road)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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519-896-3163 cbowness@ptsl.com

Count Name: Doon South Drive (Robert Ferrie
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	6	1	1	0	0	8
7:15 AM	0	7	2	0	0	0	9
7:30 AM	0	17	2	0	0	0	19
7:45 AM	0	18	1	0	0	0	19
8:00 AM	0	17	0	0	0	0	17
8:15 AM	0	23	2	0	0	0	25
8:30 AM	0	15	5	0	0	0	20
8:45 AM	0	33	1	0	0	0	34
9:00 AM	0	23	3	0	0	0	26
9:15 AM	0	11	0	0	0	0	11
9:30 AM	0	13	1	1	0	0	15
9:45 AM	0	12	0	0	0	0	12
10:00 AM	0	9	0	0	0	0	9
10:15 AM	0	17	1	0	0	0	18
10:30 AM	0	14	1	1	0	0	16
10:45 AM	0	10	1	1	0	0	12
11:00 AM	0	10	0	0	0	0	10
11:15 AM	0	10	1	0	0	0	11
11:30 AM	0	19	0	0	0	0	19
11:45 AM	0	18	1	0	0	0	19
12:00 PM	0	18	0	0	0	0	18
12:15 PM	0	22	1	0	0	0	23
12:30 PM	0	14	1	0	0	0	15
12:45 PM	0	18	0	0	0	0	18
1:00 PM	0	14	1	1	0	0	16
1:15 PM	0	19	0	0	0	0	19
1:30 PM	0	24	0	0	0	1	25
1:45 PM	0	25	1	0	0	0	26
2:00 PM	0	15	1	1	0	1	18
2:15 PM	0	22	0	0	0	0	22
2:30 PM	0	22	0	0	0	0	22
2:45 PM	0	33	2	0	0	0	35
3:00 PM	0	33	1	0	0	0	34
3:15 PM	0	31	2	0	0	0	33
3:30 PM	0	28	1	0	0	0	29
3:45 PM	0	36	3	0	0	1	40
4:00 PM	0	49	1	0	0	1	51
4:15 PM	0	30	1	0	0	0	31
4:30 PM	0	38	1	0	0	0	39

4:45 PM	0	47	1	0	0	0	48
5:00 PM	0	50	0	0	0	0	50
5:15 PM	0	36	1	0	0	0	37
5:30 PM	1	38	1	0	0	2	42
5:45 PM	0	37	0	0	0	1	38
Total	1	1001	43	6	0	7	1058
Total %	0.1	94.6	4.1	0.6	0.0	0.7	100.0
AM Times	7:00 AM	8:15 AM	8:15 AM	10:00 AM	7:00 AM	8:00 AM	8:15 AM
AM Peaks	0	94	11	2	0	0	105
PM Times	4:45 PM	4:45 PM	3:15 PM	12:15 PM	12:00 PM	5:00 PM	4:45 PM
PM Peaks	1	171	7	1	0	3	177



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon South Drive (Robert Ferrie
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	13	1	0	0	0	14
7:15 AM	0	18	1	0	0	0	19
7:30 AM	0	43	4	0	0	0	47
7:45 AM	0	31	1	0	0	0	32
8:00 AM	0	35	1	0	0	1	37
8:15 AM	0	42	3	0	0	0	45
8:30 AM	0	39	3	0	0	0	42
8:45 AM	0	19	2	0	0	1	22
9:00 AM	0	39	1	0	0	0	40
9:15 AM	0	34	0	0	0	0	34
9:30 AM	0	13	1	0	0	0	14
9:45 AM	0	25	0	0	0	0	25
10:00 AM	0	25	1	0	0	0	26
10:15 AM	0	16	0	0	0	0	16
10:30 AM	0	26	1	1	0	0	28
10:45 AM	0	15	0	0	0	0	15
11:00 AM	0	23	1	0	0	0	24
11:15 AM	0	21	0	0	0	0	21
11:30 AM	0	13	1	0	0	0	14
11:45 AM	0	16	0	1	0	0	17
12:00 PM	0	14	1	0	0	0	15
12:15 PM	0	22	0	1	0	0	23
12:30 PM	0	26	2	0	0	0	28
12:45 PM	0	21	0	0	0	0	21
1:00 PM	0	9	1	0	0	0	10
1:15 PM	0	19	0	0	0	1	20
1:30 PM	0	12	1	0	0	0	13
1:45 PM	0	29	0	0	0	0	29
2:00 PM	0	18	2	1	0	1	22
2:15 PM	0	22	0	0	0	0	22
2:30 PM	0	19	1	0	0	1	21
2:45 PM	0	22	3	0	0	0	25
3:00 PM	0	25	2	0	0	0	27
3:15 PM	0	20	1	0	0	0	21
3:30 PM	0	42	3	0	0	0	45
3:45 PM	0	30	2	0	0	0	32
4:00 PM	0	27	4	0	0	0	31
4:15 PM	0	31	0	0	0	0	31
4:30 PM	0	24	2	0	0	0	26

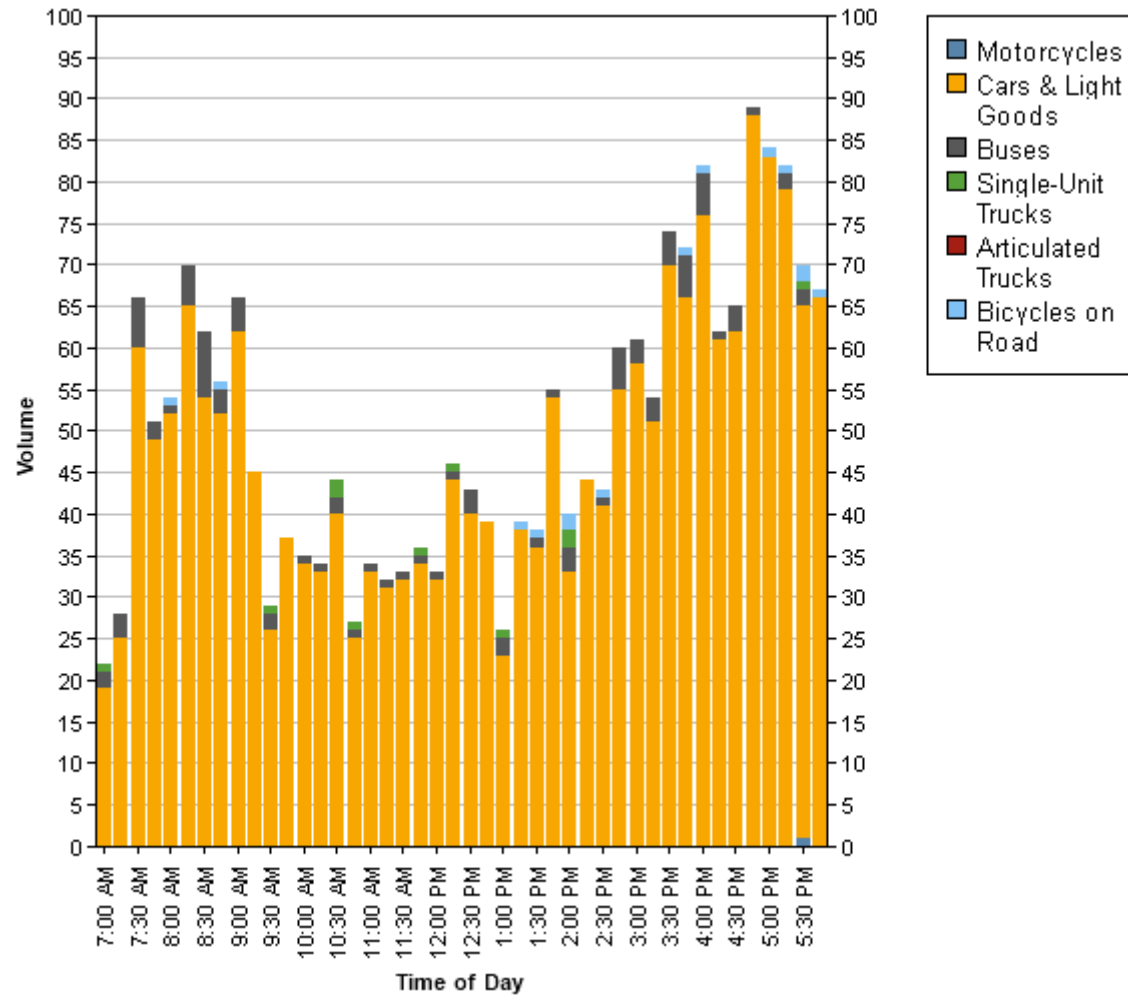
4:45 PM	0	41	0	0	0	0	41
5:00 PM	0	33	0	0	0	1	34
5:15 PM	0	43	1	0	0	1	45
5:30 PM	0	26	1	1	0	0	28
5:45 PM	0	29	0	0	0	0	29
Total	0	1110	49	5	0	7	1171
Total %	0.0	94.8	4.2	0.4	0.0	0.6	100.0
AM Times	7:00 AM	8:15 AM	8:15 AM	10:00 AM	7:00 AM	8:00 AM	8:15 AM
AM Peaks	0	139	9	1	0	2	149
PM Times	4:45 PM	4:45 PM	3:15 PM	12:15 PM	12:00 PM	5:00 PM	4:45 PM
PM Peaks	0	143	10	1	0	2	148



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon South Drive (Robert Ferrie
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road (Pioneer Drive
to Bechtel Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	24	4	1	0	0	29
7:15 AM	0	31	6	0	0	0	37
7:30 AM	0	40	6	4	0	0	50
7:45 AM	0	46	3	0	0	0	49
8:00 AM	0	89	4	0	0	0	93
8:15 AM	0	67	5	0	0	0	72
8:30 AM	0	73	3	1	0	0	77
8:45 AM	0	62	1	1	0	0	64
9:00 AM	0	51	3	3	0	0	57
9:15 AM	0	37	1	0	0	0	38
9:30 AM	0	40	1	1	0	1	43
9:45 AM	0	34	0	2	0	0	36
10:00 AM	0	38	0	0	0	0	38
10:15 AM	0	43	0	1	0	0	44
10:30 AM	0	53	2	1	0	0	56
10:45 AM	0	45	0	2	0	0	47
11:00 AM	0	44	1	2	0	0	47
11:15 AM	0	42	2	0	0	0	44
11:30 AM	0	68	0	0	0	0	68
11:45 AM	0	58	0	0	0	0	58
12:00 PM	0	64	0	2	0	0	66
12:15 PM	0	62	0	1	0	0	63
12:30 PM	0	57	0	0	0	0	57
12:45 PM	1	64	0	0	0	0	65
1:00 PM	0	54	0	2	0	0	56
1:15 PM	0	74	0	2	0	0	76
1:30 PM	0	62	0	0	0	0	62
1:45 PM	0	67	0	0	0	0	67
2:00 PM	0	61	0	1	0	1	63
2:15 PM	0	66	0	0	0	0	66
2:30 PM	0	80	0	0	0	0	80
2:45 PM	0	100	0	0	0	0	100
3:00 PM	0	116	7	0	0	0	123
3:15 PM	1	108	3	1	0	0	113
3:30 PM	0	110	1	1	0	0	112
3:45 PM	0	114	0	0	0	1	115
4:00 PM	2	129	1	1	0	0	133
4:15 PM	0	137	1	0	0	0	138
4:30 PM	0	119	1	0	0	0	120

4:45 PM	0	135	0	0	0	0	135
5:00 PM	0	143	0	0	0	0	143
5:15 PM	0	159	1	1	0	3	164
5:30 PM	0	149	0	0	0	0	149
5:45 PM	0	118	0	1	0	0	119
Total	4	3333	57	32	0	6	3432
Total %	0.1	97.1	1.7	0.9	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	10:15 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	0	275	18	6	0	0	291
PM Times	12:45 PM	4:45 PM	2:45 PM	1:00 PM	12:00 PM	4:45 PM	4:45 PM
PM Peaks	1	586	11	4	0	3	591



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road (Pioneer Drive
to Bechtel Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	1	57	1	0	0	0	59
7:15 AM	0	95	3	0	0	0	98
7:30 AM	0	126	9	2	0	1	138
7:45 AM	0	145	0	2	0	0	147
8:00 AM	0	135	1	0	0	1	137
8:15 AM	0	127	5	0	0	0	132
8:30 AM	0	115	4	0	0	0	119
8:45 AM	0	85	2	1	0	1	89
9:00 AM	0	103	5	0	0	0	108
9:15 AM	0	88	2	2	0	0	92
9:30 AM	0	72	0	1	0	0	73
9:45 AM	0	69	0	0	0	0	69
10:00 AM	0	81	0	1	0	0	82
10:15 AM	0	62	0	2	0	0	64
10:30 AM	0	44	0	2	0	0	46
10:45 AM	0	49	0	1	0	0	50
11:00 AM	0	64	0	0	0	1	65
11:15 AM	0	65	1	1	0	0	67
11:30 AM	0	64	1	0	0	0	65
11:45 AM	0	67	0	1	0	0	68
12:00 PM	1	49	0	0	0	0	50
12:15 PM	0	66	0	1	0	0	67
12:30 PM	0	68	1	0	0	0	69
12:45 PM	0	70	0	0	0	0	70
1:00 PM	0	59	0	1	0	0	60
1:15 PM	0	44	1	1	0	0	46
1:30 PM	2	55	0	3	0	1	61
1:45 PM	0	48	0	1	0	0	49
2:00 PM	0	69	0	0	0	0	69
2:15 PM	0	52	1	0	0	0	53
2:30 PM	0	64	1	0	0	1	66
2:45 PM	0	63	2	0	0	1	66
3:00 PM	0	84	3	2	0	0	89
3:15 PM	0	67	5	0	0	0	72
3:30 PM	0	101	2	0	0	0	103
3:45 PM	0	102	2	0	0	0	104
4:00 PM	0	100	1	0	0	0	101
4:15 PM	0	105	0	0	0	0	105
4:30 PM	0	89	1	2	0	0	92

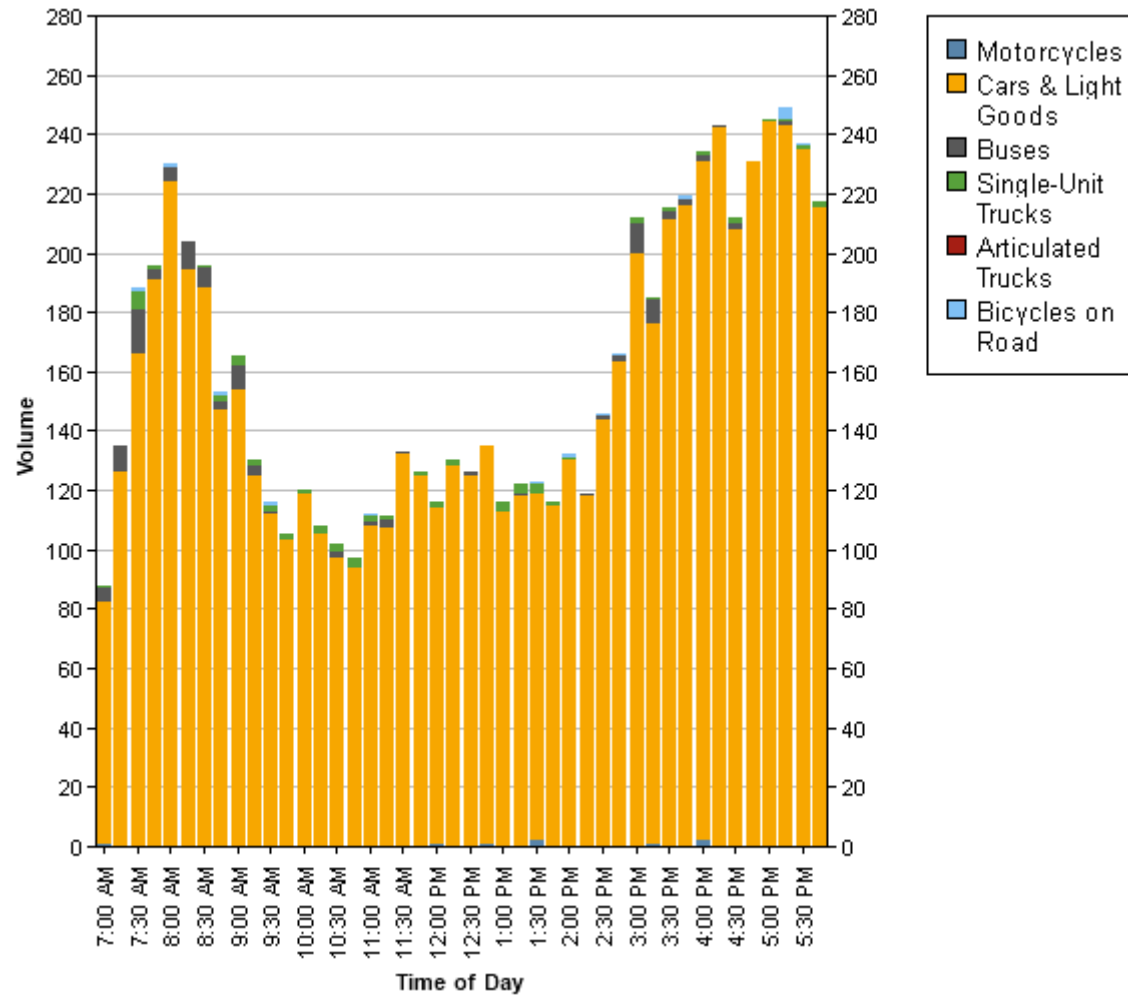
4:45 PM	0	96	0	0	0	0	96
5:00 PM	0	101	0	1	0	0	102
5:15 PM	0	84	0	0	0	1	85
5:30 PM	0	86	0	1	0	1	88
5:45 PM	0	97	0	1	0	0	98
Total	4	3532	54	30	0	9	3629
Total %	0.1	97.3	1.5	0.8	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:30 AM	10:15 AM	7:00 AM	7:15 AM	7:45 AM
AM Peaks	1	522	15	5	0	2	535
PM Times	12:45 PM	4:45 PM	2:45 PM	1:00 PM	12:00 PM	4:45 PM	4:45 PM
PM Peaks	2	367	12	6	0	2	371



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Doon Village Road (Pioneer Drive
to Bechtel Drive)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road (Pioneer Drive
to Homer Watson Boulevard)
Site Code: 230376
Start Date: 10/17/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	33	5	1	0	0	39
7:15 AM	0	38	7	0	0	1	46
7:30 AM	0	63	8	4	0	0	75
7:45 AM	0	82	5	0	0	0	87
8:00 AM	0	110	5	5	0	0	120
8:15 AM	0	107	5	1	0	0	113
8:30 AM	0	78	3	1	0	0	82
8:45 AM	0	85	3	2	0	0	90
9:00 AM	0	68	3	2	0	0	73
9:15 AM	0	72	2	1	0	0	75
9:30 AM	0	61	2	2	0	1	66
9:45 AM	0	50	2	4	0	0	56
10:00 AM	0	58	2	1	0	0	61
10:15 AM	0	68	3	4	1	0	76
10:30 AM	0	85	3	3	0	0	91
10:45 AM	0	66	1	3	0	0	70
11:00 AM	0	70	2	1	0	0	73
11:15 AM	0	65	3	0	0	0	68
11:30 AM	0	97	1	4	0	0	102
11:45 AM	0	100	1	2	0	0	103
12:00 PM	1	102	1	1	0	0	105
12:15 PM	0	91	1	1	0	1	94
12:30 PM	0	89	1	0	0	1	91
12:45 PM	1	94	2	1	0	0	98
1:00 PM	0	70	1	2	0	0	73
1:15 PM	1	104	1	3	0	0	109
1:30 PM	0	96	2	0	0	0	98
1:45 PM	0	96	1	0	0	0	97
2:00 PM	0	102	3	1	0	1	107
2:15 PM	0	98	1	0	0	0	99
2:30 PM	0	106	2	0	0	0	108
2:45 PM	0	141	7	0	0	0	148
3:00 PM	0	135	5	0	0	0	140
3:15 PM	1	147	3	2	0	0	153
3:30 PM	0	147	3	1	0	0	151
3:45 PM	2	161	2	1	0	1	167
4:00 PM	0	175	3	1	0	0	179
4:15 PM	0	180	2	0	0	0	182
4:30 PM	0	182	1	0	0	0	183

4:45 PM	0	198	2	0	0	0	200
5:00 PM	0	211	1	0	0	1	213
5:15 PM	1	213	2	1	0	2	219
5:30 PM	0	205	1	0	0	0	206
5:45 PM	0	173	1	1	0	0	175
Total	7	4772	115	57	1	9	4961
Total %	0.1	96.2	2.3	1.1	0.0	0.2	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	9:45 AM	9:30 AM	7:15 AM	7:30 AM
AM Peaks	0	377	25	12	1	1	395
PM Times	12:45 PM	4:45 PM	2:45 PM	1:00 PM	12:30 PM	2:00 PM	4:45 PM
PM Peaks	2	827	18	5	0	1	838



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Doon Village Road (Pioneer Drive
to Homer Watson Boulevard)
Site Code: 230376
Start Date: 10/17/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	81	2	0	0	0	83
7:15 AM	0	135	3	0	0	0	138
7:30 AM	0	161	9	1	0	0	171
7:45 AM	0	187	3	3	0	0	193
8:00 AM	0	169	1	0	0	1	171
8:15 AM	0	152	4	1	0	1	158
8:30 AM	0	154	5	0	0	0	159
8:45 AM	0	146	4	2	0	0	152
9:00 AM	0	143	8	0	0	0	151
9:15 AM	0	119	4	1	0	0	124
9:30 AM	0	104	2	1	0	0	107
9:45 AM	0	86	1	0	0	0	87
10:00 AM	0	105	1	3	0	0	109
10:15 AM	0	100	1	2	0	0	103
10:30 AM	0	89	1	3	0	0	93
10:45 AM	0	72	1	1	0	0	74
11:00 AM	0	91	0	0	0	1	92
11:15 AM	0	91	2	3	0	0	96
11:30 AM	0	91	2	5	0	0	98
11:45 AM	0	88	1	1	0	0	90
12:00 PM	1	82	0	0	0	0	83
12:15 PM	0	89	2	1	0	0	92
12:30 PM	1	103	1	1	0	0	106
12:45 PM	1	100	2	0	0	0	103
1:00 PM	0	78	2	1	0	0	81
1:15 PM	1	73	2	3	1	0	80
1:30 PM	3	88	1	3	0	0	95
1:45 PM	0	80	1	3	0	0	84
2:00 PM	0	89	1	0	0	0	90
2:15 PM	0	90	3	1	0	0	94
2:30 PM	0	94	1	0	0	1	96
2:45 PM	0	71	2	1	0	1	75
3:00 PM	0	119	2	2	0	0	123
3:15 PM	1	118	5	2	0	0	126
3:30 PM	0	126	3	1	0	0	130
3:45 PM	0	164	4	1	0	0	169
4:00 PM	0	121	1	0	0	0	122
4:15 PM	0	146	3	0	0	0	149
4:30 PM	0	142	2	2	0	0	146

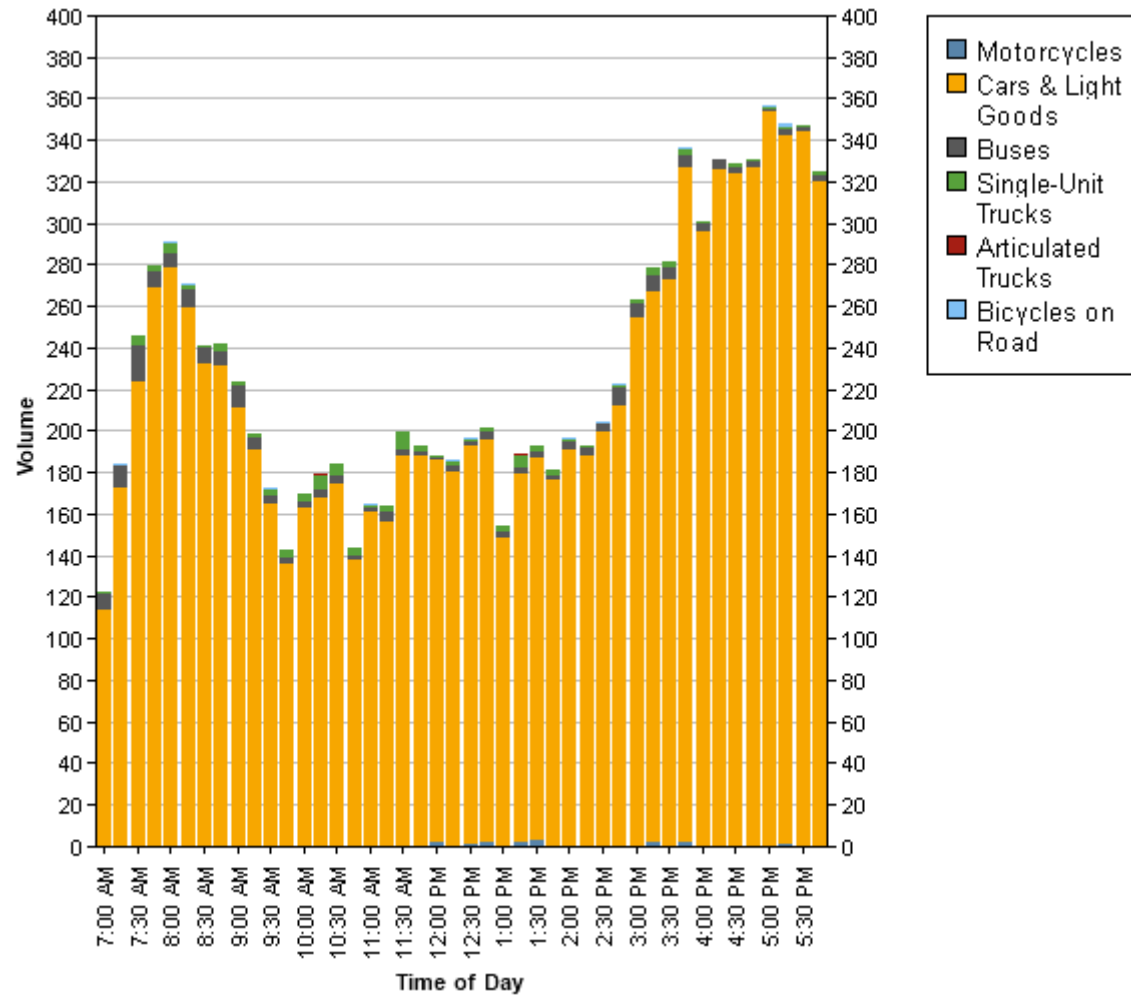
4:45 PM	0	129	1	1	0	0	131
5:00 PM	0	143	0	1	0	0	144
5:15 PM	0	128	1	0	0	0	129
5:30 PM	0	139	1	1	0	0	141
5:45 PM	0	147	2	1	0	0	150
Total	8	5023	98	53	1	5	5188
Total %	0.2	96.8	1.9	1.0	0.0	0.1	100.0
AM Times	7:00 AM	7:45 AM	7:00 AM	9:45 AM	9:30 AM	7:15 AM	7:30 AM
AM Peaks	0	662	17	8	0	1	693
PM Times	12:45 PM	4:45 PM	2:45 PM	1:00 PM	12:30 PM	2:00 PM	4:45 PM
PM Peaks	5	539	12	10	1	2	545



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Doon Village Road (Pioneer Drive
to Homer Watson Boulevard)
Site Code: 230376
Start Date: 10/17/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Creek Drive (Robert Ferrie
Drive to Appleridge Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	6	2	0	0	0	8
7:15 AM	0	10	1	0	0	0	11
7:30 AM	0	9	1	0	0	0	10
7:45 AM	0	14	0	0	0	0	14
8:00 AM	0	11	0	1	0	0	12
8:15 AM	0	15	1	0	0	0	16
8:30 AM	0	14	1	1	0	0	16
8:45 AM	0	26	0	0	0	0	26
9:00 AM	0	26	0	0	0	0	26
9:15 AM	0	16	0	1	0	0	17
9:30 AM	0	11	1	0	0	0	12
9:45 AM	0	16	0	0	0	0	16
10:00 AM	0	9	0	0	0	1	10
10:15 AM	0	13	0	0	0	0	13
10:30 AM	0	9	0	0	0	0	9
10:45 AM	0	15	0	0	0	0	15
11:00 AM	0	11	0	1	0	0	12
11:15 AM	0	16	0	1	0	0	17
11:30 AM	0	17	0	1	0	0	18
11:45 AM	0	17	0	0	0	0	17
12:00 PM	0	12	0	0	0	1	13
12:15 PM	0	13	0	0	0	0	13
12:30 PM	0	14	0	0	0	0	14
12:45 PM	0	12	0	1	0	0	13
1:00 PM	0	20	0	0	0	0	20
1:15 PM	0	18	0	0	0	0	18
1:30 PM	0	14	0	1	0	0	15
1:45 PM	0	11	0	0	0	0	11
2:00 PM	0	17	0	0	0	0	17
2:15 PM	0	15	0	1	0	0	16
2:30 PM	0	20	0	0	0	0	20
2:45 PM	0	23	0	0	0	0	23
3:00 PM	0	27	2	0	0	0	29
3:15 PM	0	18	0	0	0	0	18
3:30 PM	0	48	0	1	0	0	49
3:45 PM	0	29	0	0	0	0	29
4:00 PM	0	30	0	0	0	0	30
4:15 PM	0	27	0	0	0	0	27
4:30 PM	0	28	0	0	0	1	29

4:45 PM	0	39	0	0	0	0	39
5:00 PM	0	34	0	0	0	0	34
5:15 PM	0	34	0	0	0	0	34
5:30 PM	0	28	0	0	0	0	28
5:45 PM	0	36	0	0	0	0	36
Total	0	848	9	10	0	3	870
Total %	0.0	97.5	1.0	1.1	0.0	0.3	100.0
AM Times	7:00 AM	8:15 AM	7:00 AM	10:45 AM	7:00 AM	9:15 AM	8:15 AM
AM Peaks	0	81	4	3	0	1	84
PM Times	12:00 PM	4:30 PM	2:45 PM	12:45 PM	12:00 PM	12:00 PM	4:30 PM
PM Peaks	0	135	2	2	0	1	136



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Creek Drive (Robert Ferrie
Drive to Appleridge Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	19	1	0	0	0	20
7:15 AM	0	18	1	0	0	0	19
7:30 AM	0	36	1	0	0	0	37
7:45 AM	0	26	0	1	0	0	27
8:00 AM	0	21	2	0	0	0	23
8:15 AM	0	27	1	1	0	0	29
8:30 AM	0	23	1	0	0	0	24
8:45 AM	0	36	0	0	0	0	36
9:00 AM	0	41	0	0	0	0	41
9:15 AM	0	20	0	0	0	0	20
9:30 AM	0	18	0	0	0	0	18
9:45 AM	0	15	0	1	0	0	16
10:00 AM	0	21	0	1	0	0	22
10:15 AM	0	7	0	0	0	0	7
10:30 AM	0	21	0	1	0	0	22
10:45 AM	0	10	0	0	0	0	10
11:00 AM	0	17	0	1	0	0	18
11:15 AM	0	22	0	0	0	0	22
11:30 AM	0	14	0	1	0	0	15
11:45 AM	0	13	0	0	0	0	13
12:00 PM	0	6	0	0	0	1	7
12:15 PM	0	22	0	0	0	0	22
12:30 PM	0	20	0	0	0	0	20
12:45 PM	0	20	0	0	0	0	20
1:00 PM	0	19	0	0	0	0	19
1:15 PM	0	14	0	1	0	0	15
1:30 PM	0	12	0	1	0	0	13
1:45 PM	0	18	0	0	0	1	19
2:00 PM	0	10	0	0	0	0	10
2:15 PM	0	16	0	0	0	1	17
2:30 PM	0	11	0	0	0	0	11
2:45 PM	0	15	1	1	0	0	17
3:00 PM	0	27	1	0	0	0	28
3:15 PM	0	23	1	0	0	0	24
3:30 PM	0	27	3	0	0	0	30
3:45 PM	0	20	0	0	0	0	20
4:00 PM	0	28	0	0	0	0	28
4:15 PM	0	22	0	1	0	0	23
4:30 PM	0	32	0	0	0	0	32

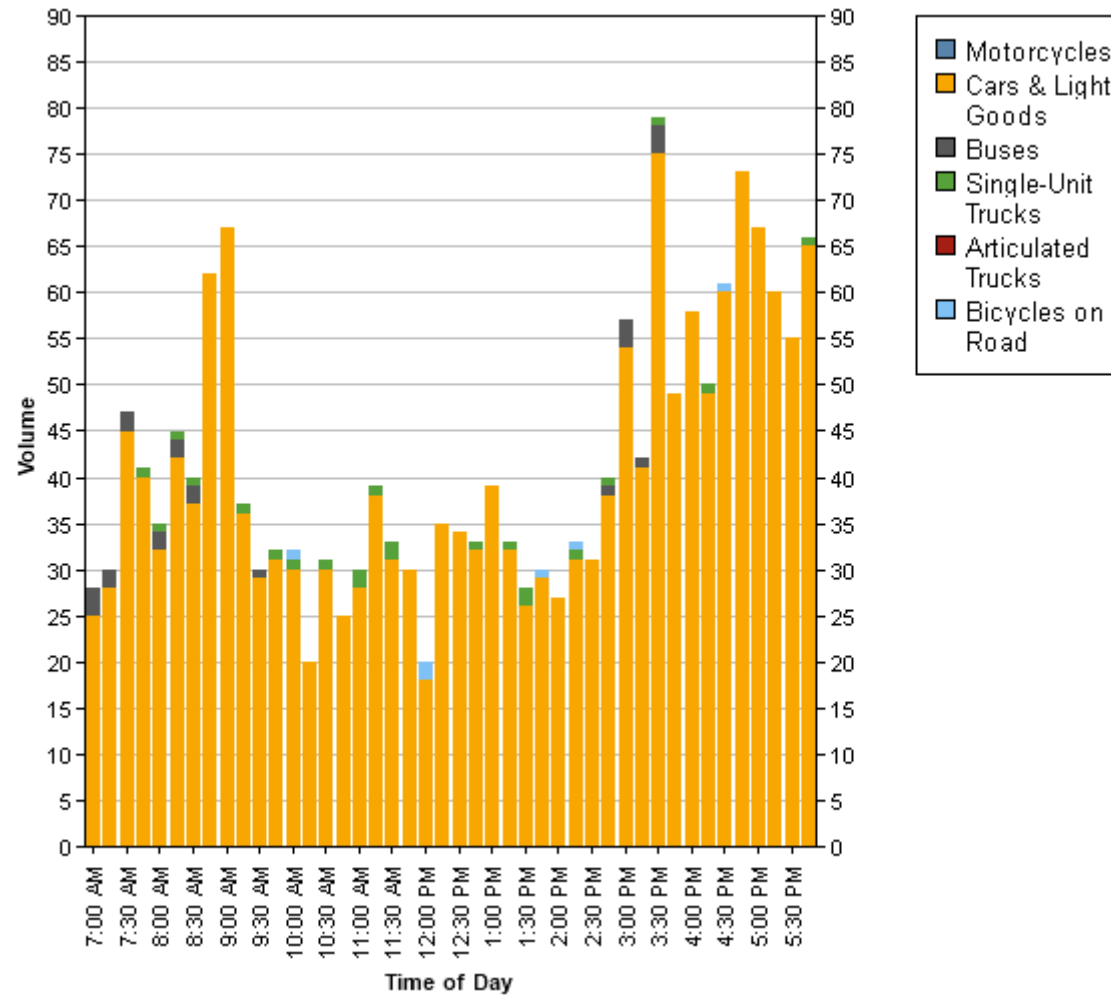
4:45 PM	0	34	0	0	0	0	34
5:00 PM	0	33	0	0	0	0	33
5:15 PM	0	26	0	0	0	0	26
5:30 PM	0	27	0	0	0	0	27
5:45 PM	0	29	0	1	0	0	30
Total	0	936	13	12	0	3	964
Total %	0.0	97.1	1.3	1.2	0.0	0.3	100.0
AM Times	7:00 AM	8:15 AM	7:00 AM	10:45 AM	7:00 AM	9:15 AM	8:15 AM
AM Peaks	0	127	3	2	0	0	130
PM Times	12:00 PM	4:30 PM	2:45 PM	12:45 PM	12:00 PM	12:00 PM	4:30 PM
PM Peaks	0	125	6	2	0	1	125



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Forest Creek Drive (Robert Ferrie
Drive to Appleridge Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Edge Trail (Doon South
Drive to Windrush Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	4	1	0	0	0	5
7:30 AM	0	4	0	0	0	0	4
7:45 AM	0	2	0	0	0	0	2
8:00 AM	0	6	0	0	0	0	6
8:15 AM	0	7	1	0	0	0	8
8:30 AM	0	13	0	0	0	0	13
8:45 AM	0	6	0	0	0	0	6
9:00 AM	0	5	2	0	0	0	7
9:15 AM	0	5	0	0	0	0	5
9:30 AM	0	3	0	0	0	0	3
9:45 AM	0	8	0	0	0	0	8
10:00 AM	0	3	0	1	0	0	4
10:15 AM	0	4	0	0	0	0	4
10:30 AM	0	3	0	0	0	0	3
10:45 AM	0	1	0	0	0	0	1
11:00 AM	0	4	0	0	0	0	4
11:15 AM	0	9	0	0	0	0	9
11:30 AM	0	3	0	0	0	0	3
11:45 AM	0	7	0	0	0	0	7
12:00 PM	0	1	0	0	0	0	1
12:15 PM	0	1	0	0	0	0	1
12:30 PM	0	5	0	0	0	0	5
12:45 PM	0	3	0	1	0	0	4
1:00 PM	0	2	0	0	0	0	2
1:15 PM	0	6	0	1	0	0	7
1:30 PM	0	4	0	0	0	0	4
1:45 PM	0	3	0	0	0	0	3
2:00 PM	0	5	0	0	0	0	5
2:15 PM	0	4	0	0	0	0	4
2:30 PM	0	4	1	0	0	0	5
2:45 PM	0	6	0	0	0	0	6
3:00 PM	0	9	1	0	0	0	10
3:15 PM	0	10	1	0	0	0	11
3:30 PM	0	5	0	0	0	0	5
3:45 PM	0	4	0	0	0	0	4
4:00 PM	0	6	0	0	0	0	6
4:15 PM	0	9	1	0	0	0	10
4:30 PM	0	7	0	0	0	0	7

4:45 PM	0	7	0	0	0	0	7
5:00 PM	0	10	0	0	0	0	10
5:15 PM	0	8	0	0	0	0	8
5:30 PM	0	7	0	0	0	0	7
5:45 PM	0	11	0	0	0	0	11
Total	0	234	8	3	0	0	245
Total %	0.0	95.5	3.3	1.2	0.0	0.0	100.0
AM Times	7:00 AM	8:30 AM	7:00 AM	9:15 AM	7:00 AM	7:00 AM	8:15 AM
AM Peaks	0	29	1	1	0	0	34
PM Times	12:00 PM	5:00 PM	3:00 PM	12:30 PM	12:00 PM	12:00 PM	5:00 PM
PM Peaks	0	36	2	2	0	0	36



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Edge Trail (Doon South
Drive to Windrush Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	3	1	0	0	0	4
7:30 AM	0	2	3	0	0	0	5
7:45 AM	0	1	0	0	0	0	1
8:00 AM	0	2	0	0	0	0	2
8:15 AM	0	6	1	0	0	0	7
8:30 AM	0	6	0	1	0	0	7
8:45 AM	0	5	0	0	0	0	5
9:00 AM	0	3	0	0	0	0	3
9:15 AM	0	9	0	0	0	0	9
9:30 AM	0	3	0	1	0	0	4
9:45 AM	0	4	0	0	0	0	4
10:00 AM	0	3	0	0	0	0	3
10:15 AM	0	0	0	0	0	0	0
10:30 AM	0	5	0	0	0	0	5
10:45 AM	0	2	0	1	0	0	3
11:00 AM	0	3	0	0	0	0	3
11:15 AM	0	1	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0
11:45 AM	0	3	0	0	0	0	3
12:00 PM	0	7	0	0	0	0	7
12:15 PM	0	9	0	0	0	0	9
12:30 PM	0	4	0	0	0	0	4
12:45 PM	0	5	0	1	0	0	6
1:00 PM	0	4	0	0	0	0	4
1:15 PM	0	3	0	0	0	0	3
1:30 PM	0	3	0	0	0	0	3
1:45 PM	0	5	0	0	0	0	5
2:00 PM	0	5	0	0	0	0	5
2:15 PM	0	0	0	0	0	0	0
2:30 PM	0	5	0	0	0	0	5
2:45 PM	0	3	0	0	0	0	3
3:00 PM	0	5	1	0	0	0	6
3:15 PM	0	6	1	0	0	0	7
3:30 PM	0	7	1	0	0	0	8
3:45 PM	0	8	2	0	0	0	10
4:00 PM	0	7	2	0	0	0	9
4:15 PM	0	3	0	0	0	0	3
4:30 PM	0	9	0	0	0	0	9

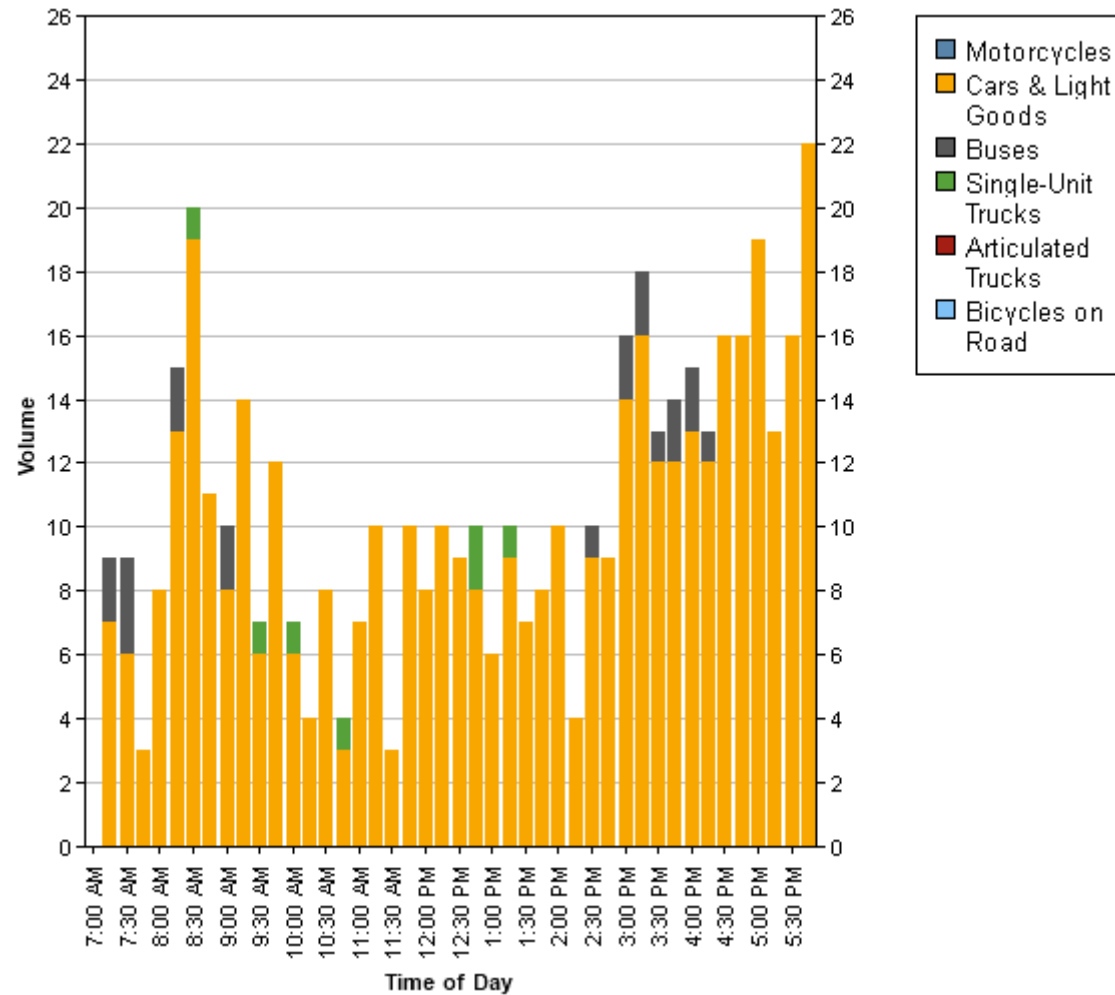
4:45 PM	0	9	0	0	0	0	9
5:00 PM	0	9	0	0	0	0	9
5:15 PM	0	5	0	0	0	0	5
5:30 PM	0	9	0	0	0	0	9
5:45 PM	0	11	0	0	0	0	11
Total	0	202	12	4	0	0	218
Total %	0.0	92.7	5.5	1.8	0.0	0.0	100.0
AM Times	7:00 AM	8:30 AM	7:00 AM	9:15 AM	7:00 AM	7:00 AM	8:15 AM
AM Peaks	0	23	4	1	0	0	22
PM Times	12:00 PM	5:00 PM	3:00 PM	12:30 PM	12:00 PM	12:00 PM	5:00 PM
PM Peaks	0	34	5	1	0	0	34



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Forest Edge Trail (Doon South
Drive to Windrush Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Edge Trail (Windrush Trail
to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	6	0	0	0	0	6
7:15 AM	0	8	2	0	0	0	10
7:30 AM	0	7	1	0	0	0	8
7:45 AM	0	7	0	0	0	0	7
8:00 AM	0	6	0	0	0	0	6
8:15 AM	0	8	1	0	0	0	9
8:30 AM	0	8	1	1	0	0	10
8:45 AM	0	8	1	0	0	0	9
9:00 AM	0	8	1	0	0	0	9
9:15 AM	0	13	0	0	0	0	13
9:30 AM	0	7	0	1	0	0	8
9:45 AM	0	5	0	0	0	0	5
10:00 AM	0	8	0	1	0	0	9
10:15 AM	0	6	0	0	0	0	6
10:30 AM	0	6	0	0	0	0	6
10:45 AM	0	4	0	0	0	0	4
11:00 AM	0	10	0	0	0	0	10
11:15 AM	0	6	0	0	0	0	6
11:30 AM	0	4	0	0	0	0	4
11:45 AM	0	9	0	0	0	0	9
12:00 PM	0	7	0	0	0	0	7
12:15 PM	0	14	0	0	0	0	14
12:30 PM	0	9	0	0	0	0	9
12:45 PM	0	4	0	0	0	0	4
1:00 PM	0	12	0	0	0	0	12
1:15 PM	0	3	0	0	0	0	3
1:30 PM	0	7	0	0	0	0	7
1:45 PM	0	7	0	0	0	0	7
2:00 PM	0	6	0	0	0	0	6
2:15 PM	1	5	0	0	0	0	6
2:30 PM	0	10	0	0	0	0	10
2:45 PM	0	10	1	0	0	0	11
3:00 PM	0	17	0	0	0	0	17
3:15 PM	0	13	1	0	0	0	14
3:30 PM	0	19	1	0	0	0	20
3:45 PM	0	22	3	0	0	0	25
4:00 PM	0	14	2	0	0	0	16
4:15 PM	0	13	0	0	0	0	13
4:30 PM	0	15	0	0	0	0	15

4:45 PM	0	14	0	0	0	0	14
5:00 PM	0	24	0	0	0	0	24
5:15 PM	0	20	0	0	0	0	20
5:30 PM	0	24	0	0	0	0	24
5:45 PM	0	24	0	0	0	0	24
Total	1	457	15	3	0	0	476
Total %	0.2	96.0	3.2	0.6	0.0	0.0	100.0
AM Times	7:00 AM	8:15 AM	8:15 AM	9:15 AM	7:00 AM	7:00 AM	8:15 AM
AM Peaks	0	32	4	2	0	0	37
PM Times	1:30 PM	5:00 PM	3:15 PM	12:30 PM	12:00 PM	12:00 PM	5:00 PM
PM Peaks	1	92	7	0	0	0	92



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Forest Edge Trail (Windrush Trail
to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	10	0	0	0	0	10
7:15 AM	0	8	1	0	0	0	9
7:30 AM	0	15	1	1	0	0	17
7:45 AM	0	14	0	0	0	0	14
8:00 AM	0	14	0	0	0	0	14
8:15 AM	0	17	1	0	0	0	18
8:30 AM	0	23	0	0	0	0	23
8:45 AM	0	16	0	0	0	0	16
9:00 AM	0	18	2	0	0	0	20
9:15 AM	0	12	0	0	0	0	12
9:30 AM	0	7	0	0	0	0	7
9:45 AM	0	9	0	0	0	0	9
10:00 AM	0	7	0	2	0	0	9
10:15 AM	0	14	0	0	0	0	14
10:30 AM	0	10	0	0	0	0	10
10:45 AM	0	5	0	0	0	0	5
11:00 AM	0	10	0	0	0	0	10
11:15 AM	0	10	0	2	0	0	12
11:30 AM	0	9	0	0	0	0	9
11:45 AM	0	12	0	0	0	0	12
12:00 PM	0	7	0	0	0	0	7
12:15 PM	0	7	0	0	0	2	9
12:30 PM	0	13	0	0	0	0	13
12:45 PM	0	8	0	0	0	0	8
1:00 PM	0	13	0	0	0	0	13
1:15 PM	0	11	0	1	0	0	12
1:30 PM	0	12	0	0	0	0	12
1:45 PM	0	8	0	0	0	0	8
2:00 PM	0	12	0	0	0	0	12
2:15 PM	0	13	0	0	0	0	13
2:30 PM	0	9	1	0	0	0	10
2:45 PM	0	17	0	0	0	0	17
3:00 PM	0	15	1	0	0	0	16
3:15 PM	0	19	0	0	0	0	19
3:30 PM	0	13	0	0	0	0	13
3:45 PM	0	11	0	0	0	0	11
4:00 PM	0	20	2	0	0	0	22
4:15 PM	0	19	1	0	0	0	20
4:30 PM	0	17	0	0	0	0	17

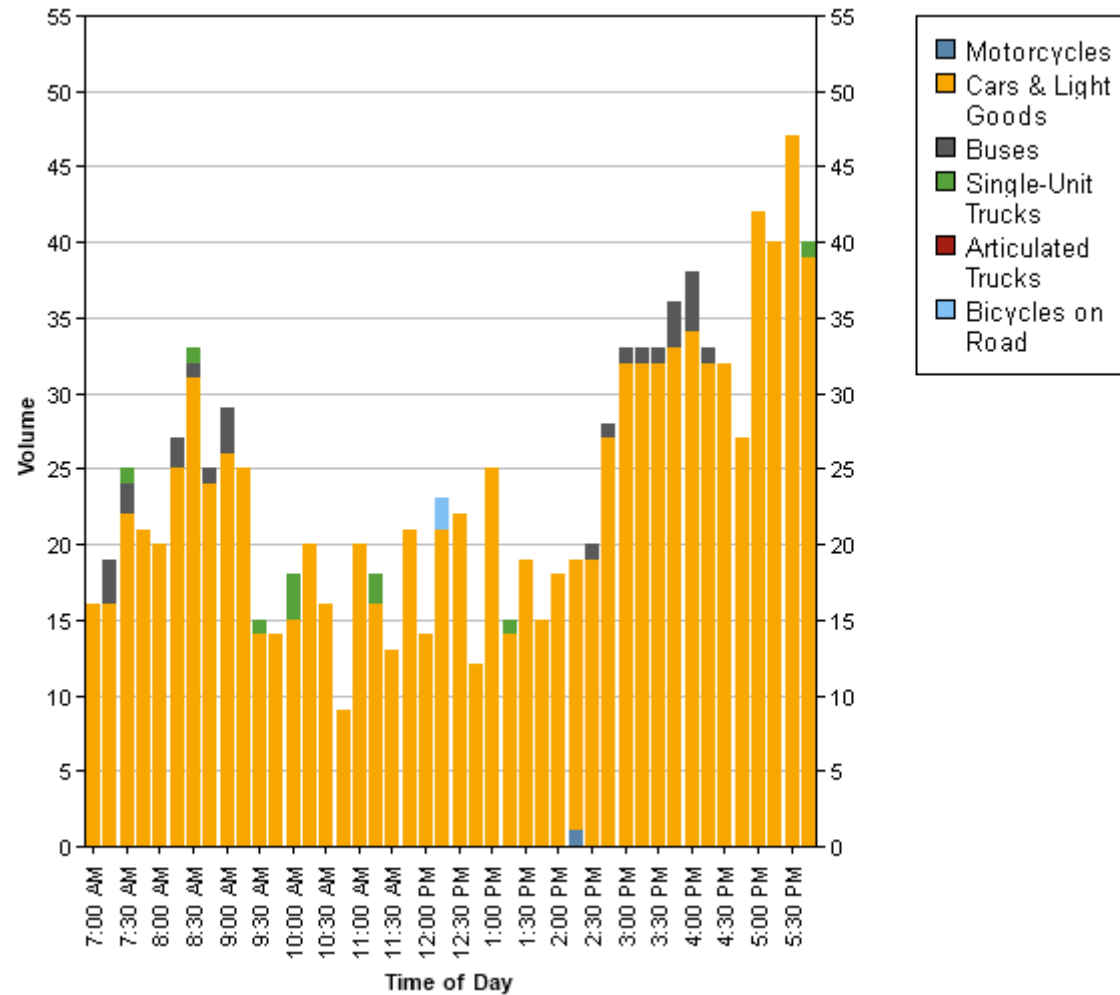
4:45 PM	0	13	0	0	0	0	13
5:00 PM	0	18	0	0	0	0	18
5:15 PM	0	20	0	0	0	0	20
5:30 PM	0	23	0	0	0	0	23
5:45 PM	0	15	0	1	0	0	16
Total	0	573	10	7	0	2	592
Total %	0.0	96.8	1.7	1.2	0.0	0.3	100.0
AM Times	7:00 AM	8:15 AM	8:15 AM	9:15 AM	7:00 AM	7:00 AM	8:15 AM
AM Peaks	0	74	3	2	0	0	77
PM Times	1:30 PM	5:00 PM	3:15 PM	12:30 PM	12:00 PM	12:00 PM	5:00 PM
PM Peaks	0	76	2	1	0	2	77



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Forest Edge Trail (Windrush Trail
to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Riedel Drive (Stauffer Drive to
New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	7	0	0	0	0	7
7:15 AM	1	13	0	0	0	0	14
7:30 AM	0	17	0	0	0	0	17
7:45 AM	0	10	0	0	0	0	10
8:00 AM	0	12	0	1	0	0	13
8:15 AM	0	19	0	0	0	0	19
8:30 AM	1	20	0	0	0	0	21
8:45 AM	0	9	0	1	0	0	10
9:00 AM	0	14	0	0	0	1	15
9:15 AM	0	10	0	0	0	0	10
9:30 AM	0	7	0	0	0	0	7
9:45 AM	0	9	0	0	0	1	10
10:00 AM	0	4	0	0	0	1	5
10:15 AM	0	8	0	0	0	0	8
10:30 AM	0	4	0	1	0	0	5
10:45 AM	0	5	0	1	0	0	6
11:00 AM	0	5	0	0	0	0	5
11:15 AM	0	9	0	0	0	0	9
11:30 AM	0	7	0	0	0	0	7
11:45 AM	0	7	0	0	0	0	7
12:00 PM	0	8	0	0	0	0	8
12:15 PM	0	5	0	0	0	0	5
12:30 PM	0	6	0	0	0	0	6
12:45 PM	0	4	0	0	0	0	4
1:00 PM	0	7	0	0	0	0	7
1:15 PM	0	8	0	0	0	0	8
1:30 PM	0	14	0	0	0	0	14
1:45 PM	0	14	0	0	0	0	14
2:00 PM	0	11	0	0	0	0	11
2:15 PM	0	4	0	1	0	0	5
2:30 PM	0	9	0	0	0	0	9
2:45 PM	0	9	0	0	0	0	9
3:00 PM	0	16	1	0	0	0	17
3:15 PM	0	10	1	0	0	0	11
3:30 PM	0	13	0	1	0	0	14
3:45 PM	0	18	1	0	0	0	19
4:00 PM	0	20	1	0	0	0	21
4:15 PM	0	12	1	0	0	0	13
4:30 PM	0	13	0	0	0	0	13

4:45 PM	0	18	0	0	0	0	18
5:00 PM	0	8	0	0	0	0	8
5:15 PM	0	10	0	0	0	0	10
5:30 PM	0	8	0	0	0	0	8
5:45 PM	0	13	0	0	0	0	13
Total	2	454	5	6	0	3	470
Total %	0.4	96.6	1.1	1.3	0.0	0.6	100.0
AM Times	7:00 AM	8:00 AM	7:00 AM	10:00 AM	7:00 AM	9:00 AM	8:00 AM
AM Peaks	1	60	0	2	0	2	63
PM Times	12:00 PM	4:00 PM	3:00 PM	1:45 PM	12:00 PM	12:00 PM	4:00 PM
PM Peaks	0	63	3	1	0	0	65



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Riedel Drive (Stauffer Drive to
New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	2	0	0	0	0	2
7:15 AM	0	7	3	0	0	0	10
7:30 AM	0	11	1	0	0	0	12
7:45 AM	0	13	1	1	0	0	15
8:00 AM	0	12	0	0	0	0	12
8:15 AM	0	16	1	0	0	0	17
8:30 AM	0	10	0	1	0	0	11
8:45 AM	0	21	1	0	0	0	22
9:00 AM	0	7	0	0	0	0	7
9:15 AM	0	5	0	0	0	0	5
9:30 AM	0	4	0	0	0	0	4
9:45 AM	0	4	0	0	0	0	4
10:00 AM	0	4	0	0	0	0	4
10:15 AM	0	6	0	0	0	0	6
10:30 AM	0	3	0	2	0	0	5
10:45 AM	0	6	1	1	0	1	9
11:00 AM	0	5	0	0	0	0	5
11:15 AM	0	10	0	0	0	0	10
11:30 AM	0	7	0	0	0	0	7
11:45 AM	0	6	0	0	0	0	6
12:00 PM	0	10	0	0	0	0	10
12:15 PM	0	9	0	0	0	0	9
12:30 PM	0	12	0	0	0	0	12
12:45 PM	0	4	0	1	0	1	6
1:00 PM	0	2	0	0	0	0	2
1:15 PM	0	11	0	0	0	0	11
1:30 PM	0	8	0	0	0	0	8
1:45 PM	0	7	0	0	0	0	7
2:00 PM	0	28	0	1	0	0	29
2:15 PM	0	13	0	1	0	0	14
2:30 PM	0	13	0	1	0	0	14
2:45 PM	0	10	1	0	0	0	11
3:00 PM	0	16	1	0	0	0	17
3:15 PM	0	13	0	2	0	0	15
3:30 PM	0	22	0	0	0	0	22
3:45 PM	0	22	3	0	0	0	25
4:00 PM	0	25	0	0	0	0	25
4:15 PM	0	39	0	2	0	0	41
4:30 PM	0	33	1	0	0	0	34

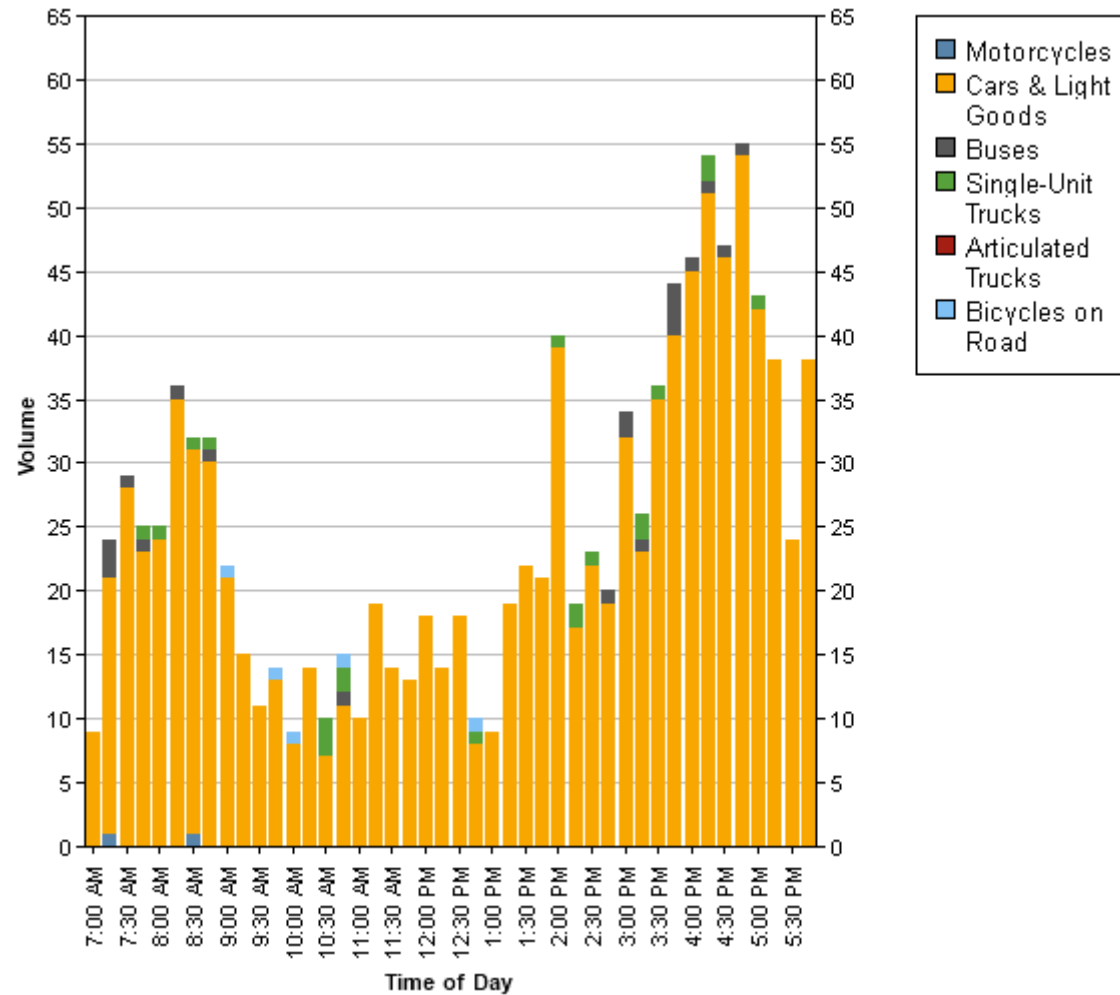
4:45 PM	0	36	1	0	0	0	37
5:00 PM	0	34	0	1	0	0	35
5:15 PM	0	28	0	0	0	0	28
5:30 PM	0	16	0	0	0	0	16
5:45 PM	0	25	0	0	0	0	25
Total	0	595	15	14	0	2	626
Total %	0.0	95.0	2.4	2.2	0.0	0.3	100.0
AM Times	7:00 AM	8:00 AM	7:00 AM	10:00 AM	7:00 AM	9:00 AM	8:00 AM
AM Peaks	0	59	5	3	0	0	62
PM Times	12:00 PM	4:00 PM	3:00 PM	1:45 PM	12:00 PM	12:00 PM	4:00 PM
PM Peaks	0	133	4	3	0	1	137



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Riedel Drive (Stauffer Drive to
New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive (Blair Creek
Drive to New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	71	1	0	0	0	72
7:15 AM	0	83	2	0	0	0	85
7:30 AM	0	113	1	1	0	0	115
7:45 AM	0	91	1	2	0	0	94
8:00 AM	0	103	0	2	0	0	105
8:15 AM	0	94	1	2	0	0	97
8:30 AM	0	87	1	1	0	0	89
8:45 AM	0	81	1	1	0	0	83
9:00 AM	0	67	0	2	0	0	69
9:15 AM	0	74	1	0	0	0	75
9:30 AM	0	69	0	2	0	0	71
9:45 AM	0	47	1	1	0	0	49
10:00 AM	0	39	0	1	0	0	40
10:15 AM	0	45	1	0	0	0	46
10:30 AM	0	40	0	1	1	0	42
10:45 AM	0	42	1	1	0	0	44
11:00 AM	0	32	0	2	0	0	34
11:15 AM	0	42	1	0	0	0	43
11:30 AM	0	45	0	1	0	0	46
11:45 AM	0	33	1	0	0	0	34
12:00 PM	0	47	0	1	0	0	48
12:15 PM	0	43	1	0	1	0	45
12:30 PM	0	41	0	2	0	0	43
12:45 PM	0	40	1	1	0	0	42
1:00 PM	0	29	0	2	0	0	31
1:15 PM	0	41	1	1	0	0	43
1:30 PM	0	55	0	0	0	0	55
1:45 PM	0	34	1	0	0	0	35
2:00 PM	0	40	0	1	0	0	41
2:15 PM	0	36	1	1	0	0	38
2:30 PM	0	45	0	0	0	0	45
2:45 PM	0	41	1	0	0	0	42
3:00 PM	0	49	2	1	0	0	52
3:15 PM	0	36	1	0	0	0	37
3:30 PM	2	76	0	0	0	0	78
3:45 PM	0	54	2	3	0	0	59
4:00 PM	0	62	2	0	0	0	64
4:15 PM	0	48	1	2	1	0	52
4:30 PM	0	62	0	0	0	0	62

4:45 PM	0	72	2	0	0	0	74
5:00 PM	0	69	0	0	0	0	69
5:15 PM	0	59	1	0	0	0	60
5:30 PM	0	47	0	0	0	0	47
5:45 PM	0	78	0	0	0	0	78
Total	2	2502	31	35	3	0	2573
Total %	0.1	97.2	1.2	1.4	0.1	0.0	100.0
AM Times	7:00 AM	7:30 AM	7:00 AM	7:30 AM	10:00 AM	11:00 AM	7:30 AM
AM Peaks	0	401	5	7	1	0	411
PM Times	3:30 PM	4:45 PM	3:45 PM	12:30 PM	12:00 PM	4:00 PM	4:30 PM
PM Peaks	2	247	5	6	1	0	265



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive (Blair Creek
Drive to New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	26	1	0	0	0	27
7:15 AM	0	27	0	2	0	0	29
7:30 AM	0	32	4	4	0	0	40
7:45 AM	0	47	1	4	0	0	52
8:00 AM	0	40	1	1	0	0	42
8:15 AM	0	32	1	1	0	0	34
8:30 AM	0	38	1	2	0	0	41
8:45 AM	0	44	1	0	0	0	45
9:00 AM	0	35	1	1	0	0	37
9:15 AM	0	42	1	0	0	0	43
9:30 AM	0	20	1	0	0	0	21
9:45 AM	0	24	0	3	0	0	27
10:00 AM	0	28	1	0	0	0	29
10:15 AM	0	32	0	1	1	0	34
10:30 AM	0	33	1	0	0	0	34
10:45 AM	0	28	0	0	1	0	29
11:00 AM	0	24	1	1	0	0	26
11:15 AM	0	24	0	2	0	0	26
11:30 AM	0	39	1	1	0	0	41
11:45 AM	0	26	0	0	0	1	27
12:00 PM	0	43	1	0	0	0	44
12:15 PM	0	33	0	0	0	0	33
12:30 PM	0	48	1	0	1	0	50
12:45 PM	0	41	0	0	0	0	41
1:00 PM	0	35	1	1	0	0	37
1:15 PM	0	46	0	1	0	0	47
1:30 PM	0	42	1	1	0	0	44
1:45 PM	0	37	0	0	0	0	37
2:00 PM	0	40	1	0	0	0	41
2:15 PM	0	48	0	0	0	0	48
2:30 PM	0	43	2	0	0	0	45
2:45 PM	0	59	0	1	0	0	60
3:00 PM	0	76	2	1	0	0	79
3:15 PM	0	80	1	1	0	0	82
3:30 PM	0	81	0	0	0	0	81
3:45 PM	0	67	1	0	0	0	68
4:00 PM	0	100	2	0	0	0	102
4:15 PM	1	86	1	1	0	0	89
4:30 PM	0	88	2	1	0	0	91

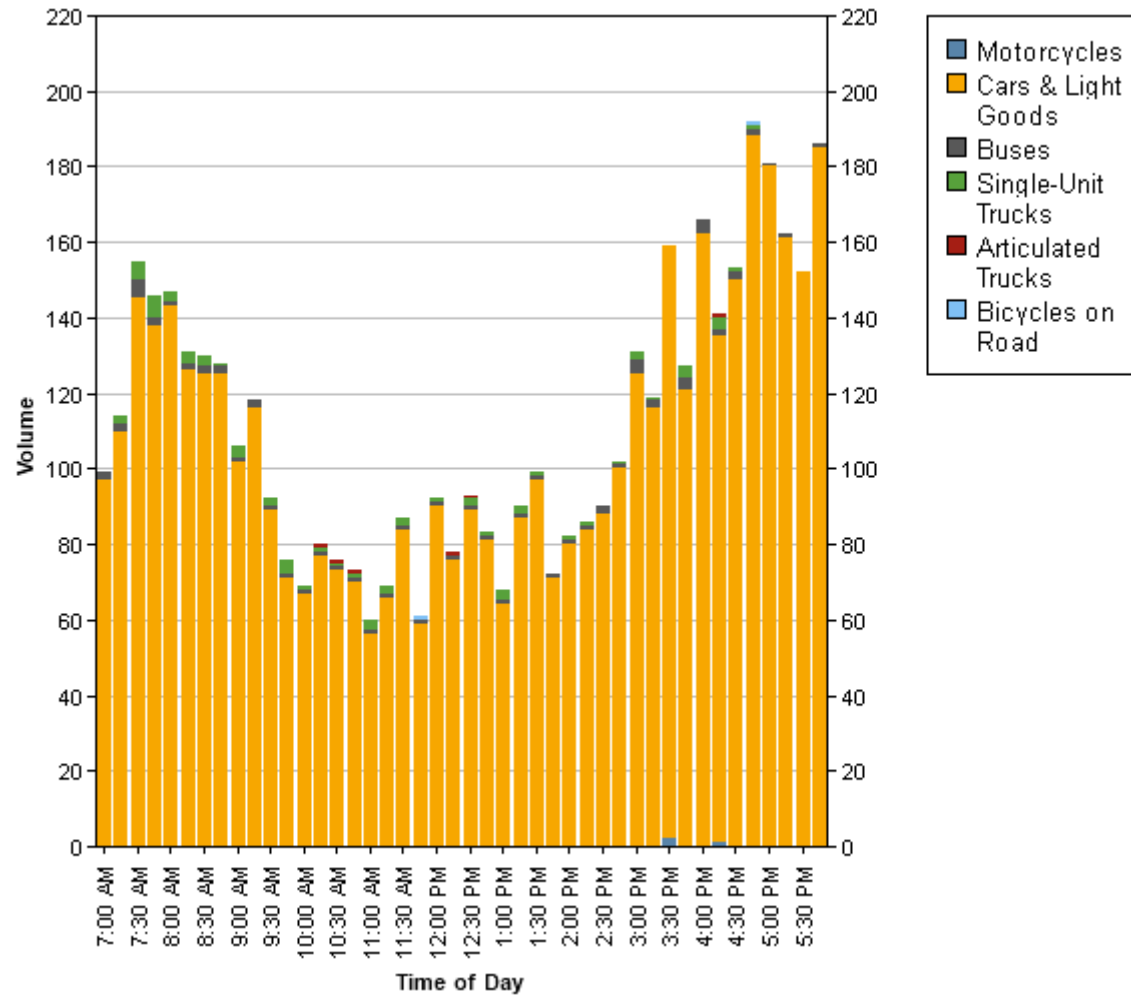
4:45 PM	0	116	0	1	0	1	118
5:00 PM	0	111	1	0	0	0	112
5:15 PM	0	102	0	0	0	0	102
5:30 PM	0	105	0	0	0	0	105
5:45 PM	0	107	1	0	0	0	108
Total	1	2275	35	32	3	2	2348
Total %	0.0	96.9	1.5	1.4	0.1	0.1	100.0
AM Times	7:00 AM	7:30 AM	7:00 AM	7:30 AM	10:00 AM	11:00 AM	7:30 AM
AM Peaks	0	151	6	10	2	1	168
PM Times	3:30 PM	4:45 PM	3:45 PM	12:30 PM	12:00 PM	4:00 PM	4:30 PM
PM Peaks	1	434	6	2	1	1	423



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Robert Ferrie Drive (Blair Creek
Drive to New Dundee Road)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive (Doon South
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	10	0	0	0	0	10
7:15 AM	0	14	0	1	0	0	15
7:30 AM	0	28	1	1	0	0	30
7:45 AM	0	36	0	1	0	0	37
8:00 AM	0	26	2	1	0	0	29
8:15 AM	0	24	1	1	0	0	26
8:30 AM	0	18	1	1	0	0	20
8:45 AM	0	18	2	0	0	0	20
9:00 AM	0	29	0	0	0	0	29
9:15 AM	0	23	1	0	0	0	24
9:30 AM	0	21	0	0	0	0	21
9:45 AM	0	14	0	1	0	0	15
10:00 AM	0	21	0	1	0	0	22
10:15 AM	0	27	0	0	1	0	28
10:30 AM	0	22	0	1	0	0	23
10:45 AM	0	19	0	0	1	0	20
11:00 AM	0	21	0	1	0	0	22
11:15 AM	0	20	0	1	0	0	21
11:30 AM	0	18	0	1	0	0	19
11:45 AM	0	22	0	0	0	0	22
12:00 PM	0	26	0	0	0	0	26
12:15 PM	0	14	0	2	0	0	16
12:30 PM	0	26	0	0	1	0	27
12:45 PM	0	21	0	0	0	0	21
1:00 PM	0	23	0	0	0	0	23
1:15 PM	0	21	0	1	0	0	22
1:30 PM	0	23	0	1	0	0	24
1:45 PM	0	17	0	0	0	0	17
2:00 PM	0	22	0	0	0	0	22
2:15 PM	0	26	0	0	0	0	26
2:30 PM	0	19	1	0	0	0	20
2:45 PM	0	33	0	1	0	0	34
3:00 PM	0	35	2	0	0	0	37
3:15 PM	1	33	2	0	0	0	36
3:30 PM	0	42	1	0	0	0	43
3:45 PM	0	41	0	0	0	0	41
4:00 PM	0	48	2	0	0	0	50
4:15 PM	0	38	0	1	0	0	39
4:30 PM	0	48	0	0	0	0	48

4:45 PM	0	65	1	1	0	1	68
5:00 PM	0	59	0	0	0	1	60
5:15 PM	0	55	0	0	0	0	55
5:30 PM	0	52	0	0	0	0	52
5:45 PM	0	46	0	0	0	0	46
Total	1	1264	17	19	3	2	1306
Total %	0.1	96.8	1.3	1.5	0.2	0.2	100.0
AM Times	7:00 AM	7:30 AM	8:00 AM	10:30 AM	10:00 AM	7:00 AM	7:30 AM
AM Peaks	0	114	6	3	2	0	122
PM Times	2:45 PM	4:45 PM	3:00 PM	3:30 PM	12:00 PM	4:30 PM	4:45 PM
PM Peaks	1	231	5	1	1	2	235



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Robert Ferrie Drive (Doon South
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	23	0	0	0	0	23
7:15 AM	0	31	1	0	0	0	32
7:30 AM	0	46	3	1	0	0	50
7:45 AM	0	28	1	0	0	0	29
8:00 AM	0	47	0	0	0	0	47
8:15 AM	0	34	0	0	1	0	35
8:30 AM	0	36	3	0	0	0	39
8:45 AM	0	30	0	0	0	0	30
9:00 AM	0	27	0	1	0	0	28
9:15 AM	0	31	0	0	0	0	31
9:30 AM	0	32	0	1	0	0	33
9:45 AM	0	16	0	0	0	0	16
10:00 AM	0	16	0	1	0	0	17
10:15 AM	0	15	0	0	0	0	15
10:30 AM	0	17	0	1	1	0	19
10:45 AM	0	26	0	1	0	0	27
11:00 AM	0	13	0	2	0	0	15
11:15 AM	0	15	0	0	0	0	15
11:30 AM	0	20	0	1	0	0	21
11:45 AM	0	18	0	0	0	0	18
12:00 PM	0	18	0	1	0	2	21
12:15 PM	0	12	0	0	1	0	13
12:30 PM	0	25	0	0	0	0	25
12:45 PM	0	15	0	1	0	0	16
1:00 PM	0	10	0	0	0	0	10
1:15 PM	0	22	0	0	0	0	22
1:30 PM	0	27	0	0	0	0	27
1:45 PM	0	17	0	0	0	0	17
2:00 PM	0	12	0	0	0	0	12
2:15 PM	0	13	0	1	0	0	14
2:30 PM	0	24	1	0	0	0	25
2:45 PM	0	24	0	0	0	0	24
3:00 PM	0	19	1	0	0	0	20
3:15 PM	0	17	0	0	0	0	17
3:30 PM	1	32	2	1	0	0	36
3:45 PM	0	39	1	1	0	0	41
4:00 PM	0	36	1	1	0	1	39
4:15 PM	0	22	0	1	1	0	24
4:30 PM	0	25	0	0	0	0	25

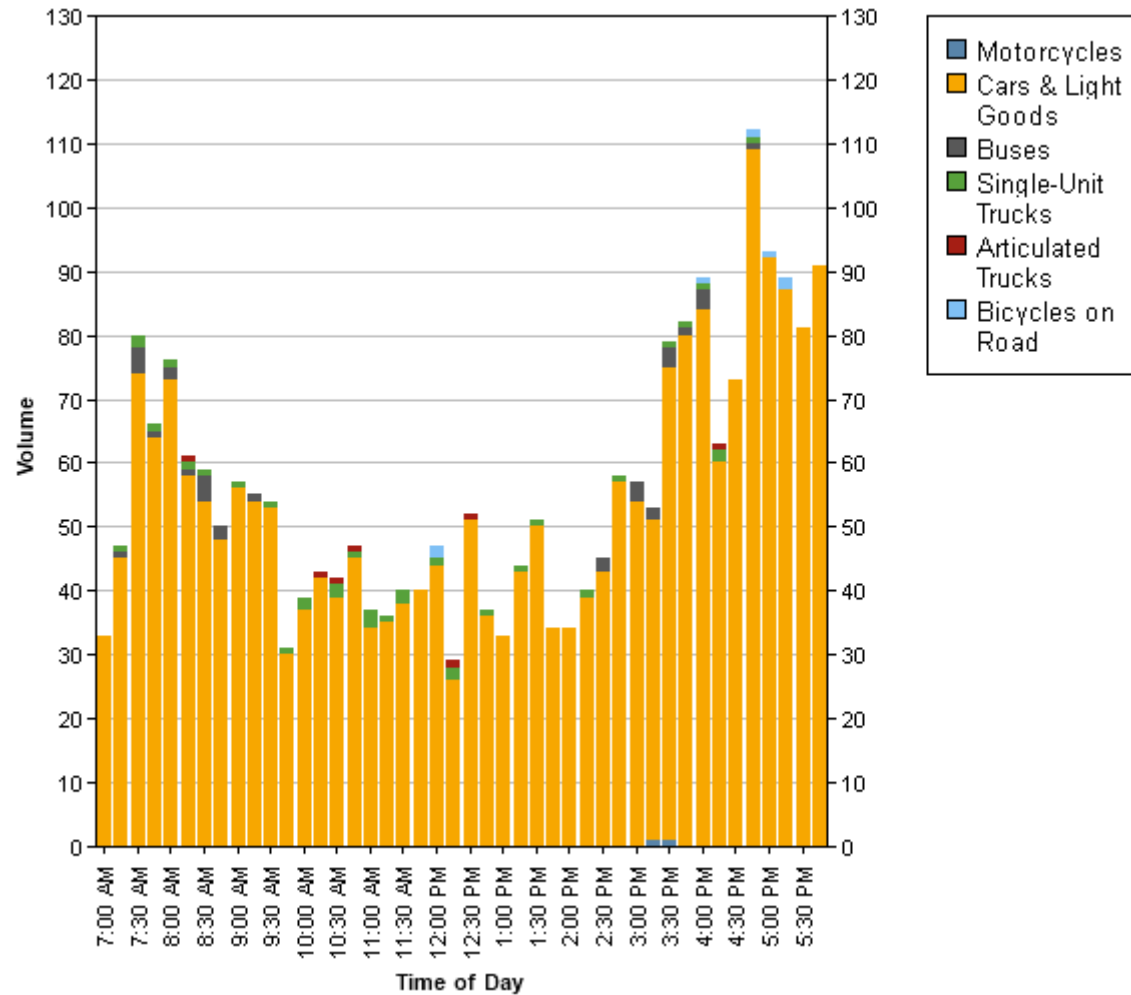
4:45 PM	0	44	0	0	0	0	44
5:00 PM	0	33	0	0	0	0	33
5:15 PM	0	32	0	0	0	2	34
5:30 PM	0	29	0	0	0	0	29
5:45 PM	0	45	0	0	0	0	45
Total	1	1113	14	16	4	5	1153
Total %	0.1	96.5	1.2	1.4	0.3	0.4	100.0
AM Times	7:00 AM	7:30 AM	8:00 AM	10:30 AM	10:00 AM	7:00 AM	7:30 AM
AM Peaks	0	155	3	4	1	0	161
PM Times	2:45 PM	4:45 PM	3:00 PM	3:30 PM	12:00 PM	4:30 PM	4:45 PM
PM Peaks	1	138	4	4	1	2	140



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Robert Ferrie Drive (Doon South
Drive to Thomas Slee Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive (Forest Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	10	1	0	0	0	11
7:15 AM	0	11	2	0	0	0	13
7:30 AM	0	26	6	0	0	0	32
7:45 AM	0	25	0	2	0	0	27
8:00 AM	0	21	4	0	0	0	25
8:15 AM	0	29	0	1	0	0	30
8:30 AM	0	24	2	1	0	0	27
8:45 AM	0	35	2	0	0	0	37
9:00 AM	0	38	3	0	0	0	41
9:15 AM	0	26	1	0	0	0	27
9:30 AM	0	9	1	0	0	0	10
9:45 AM	0	14	0	1	0	0	15
10:00 AM	0	15	1	2	0	0	18
10:15 AM	0	16	0	0	0	0	16
10:30 AM	0	13	1	1	0	0	15
10:45 AM	0	16	0	0	0	0	16
11:00 AM	0	8	1	0	0	0	9
11:15 AM	0	9	0	0	0	0	9
11:30 AM	0	5	1	0	0	0	6
11:45 AM	0	14	0	0	0	0	14
12:00 PM	0	14	1	3	0	0	18
12:15 PM	0	13	0	1	0	0	14
12:30 PM	0	15	1	1	0	0	17
12:45 PM	0	12	0	0	0	0	12
1:00 PM	0	20	1	0	0	1	22
1:15 PM	0	7	0	1	0	0	8
1:30 PM	0	14	1	1	0	0	16
1:45 PM	0	18	0	0	0	0	18
2:00 PM	0	16	1	0	0	0	17
2:15 PM	0	16	0	0	0	0	16
2:30 PM	0	20	1	0	0	0	21
2:45 PM	0	23	2	0	0	0	25
3:00 PM	0	30	0	0	0	0	30
3:15 PM	0	34	6	0	0	0	40
3:30 PM	0	34	2	0	0	0	36
3:45 PM	0	26	1	0	0	0	27
4:00 PM	0	34	3	0	0	0	37
4:15 PM	0	29	0	1	0	0	30
4:30 PM	0	31	1	0	0	0	32

4:45 PM	0	35	0	0	0	0	35
5:00 PM	0	39	1	0	0	0	40
5:15 PM	1	37	0	0	0	0	38
5:30 PM	0	33	1	0	1	0	35
5:45 PM	0	28	0	1	0	0	29
Total	1	942	49	17	1	1	1011
Total %	0.1	93.2	4.8	1.7	0.1	0.1	100.0
AM Times	7:00 AM	8:15 AM	7:15 AM	9:45 AM	8:30 AM	10:45 AM	8:15 AM
AM Peaks	0	126	12	4	0	0	135
PM Times	4:30 PM	4:45 PM	2:45 PM	12:00 PM	5:00 PM	12:15 PM	4:45 PM
PM Peaks	1	144	10	5	1	1	148



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Robert Ferrie Drive (Forest Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	15	0	0	0	0	15
7:15 AM	0	13	4	0	0	0	17
7:30 AM	0	31	2	0	0	0	33
7:45 AM	0	25	2	0	0	0	27
8:00 AM	0	29	2	0	0	0	31
8:15 AM	0	36	3	0	0	0	39
8:30 AM	0	25	0	0	0	0	25
8:45 AM	0	26	2	0	0	0	28
9:00 AM	0	35	0	0	0	0	35
9:15 AM	0	29	1	1	1	0	32
9:30 AM	0	19	1	0	0	0	20
9:45 AM	0	23	0	0	0	0	23
10:00 AM	0	12	1	1	0	0	14
10:15 AM	0	15	0	1	0	0	16
10:30 AM	0	19	0	0	0	0	19
10:45 AM	0	15	1	1	0	0	17
11:00 AM	0	15	1	0	0	0	16
11:15 AM	0	8	0	1	0	0	9
11:30 AM	0	14	1	1	0	1	17
11:45 AM	0	13	0	0	0	0	13
12:00 PM	0	12	0	0	0	0	12
12:15 PM	0	17	1	1	0	0	19
12:30 PM	0	17	1	0	0	0	18
12:45 PM	0	21	0	0	0	0	21
1:00 PM	0	15	1	1	0	1	18
1:15 PM	0	10	0	0	0	0	10
1:30 PM	0	18	1	1	0	0	20
1:45 PM	0	17	0	1	0	0	18
2:00 PM	0	17	1	0	0	0	18
2:15 PM	0	13	0	0	0	0	13
2:30 PM	0	18	2	1	0	0	21
2:45 PM	0	16	5	1	0	0	22
3:00 PM	0	17	2	0	0	0	19
3:15 PM	0	15	3	0	0	0	18
3:30 PM	0	30	3	0	0	0	33
3:45 PM	0	29	3	0	0	0	32
4:00 PM	0	33	2	0	0	0	35
4:15 PM	0	25	1	1	0	0	27
4:30 PM	0	30	0	1	0	0	31

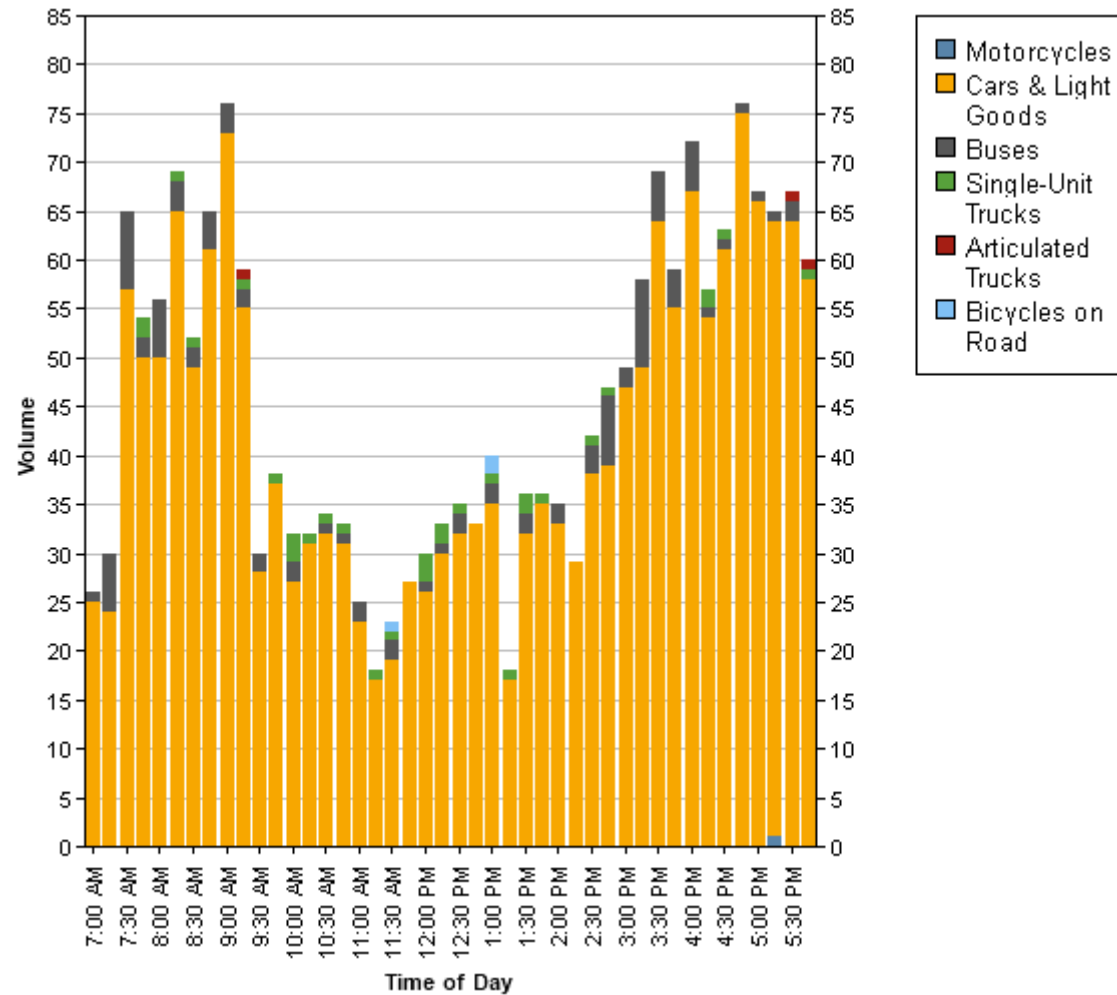
4:45 PM	0	40	1	0	0	0	41
5:00 PM	0	27	0	0	0	0	27
5:15 PM	0	26	1	0	0	0	27
5:30 PM	0	31	1	0	0	0	32
5:45 PM	0	30	0	0	1	0	31
Total	0	941	50	14	2	2	1009
Total %	0.0	93.3	5.0	1.4	0.2	0.2	100.0
AM Times	7:00 AM	8:15 AM	7:15 AM	9:45 AM	8:30 AM	10:45 AM	8:15 AM
AM Peaks	0	122	10	2	1	1	127
PM Times	4:30 PM	4:45 PM	2:45 PM	12:00 PM	5:00 PM	12:15 PM	4:45 PM
PM Peaks	0	124	13	1	1	1	127



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Robert Ferrie Drive (Forest Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/11/2023
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Robert Ferrie Drive (South Creek
Drive to Forest Creek Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	14	2	0	0	0	16
7:15 AM	0	14	2	0	0	2	18
7:30 AM	0	26	7	0	0	0	33
7:45 AM	0	33	1	1	0	0	35
8:00 AM	0	25	2	1	0	0	28
8:15 AM	0	27	0	0	0	0	27
8:30 AM	0	30	1	1	0	0	32
8:45 AM	0	37	2	1	0	0	40
9:00 AM	0	32	3	0	0	0	35
9:15 AM	0	30	3	0	0	0	33
9:30 AM	0	9	1	0	0	0	10
9:45 AM	0	20	0	1	0	0	21
10:00 AM	0	17	1	1	0	0	19
10:15 AM	0	24	0	3	0	0	27
10:30 AM	0	19	1	1	0	0	21
10:45 AM	0	21	0	0	0	0	21
11:00 AM	0	15	1	0	0	0	16
11:15 AM	0	19	0	0	0	0	19
11:30 AM	0	13	1	0	0	0	14
11:45 AM	0	20	0	0	0	0	20
12:00 PM	0	22	1	3	0	0	26
12:15 PM	0	23	0	0	0	0	23
12:30 PM	0	18	1	2	0	0	21
12:45 PM	0	17	0	0	0	0	17
1:00 PM	0	24	1	0	0	1	26
1:15 PM	0	21	0	0	0	0	21
1:30 PM	0	14	1	0	0	0	15
1:45 PM	0	30	0	0	0	0	30
2:00 PM	0	24	1	0	0	0	25
2:15 PM	0	29	0	0	0	0	29
2:30 PM	0	24	1	0	0	0	25
2:45 PM	0	36	2	0	0	0	38
3:00 PM	0	31	2	0	0	0	33
3:15 PM	0	32	3	0	0	0	35
3:30 PM	0	31	4	0	0	0	35
3:45 PM	0	33	1	0	1	0	35
4:00 PM	0	38	2	0	0	0	40
4:15 PM	0	36	1	1	0	0	38
4:30 PM	0	42	0	1	0	0	43

4:45 PM	0	43	1	0	0	0	44
5:00 PM	0	56	0	0	0	1	57
5:15 PM	0	50	1	0	0	0	51
5:30 PM	0	47	1	2	1	0	51
5:45 PM	0	50	0	1	0	0	51
Total	0	1216	52	20	2	4	1294
Total %	0.0	94.0	4.0	1.5	0.2	0.3	100.0
AM Times	7:00 AM	8:15 AM	7:00 AM	10:00 AM	8:30 AM	7:00 AM	8:30 AM
AM Peaks	0	126	12	5	0	2	140
PM Times	12:00 PM	4:45 PM	2:45 PM	12:00 PM	5:00 PM	12:15 PM	4:45 PM
PM Peaks	0	196	11	5	1	1	203



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Count Name: Robert Ferrie Drive (South Creek
Drive to Forest Creek Drive)
Site Code: 230376
Start Date: 10/11/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	20	2	0	0	0	22
7:15 AM	0	19	3	0	0	0	22
7:30 AM	0	38	3	0	0	1	42
7:45 AM	0	31	2	0	0	0	33
8:00 AM	0	35	2	0	0	0	37
8:15 AM	0	32	3	0	0	0	35
8:30 AM	0	30	1	0	0	0	31
8:45 AM	0	33	2	0	0	0	35
9:00 AM	0	36	0	0	0	0	36
9:15 AM	0	29	1	1	1	0	32
9:30 AM	0	21	1	0	0	0	22
9:45 AM	0	26	0	0	0	0	26
10:00 AM	0	17	1	2	0	0	20
10:15 AM	0	22	0	1	0	0	23
10:30 AM	0	28	0	1	0	0	29
10:45 AM	0	20	1	3	0	0	24
11:00 AM	0	21	1	0	0	0	22
11:15 AM	0	17	0	1	0	0	18
11:30 AM	0	25	1	1	0	0	27
11:45 AM	0	25	0	0	0	0	25
12:00 PM	0	17	1	0	0	1	19
12:15 PM	0	25	0	1	0	0	26
12:30 PM	0	15	1	0	0	0	16
12:45 PM	0	21	0	0	0	0	21
1:00 PM	0	20	1	1	0	1	23
1:15 PM	0	21	0	0	0	0	21
1:30 PM	0	22	1	2	0	0	25
1:45 PM	0	24	0	1	0	0	25
2:00 PM	0	22	1	0	0	0	23
2:15 PM	0	16	0	1	0	0	17
2:30 PM	0	30	2	0	0	0	32
2:45 PM	0	30	6	2	0	0	38
3:00 PM	0	20	2	0	0	0	22
3:15 PM	0	20	4	0	0	0	24
3:30 PM	0	30	3	0	0	0	33
3:45 PM	0	34	3	1	0	1	39
4:00 PM	0	36	2	0	0	0	38
4:15 PM	0	48	1	1	0	0	50
4:30 PM	0	33	0	1	0	0	34

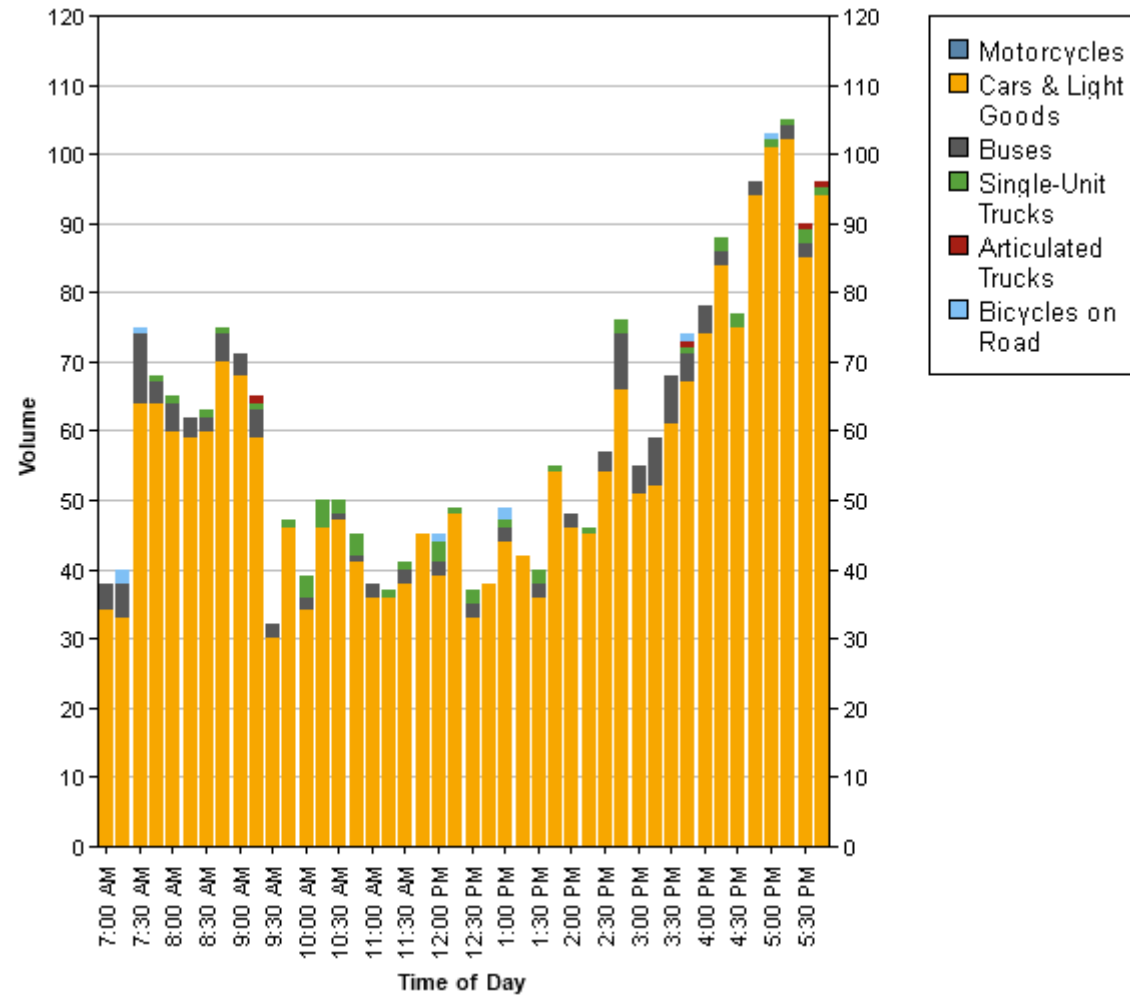
4:45 PM	0	51	1	0	0	0	52
5:00 PM	0	45	0	1	0	0	46
5:15 PM	0	52	1	1	0	0	54
5:30 PM	0	38	1	0	0	0	39
5:45 PM	0	44	0	0	1	0	45
Total	0	1239	55	23	2	4	1323
Total %	0.0	93.7	4.2	1.7	0.2	0.3	100.0
AM Times	7:00 AM	8:15 AM	7:00 AM	10:00 AM	8:30 AM	7:00 AM	8:30 AM
AM Peaks	0	131	10	7	1	1	134
PM Times	12:00 PM	4:45 PM	2:45 PM	12:00 PM	5:00 PM	12:15 PM	4:45 PM
PM Peaks	0	186	15	1	1	1	191



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Robert Ferrie Drive (South Creek
Drive to Forest Creek Drive)
Site Code: 230376
Start Date: 10/11/2023
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: South Creek Drive (Robert Ferrie
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	3	2	0	0	0	5
7:15 AM	0	9	2	0	0	0	11
7:30 AM	0	10	1	1	0	0	12
7:45 AM	0	10	0	0	0	1	11
8:00 AM	0	25	1	1	0	0	27
8:15 AM	0	22	0	0	0	0	22
8:30 AM	0	15	1	1	0	0	17
8:45 AM	0	23	1	1	0	0	25
9:00 AM	1	43	0	0	0	0	44
9:15 AM	0	10	0	0	0	0	10
9:30 AM	0	8	0	1	0	0	9
9:45 AM	0	14	0	0	0	0	14
10:00 AM	0	4	0	0	0	0	4
10:15 AM	0	15	0	1	0	0	16
10:30 AM	0	10	0	0	0	0	10
10:45 AM	0	9	0	0	0	0	9
11:00 AM	0	7	0	0	0	0	7
11:15 AM	0	14	0	0	0	0	14
11:30 AM	0	14	0	1	0	0	15
11:45 AM	0	12	0	0	0	0	12
12:00 PM	0	9	0	0	0	0	9
12:15 PM	0	13	0	0	0	0	13
12:30 PM	0	9	0	0	0	0	9
12:45 PM	0	14	0	1	0	0	15
1:00 PM	0	9	0	0	0	0	9
1:15 PM	0	10	0	0	0	0	10
1:30 PM	0	10	0	0	0	0	10
1:45 PM	0	16	0	1	0	0	17
2:00 PM	0	20	0	0	0	0	20
2:15 PM	1	17	0	1	0	0	19
2:30 PM	0	18	1	0	0	0	19
2:45 PM	0	29	4	0	0	0	33
3:00 PM	0	26	1	0	0	0	27
3:15 PM	0	42	1	0	0	0	43
3:30 PM	0	26	0	0	0	0	26
3:45 PM	0	20	3	0	0	0	23
4:00 PM	0	20	0	0	0	0	20
4:15 PM	0	27	0	0	0	0	27
4:30 PM	0	22	0	0	0	0	22

4:45 PM	0	30	0	0	0	0	30
5:00 PM	0	27	0	0	0	0	27
5:15 PM	0	32	0	0	0	0	32
5:30 PM	0	30	0	0	0	0	30
5:45 PM	0	35	0	1	0	0	36
Total	2	788	18	11	0	1	820
Total %	0.2	96.1	2.2	1.3	0.0	0.1	100.0
AM Times	8:15 AM	8:15 AM	7:00 AM	8:30 AM	10:15 AM	7:00 AM	8:15 AM
AM Peaks	1	103	5	2	0	1	108
PM Times	1:30 PM	3:15 PM	2:30 PM	1:30 PM	2:15 PM	12:00 PM	3:15 PM
PM Peaks	1	108	7	2	0	0	112



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5A-150 Pinebush Rd

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Count Name: South Creek Drive (Robert Ferrie
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	19	1	0	0	0	20
7:15 AM	0	21	0	0	0	0	21
7:30 AM	0	30	3	0	0	0	33
7:45 AM	0	33	0	0	0	0	33
8:00 AM	0	25	0	0	0	0	25
8:15 AM	0	32	1	0	0	0	33
8:30 AM	0	25	1	0	0	0	26
8:45 AM	0	23	1	0	0	0	24
9:00 AM	0	42	1	1	0	0	44
9:15 AM	0	34	0	1	0	0	35
9:30 AM	0	17	0	0	0	0	17
9:45 AM	0	16	0	1	0	0	17
10:00 AM	0	10	0	0	0	0	10
10:15 AM	0	16	0	0	0	0	16
10:30 AM	0	17	0	2	0	0	19
10:45 AM	0	7	0	0	0	0	7
11:00 AM	0	17	0	0	1	0	18
11:15 AM	0	20	0	0	0	1	21
11:30 AM	0	7	0	0	0	0	7
11:45 AM	0	22	0	1	0	0	23
12:00 PM	0	14	0	0	0	1	15
12:15 PM	0	9	0	0	0	0	9
12:30 PM	0	19	0	0	0	0	19
12:45 PM	0	19	0	0	0	0	19
1:00 PM	0	21	0	0	0	0	21
1:15 PM	0	10	0	0	0	0	10
1:30 PM	0	19	0	0	0	0	19
1:45 PM	0	16	0	1	0	0	17
2:00 PM	0	13	0	0	0	0	13
2:15 PM	1	16	0	0	0	1	18
2:30 PM	0	14	1	0	0	0	15
2:45 PM	0	13	1	0	0	0	14
3:00 PM	0	15	0	0	1	0	16
3:15 PM	0	16	1	0	0	0	17
3:30 PM	0	58	2	0	0	0	60
3:45 PM	0	37	1	0	0	0	38
4:00 PM	0	27	2	0	0	0	29
4:15 PM	0	17	1	1	0	0	19
4:30 PM	0	29	0	0	0	0	29

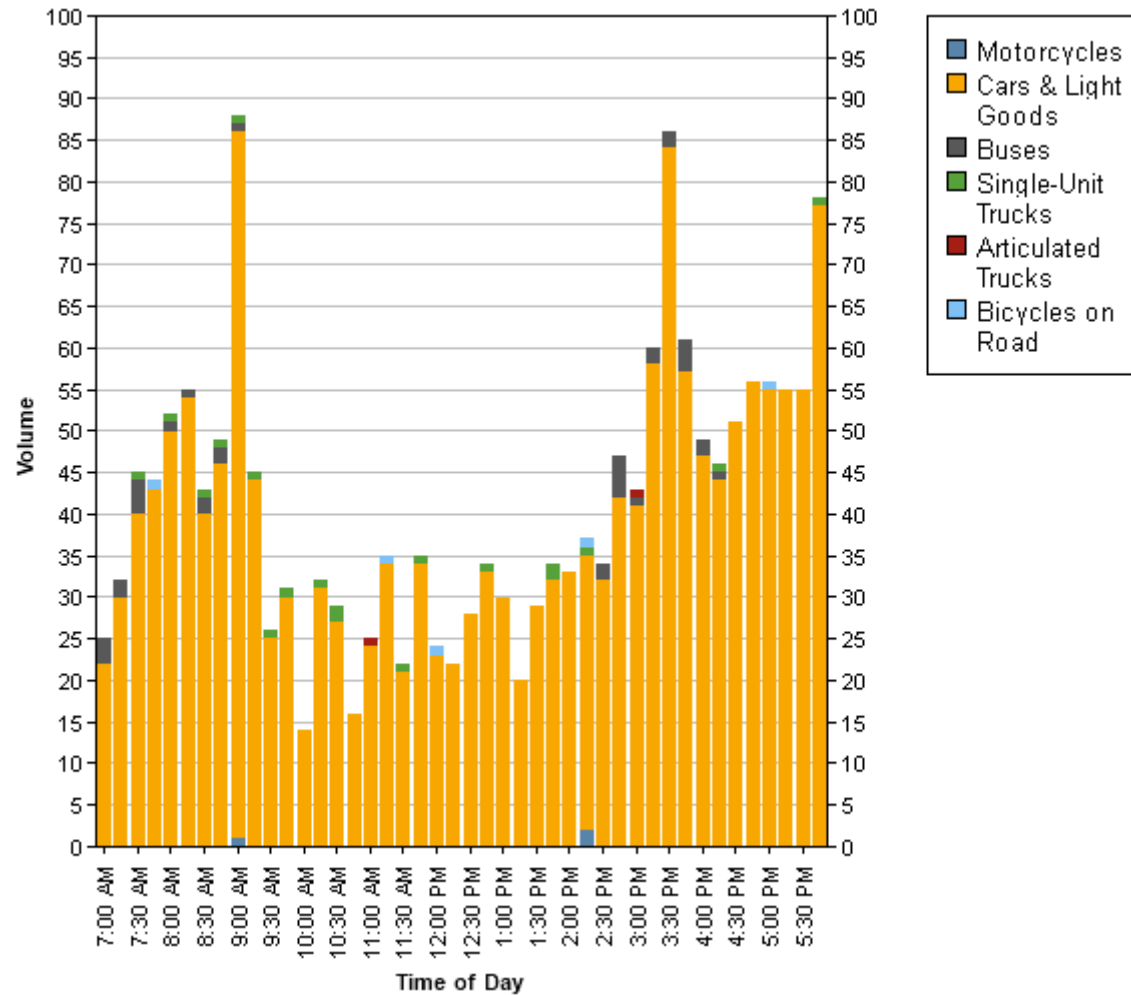
4:45 PM	0	26	0	0	0	0	26
5:00 PM	0	28	0	0	0	1	29
5:15 PM	0	23	0	0	0	0	23
5:30 PM	0	25	0	0	0	0	25
5:45 PM	0	42	0	0	0	0	42
Total	1	959	17	8	2	4	991
Total %	0.1	96.8	1.7	0.8	0.2	0.4	100.0
AM Times	8:15 AM	8:15 AM	7:00 AM	8:30 AM	10:15 AM	7:00 AM	8:15 AM
AM Peaks	0	122	4	2	1	0	127
PM Times	1:30 PM	3:15 PM	2:30 PM	1:30 PM	2:15 PM	12:00 PM	3:15 PM
PM Peaks	1	138	3	1	1	1	144



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5A-150 Pinebush Rd

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Count Name: South Creek Drive (Robert Ferrie
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Site Code: 230376
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Thomas Slee Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	7	1	0	0	0	8
7:15 AM	0	10	0	1	0	0	11
7:30 AM	0	10	5	1	0	0	16
7:45 AM	0	18	0	1	0	0	19
8:00 AM	0	10	1	1	0	0	12
8:15 AM	0	16	0	0	0	0	16
8:30 AM	0	17	2	0	0	0	19
8:45 AM	0	27	0	0	0	0	27
9:00 AM	0	17	1	2	0	1	21
9:15 AM	0	15	0	1	0	0	16
9:30 AM	0	8	1	0	0	0	9
9:45 AM	0	11	0	0	0	0	11
10:00 AM	0	8	1	0	0	0	9
10:15 AM	0	6	0	0	0	0	6
10:30 AM	0	9	1	0	0	0	10
10:45 AM	0	12	0	1	1	0	14
11:00 AM	0	11	1	1	0	0	13
11:15 AM	0	13	0	0	0	0	13
11:30 AM	0	12	1	0	0	0	13
11:45 AM	0	10	0	1	0	1	12
12:00 PM	0	10	1	1	0	0	12
12:15 PM	0	9	0	0	0	0	9
12:30 PM	0	5	0	1	0	0	6
12:45 PM	0	13	0	0	0	0	13
1:00 PM	0	11	1	0	0	0	12
1:15 PM	0	14	0	0	0	0	14
1:30 PM	0	18	1	0	0	0	19
1:45 PM	0	8	0	1	0	0	9
2:00 PM	0	17	1	1	0	1	20
2:15 PM	0	20	0	0	0	0	20
2:30 PM	0	15	1	0	0	0	16
2:45 PM	0	18	0	1	0	0	19
3:00 PM	0	29	1	1	0	0	31
3:15 PM	0	32	0	0	0	0	32
3:30 PM	0	22	0	0	0	0	22
3:45 PM	0	19	2	0	0	0	21
4:00 PM	0	37	1	0	0	1	39
4:15 PM	0	40	0	0	0	0	40
4:30 PM	0	30	1	0	0	0	31

4:45 PM	0	31	0	0	0	1	32
5:00 PM	0	31	1	0	0	0	32
5:15 PM	0	33	0	0	0	0	33
5:30 PM	0	36	0	0	0	0	36
5:45 PM	0	22	1	0	0	0	23
Total	0	767	27	16	1	5	816
Total %	0.0	94.0	3.3	2.0	0.1	0.6	100.0
AM Times	7:00 AM	7:30 AM	7:15 AM	7:15 AM	7:15 AM	8:15 AM	7:30 AM
AM Peaks	0	54	6	4	0	1	63
PM Times	12:00 PM	3:30 PM	3:00 PM	12:15 PM	12:00 PM	4:00 PM	3:30 PM
PM Peaks	0	118	3	1	0	2	122



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Count Name: Thomas Slee Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	17	0	0	0	0	17
7:15 AM	0	32	3	0	0	0	35
7:30 AM	0	40	0	1	0	0	41
7:45 AM	0	27	1	0	0	0	28
8:00 AM	0	28	1	0	1	0	30
8:15 AM	0	30	2	0	0	0	32
8:30 AM	0	22	0	2	0	0	24
8:45 AM	0	19	1	0	0	0	20
9:00 AM	0	20	1	0	0	0	21
9:15 AM	0	24	1	0	0	0	25
9:30 AM	0	18	0	0	0	0	18
9:45 AM	0	8	1	0	0	0	9
10:00 AM	0	11	0	0	0	0	11
10:15 AM	0	14	1	1	0	0	16
10:30 AM	0	9	0	0	0	0	9
10:45 AM	0	11	1	0	0	0	12
11:00 AM	0	9	0	0	0	0	9
11:15 AM	0	13	1	0	0	0	14
11:30 AM	0	16	0	0	0	0	16
11:45 AM	0	4	1	1	0	0	6
12:00 PM	0	16	0	0	0	0	16
12:15 PM	0	16	1	1	0	0	18
12:30 PM	0	12	0	1	0	0	13
12:45 PM	0	16	1	0	0	0	17
1:00 PM	0	13	0	2	0	0	15
1:15 PM	0	8	1	0	0	0	9
1:30 PM	0	16	0	0	0	0	16
1:45 PM	0	13	1	0	0	0	14
2:00 PM	0	16	0	1	0	0	17
2:15 PM	0	11	1	0	0	0	12
2:30 PM	0	9	0	0	0	0	9
2:45 PM	0	11	2	0	0	0	13
3:00 PM	0	18	1	0	0	0	19
3:15 PM	0	12	1	0	0	0	13
3:30 PM	0	34	1	0	0	0	35
3:45 PM	0	28	2	0	0	0	30
4:00 PM	0	19	0	0	0	0	19
4:15 PM	0	22	1	0	0	0	23
4:30 PM	0	19	1	0	0	1	21

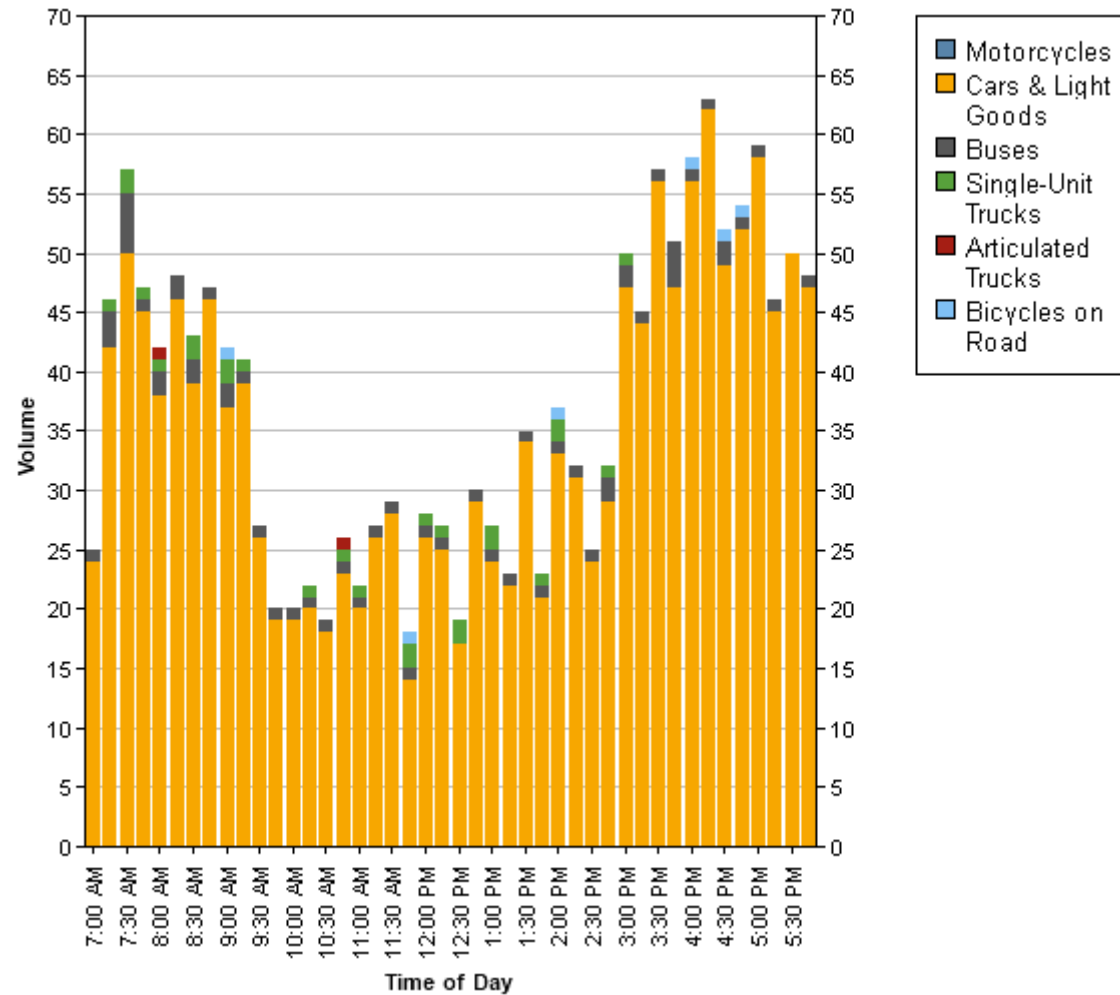
4:45 PM	0	21	1	0	0	0	22
5:00 PM	0	27	0	0	0	0	27
5:15 PM	0	12	1	0	0	0	13
5:30 PM	0	14	0	0	0	0	14
5:45 PM	0	25	0	0	0	0	25
Total	0	780	31	10	1	1	823
Total %	0.0	94.8	3.8	1.2	0.1	0.1	100.0
AM Times	7:00 AM	7:30 AM	7:15 AM	7:15 AM	7:15 AM	8:15 AM	7:30 AM
AM Peaks	0	125	5	1	1	0	131
PM Times	12:00 PM	3:30 PM	3:00 PM	12:15 PM	12:00 PM	4:00 PM	3:30 PM
PM Peaks	0	103	5	4	0	1	107



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Thomas Slee Drive (Doon South
Drive to Robert Ferrie Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Thomas Slee Drive (South Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Westbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	7	1	0	0	0	8
7:15 AM	0	10	0	0	0	0	10
7:30 AM	0	16	1	2	0	0	19
7:45 AM	0	21	0	0	1	0	22
8:00 AM	0	24	0	1	0	0	25
8:15 AM	0	24	2	0	0	0	26
8:30 AM	0	20	2	0	0	0	22
8:45 AM	0	36	0	0	0	0	36
9:00 AM	0	49	2	2	0	0	53
9:15 AM	0	9	0	0	0	0	9
9:30 AM	0	11	0	0	0	0	11
9:45 AM	0	7	1	0	0	0	8
10:00 AM	0	8	0	0	0	0	8
10:15 AM	0	10	0	0	0	0	10
10:30 AM	0	7	0	0	0	0	7
10:45 AM	0	14	0	0	0	0	14
11:00 AM	0	14	0	1	1	0	16
11:15 AM	0	9	0	0	0	0	9
11:30 AM	0	7	0	0	0	0	7
11:45 AM	0	15	0	0	0	0	15
12:00 PM	0	14	0	0	0	0	14
12:15 PM	0	7	0	0	0	0	7
12:30 PM	0	6	0	0	0	0	6
12:45 PM	0	14	0	0	0	0	14
1:00 PM	0	13	0	0	0	0	13
1:15 PM	0	12	0	0	0	0	12
1:30 PM	0	16	0	0	0	0	16
1:45 PM	0	15	0	0	0	0	15
2:00 PM	0	15	0	0	0	0	15
2:15 PM	0	15	0	0	0	0	15
2:30 PM	0	20	0	0	0	0	20
2:45 PM	0	8	1	1	0	0	10
3:00 PM	0	29	0	1	0	0	30
3:15 PM	0	45	2	0	0	1	48
3:30 PM	0	28	1	0	0	0	29
3:45 PM	0	16	0	0	0	0	16
4:00 PM	0	28	0	0	0	1	29
4:15 PM	0	32	1	0	0	0	33
4:30 PM	0	23	0	0	0	1	24

4:45 PM	0	33	0	0	0	0	33
5:00 PM	0	36	0	0	0	1	37
5:15 PM	0	30	0	0	0	0	30
5:30 PM	0	21	0	2	0	0	23
5:45 PM	0	22	0	0	0	0	22
Total	0	816	14	10	2	4	846
Total %	0.0	96.5	1.7	1.2	0.2	0.5	100.0
AM Times	7:00 AM	8:30 AM	8:15 AM	7:15 AM	7:15 AM	7:00 AM	8:30 AM
AM Peaks	0	114	6	3	1	0	120
PM Times	12:00 PM	3:15 PM	2:45 PM	2:00 PM	12:00 PM	3:45 PM	3:15 PM
PM Peaks	0	117	4	1	0	2	122



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Thomas Slee Drive (South Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Eastbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	13	1	0	0	0	14
7:15 AM	0	21	2	0	0	0	23
7:30 AM	0	34	1	1	0	0	36
7:45 AM	0	30	0	0	0	0	30
8:00 AM	0	27	0	0	1	0	28
8:15 AM	0	23	1	0	0	0	24
8:30 AM	0	30	1	0	0	0	31
8:45 AM	0	21	0	0	0	0	21
9:00 AM	0	33	1	0	0	0	34
9:15 AM	0	44	0	0	0	0	44
9:30 AM	0	16	0	1	0	0	17
9:45 AM	0	10	0	0	0	0	10
10:00 AM	0	15	0	0	0	0	15
10:15 AM	0	10	0	0	0	0	10
10:30 AM	0	12	0	0	0	0	12
10:45 AM	0	11	0	0	0	0	11
11:00 AM	0	8	0	0	0	0	8
11:15 AM	0	8	0	0	0	0	8
11:30 AM	0	14	0	0	0	0	14
11:45 AM	0	14	0	0	0	0	14
12:00 PM	0	11	0	0	0	0	11
12:15 PM	0	10	0	0	0	0	10
12:30 PM	0	16	1	1	0	0	18
12:45 PM	0	17	0	0	0	0	17
1:00 PM	0	10	0	1	0	0	11
1:15 PM	0	4	0	0	0	0	4
1:30 PM	0	9	0	0	0	0	9
1:45 PM	0	16	0	0	0	0	16
2:00 PM	0	12	1	2	0	0	15
2:15 PM	0	15	0	0	0	0	15
2:30 PM	0	16	0	0	0	0	16
2:45 PM	0	12	3	0	0	0	15
3:00 PM	0	15	2	0	0	0	17
3:15 PM	0	22	0	1	0	0	23
3:30 PM	0	55	1	0	0	0	56
3:45 PM	0	27	1	0	0	0	28
4:00 PM	0	20	1	0	0	0	21
4:15 PM	0	29	0	1	0	1	31
4:30 PM	0	23	0	0	0	1	24

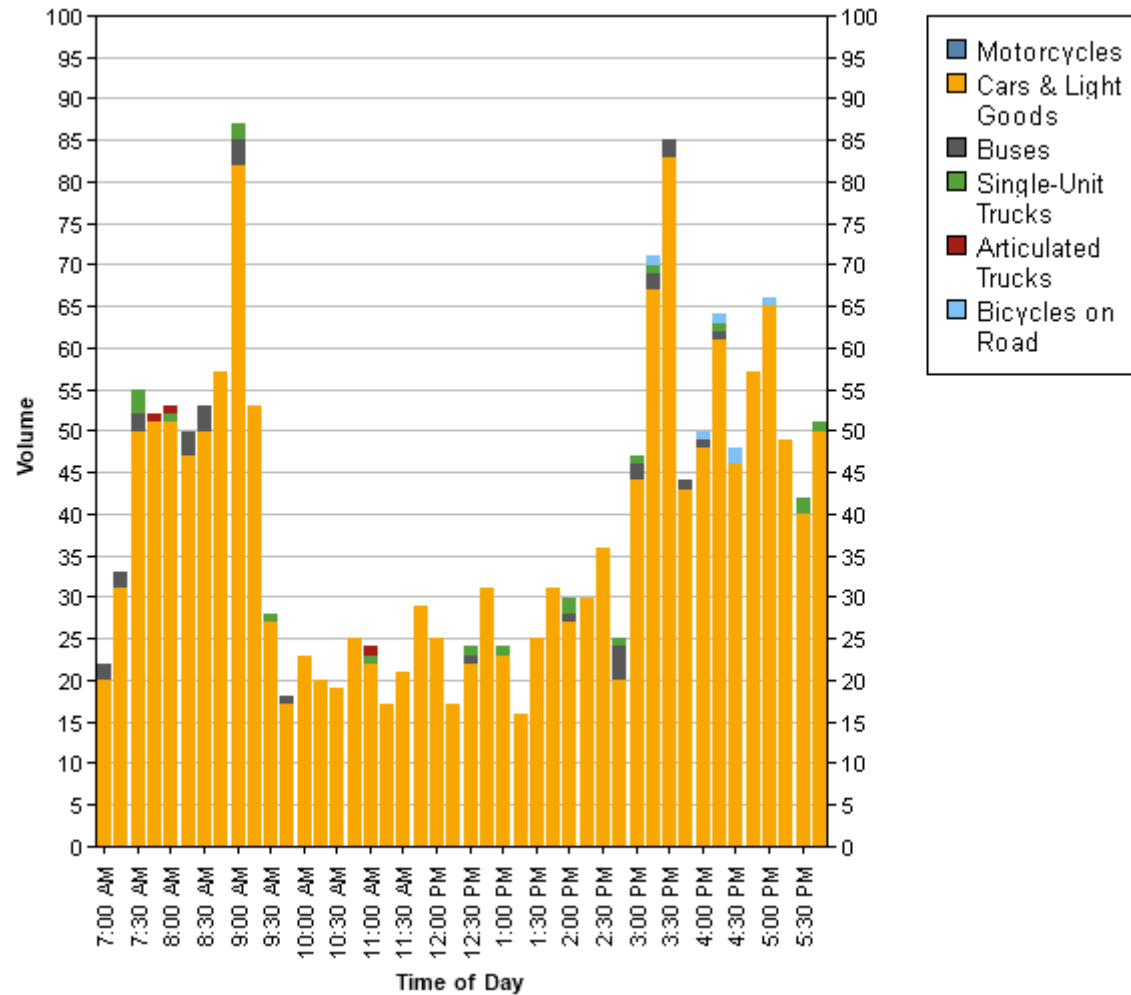
4:45 PM	0	24	0	0	0	0	24
5:00 PM	0	29	0	0	0	0	29
5:15 PM	0	19	0	0	0	0	19
5:30 PM	0	19	0	0	0	0	19
5:45 PM	0	28	0	1	0	0	29
Total	0	852	17	9	1	2	881
Total %	0.0	96.7	1.9	1.0	0.1	0.2	100.0
AM Times	7:00 AM	8:30 AM	8:15 AM	7:15 AM	7:15 AM	7:00 AM	8:30 AM
AM Peaks	0	128	3	1	1	0	130
PM Times	12:00 PM	3:15 PM	2:45 PM	2:00 PM	12:00 PM	3:45 PM	3:15 PM
PM Peaks	0	124	6	2	0	2	128



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Thomas Slee Drive (South Creek
Drive to Doon South Drive)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Windrush Trail (Doon South Drive
to Forest Edge Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 1

Direction (Southbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	3	0	0	0	0	3
7:15 AM	0	4	1	0	0	0	5
7:30 AM	0	5	1	0	0	0	6
7:45 AM	0	5	0	0	0	0	5
8:00 AM	0	6	0	0	0	0	6
8:15 AM	0	4	0	0	0	0	4
8:30 AM	0	6	2	0	0	0	8
8:45 AM	0	8	1	0	0	0	9
9:00 AM	0	9	1	0	0	0	10
9:15 AM	0	4	0	1	0	0	5
9:30 AM	0	6	0	2	0	0	8
9:45 AM	0	6	0	0	0	0	6
10:00 AM	0	3	0	0	0	0	3
10:15 AM	0	6	0	0	0	0	6
10:30 AM	0	8	0	0	0	0	8
10:45 AM	0	5	0	0	0	0	5
11:00 AM	0	10	1	0	0	0	11
11:15 AM	0	8	0	0	0	0	8
11:30 AM	0	7	0	0	0	0	7
11:45 AM	0	5	0	0	0	0	5
12:00 PM	0	7	0	0	0	0	7
12:15 PM	0	14	0	0	0	0	14
12:30 PM	0	9	0	0	0	0	9
12:45 PM	0	10	1	1	0	0	12
1:00 PM	0	12	0	0	0	0	12
1:15 PM	0	5	0	0	0	0	5
1:30 PM	0	12	0	0	0	1	13
1:45 PM	0	9	0	0	0	0	9
2:00 PM	0	7	0	0	0	0	7
2:15 PM	1	11	0	0	0	0	12
2:30 PM	0	9	0	0	0	0	9
2:45 PM	0	13	1	0	0	0	14
3:00 PM	0	15	0	0	0	0	15
3:15 PM	0	7	1	0	0	0	8
3:30 PM	0	10	0	0	0	0	10
3:45 PM	0	26	2	0	0	0	28
4:00 PM	0	16	0	0	0	0	16
4:15 PM	0	16	0	0	0	0	16
4:30 PM	0	14	0	0	0	0	14

4:45 PM	0	22	0	0	0	0	22
5:00 PM	0	18	0	0	0	0	18
5:15 PM	0	22	0	0	0	0	22
5:30 PM	0	24	0	0	0	0	24
5:45 PM	0	20	0	0	0	0	20
Total	1	446	12	4	0	1	464
Total %	0.2	96.1	2.6	0.9	0.0	0.2	100.0
AM Times	10:15 AM	7:30 AM	7:00 AM	8:45 AM	7:00 AM	7:30 AM	7:30 AM
AM Peaks	0	20	2	3	0	0	21
PM Times	1:30 PM	4:45 PM	3:00 PM	12:00 PM	12:00 PM	12:45 PM	4:45 PM
PM Peaks	1	86	3	1	0	1	86



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Windrush Trail (Doon South Drive
to Forest Edge Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 3

Direction (Northbound)

Start Time	Motorcycles	Cars & Light Goods	Buses	Single-Unit Trucks	Articulated Trucks	Bicycles on Road	Total
7:00 AM	0	15	0	0	0	0	15
7:15 AM	0	11	0	0	0	0	11
7:30 AM	0	22	3	0	0	0	25
7:45 AM	0	21	1	0	1	0	23
8:00 AM	0	24	0	0	0	0	24
8:15 AM	0	17	0	0	0	1	18
8:30 AM	0	21	1	0	0	0	22
8:45 AM	0	17	0	0	0	0	17
9:00 AM	0	13	0	0	0	0	13
9:15 AM	0	19	0	0	0	0	19
9:30 AM	0	8	1	1	0	0	10
9:45 AM	0	5	0	0	0	0	5
10:00 AM	0	2	0	0	1	0	3
10:15 AM	0	19	0	0	0	0	19
10:30 AM	0	11	0	0	0	0	11
10:45 AM	1	12	0	0	0	1	14
11:00 AM	1	6	0	0	0	0	7
11:15 AM	0	8	0	0	0	0	8
11:30 AM	0	12	0	0	0	0	12
11:45 AM	0	14	0	0	0	0	14
12:00 PM	0	16	0	0	0	0	16
12:15 PM	0	4	0	0	0	0	4
12:30 PM	0	10	0	0	0	0	10
12:45 PM	0	13	0	0	0	0	13
1:00 PM	0	13	0	0	0	0	13
1:15 PM	0	12	0	0	0	0	12
1:30 PM	0	16	0	0	0	0	16
1:45 PM	0	14	0	0	0	0	14
2:00 PM	0	16	0	1	0	0	17
2:15 PM	0	15	0	0	0	0	15
2:30 PM	0	12	0	0	0	0	12
2:45 PM	0	13	0	0	0	0	13
3:00 PM	0	17	1	0	0	0	18
3:15 PM	0	10	1	0	0	0	11
3:30 PM	0	18	0	0	0	0	18
3:45 PM	0	15	0	0	0	0	15
4:00 PM	0	13	1	0	0	0	14
4:15 PM	0	8	1	0	0	0	9
4:30 PM	0	13	0	0	0	0	13

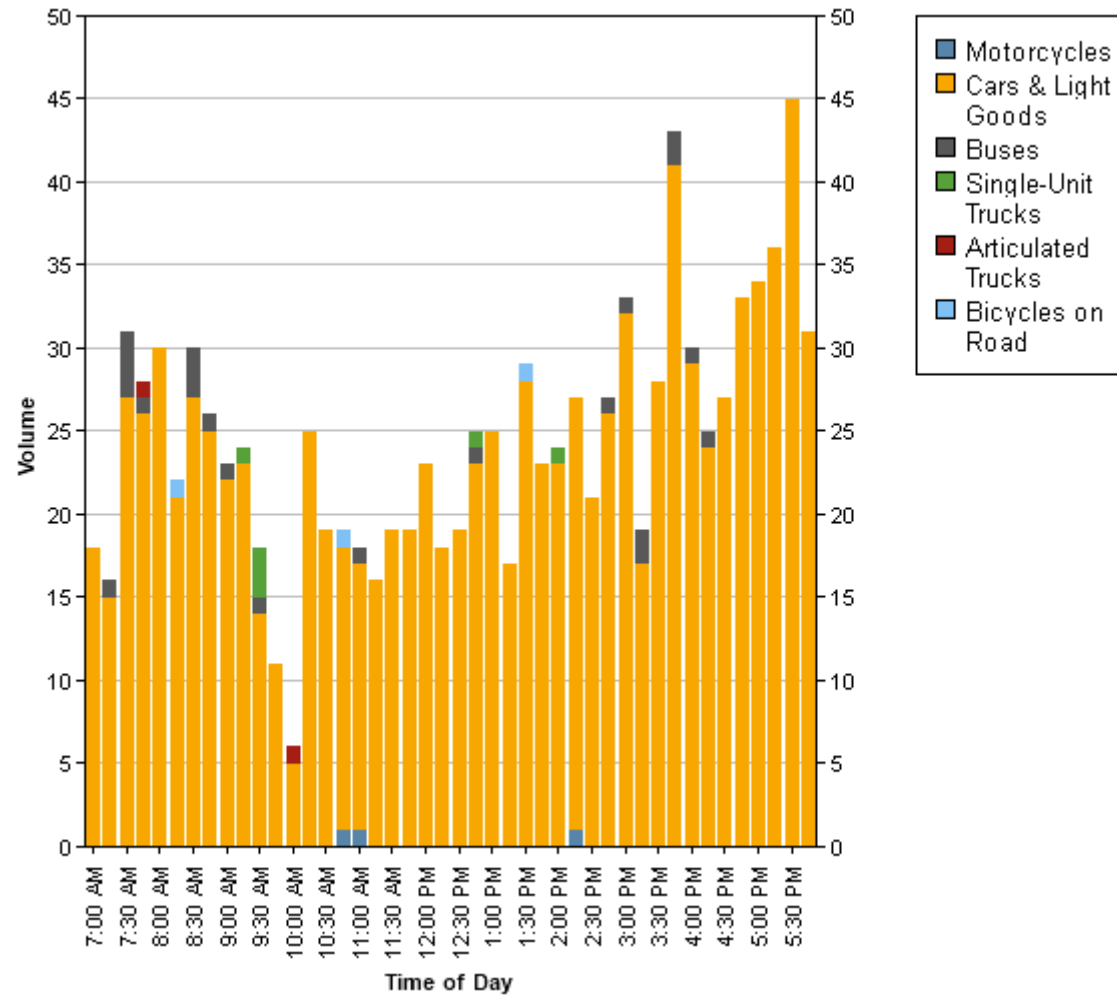
4:45 PM	0	11	0	0	0	0	11
5:00 PM	0	16	0	0	0	0	16
5:15 PM	0	14	0	0	0	0	14
5:30 PM	0	21	0	0	0	0	21
5:45 PM	0	11	0	0	0	0	11
Total	2	598	10	2	2	2	616
Total %	0.3	97.1	1.6	0.3	0.3	0.3	100.0
AM Times	10:15 AM	7:30 AM	7:00 AM	8:45 AM	7:00 AM	7:30 AM	7:30 AM
AM Peaks	2	84	4	1	1	1	90
PM Times	1:30 PM	4:45 PM	3:00 PM	12:00 PM	12:00 PM	12:45 PM	4:45 PM
PM Peaks	0	62	2	0	0	0	62



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Windrush Trail (Doon South Drive
to Forest Edge Trail)
Site Code: 230376
Start Date: 10/19/2023
Page No: 5



Appendix C

Existing Traffic Operations Reports



Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
Future Volume (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.96	1.00		0.98	0.99	1.00		0.98		0.98
Frt			0.850			0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	3374	1390	1561	3438	1390	1653	3254	0	2895	1759	1417
Flt Permitted	0.086			0.300			0.581			0.950		
Satd. Flow (perm)	140	3374	1337	491	3438	1361	1005	3254	0	2836	1759	1389
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194			450		3				118
Link Speed (k/h)		50			50				50			50
Link Distance (m)		449.7			2462.2			122.0				383.8
Travel Time (s)		32.4			177.3			8.8				27.6
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		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 (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Adj. Flow (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	300	947	218	13	1012	568	366	348	0	280	144	117
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	65.1	65.1	48.9	40.0	40.0	58.1	30.9		20.6	29.6	29.6
Actuated g/C Ratio	0.51	0.46	0.46	0.35	0.28	0.28	0.41	0.22		0.15	0.21	0.21
v/c Ratio	0.93	0.61	0.30	0.06	1.04	0.80	0.70	0.49		0.66	0.39	0.30
Control Delay	76.9	31.6	6.0	20.3	87.8	19.8	38.1	51.0		64.6	51.8	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	76.9	31.6	6.0	20.3	87.8	19.8	38.1	51.0		64.6	51.8	9.6
LOS	E	C	A	C	F	B	D	D		E	D	A
Approach Delay		37.1			63.0			44.4			49.3	
Approach LOS		D			E			D			D	
Intersection Summary												
Area Type: Other												
Cycle Length: 148.4												
Actuated Cycle Length: 141												
Natural Cycle: 125												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.04												
Intersection Signal Delay: 49.4 Intersection LOS: D												
Intersection Capacity Utilization 111.6% ICU Level of Service H												
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												
Ø1 36 s Ø2 36.3 s Ø3 10 s Ø4 47.1 s Ø5 29 s Ø6 36.3 s Ø7 29 s Ø8 47.1 s												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	300	947	218	13	1012	568	366	348	280	144	117
v/c Ratio	0.93	0.61	0.30	0.06	1.04	0.80	0.70	0.49	0.66	0.39	0.30
Control Delay	76.9	31.6	6.0	20.3	87.8	19.8	38.1	51.0	64.6	51.8	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	31.6	6.0	20.3	87.8	19.8	38.1	51.0	64.6	51.8	9.6
Queue Length 50th (m)	73.2	102.2	3.6	1.9	~169.0	32.7	77.4	47.0	40.7	37.1	0.0
Queue Length 95th (m)	#136.9	147.7	22.1	5.9	#220.3	93.3	108.5	66.5	55.4	59.2	16.6
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	321	1557	721	216	975	708	531	715	616	449	442
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.61	0.30	0.06	1.04	0.80	0.69	0.49	0.45	0.32	0.26

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
Future Volume (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1547	3374	1338	1559	3438	1362	1648	3253		2895	1759	1389
Flt Permitted	0.09	1.00	1.00	0.30	1.00	1.00	0.58	1.00		0.95	1.00	1.00
Satd. Flow (perm)	140	3374	1338	493	3438	1362	1008	3253		2895	1759	1389
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	947	218	13	1012	568	366	333	15	280	144	117
RTOR Reduction (vph)	0	0	106	0	0	317	0	2	0	0	0	93
Lane Group Flow (vph)	300	947	112	13	1012	251	366	346	0	280	144	24
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		5
Heavy Vehicles (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.8	30.9		20.6	29.6	29.6
Effective Green, g (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.8	30.9		20.6	29.6	29.6
Actuated g/C Ratio	0.50	0.45	0.45	0.31	0.30	0.30	0.38	0.22		0.14	0.21	0.21
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	315	1531	607	172	1018	403	491	700		415	363	286
v/s Ratio Prot	c0.17	0.28		0.00	0.29		c0.12	0.11		0.10	0.08	
v/s Ratio Perm	c0.31		0.08	0.02		0.18	c0.16					0.02
v/c Ratio	0.95	0.62	0.18	0.08	0.99	0.62	0.75	0.49		0.67	0.40	0.08
Uniform Delay, d1	45.3	29.7	23.3	34.1	50.3	43.5	35.5	49.4		58.2	49.2	46.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	37.9	0.8	0.1	0.2	26.6	3.0	6.1	2.5		5.6	3.2	0.6
Delay (s)	83.2	30.5	23.5	34.3	76.9	46.5	41.5	51.9		63.8	52.4	46.5
Level of Service	F	C	C	C	E	D	D	D		E	D	D
Approach Delay (s)		40.2			65.7			46.6			57.0	
Approach LOS		D			E			D			E	

Intersection Summary

HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	24.4
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
Future Volume (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99		1.00				1.00	
Frt			0.850		0.865						0.991	
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1537	1444	0	1323	0	1637	3094	0	1775	3067	0
Flt Permitted		0.757					0.950					
Satd. Flow (perm)	0	1223	1425	0	1323	0	1632	3094	0	1775	3067	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213		80						6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	1		1	1		1	7					7
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 (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Adj. Flow (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	213	0	2	0	76	1482	0	0	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm		NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		23.2			23.2			11.4		58.6		46.2
Actuated g/C Ratio		0.24			0.24			0.12		0.62		0.49
v/c Ratio		0.80			0.42			0.39		0.77		0.93
Control Delay		53.8			6.7			48.8		18.1		37.9
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.8			6.7			48.8		18.1		37.9
LOS		D			A			D		B		D
Approach Delay		31.5						19.6				37.9
Approach LOS		C						B				D

Intersection Summary

Area Type: Other

Cycle Length: 117.6

Actuated Cycle Length: 94.8

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 28.6

Intersection LOS: C

Intersection Capacity Utilization 98.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	→	↘	←	↙	↑	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	238	213	2	76	1482	1386
v/c Ratio	0.80	0.42	0.01	0.39	0.77	0.93
Control Delay	53.8	6.7	0.0	48.8	18.1	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.7	0.0	48.8	18.1	37.9
Queue Length 50th (m)	43.8	0.0	0.0	14.2	100.9	133.4
Queue Length 95th (m)	75.9	17.2	0.0	31.4	173.7	#240.2
Internal Link Dist (m)	295.9		64.4		538.4	2438.2
Turn Bay Length (m)				110.0		
Base Capacity (vph)	463	672	550	354	2343	1496
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	0.51	0.32	0.00	0.21	0.63	0.93

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
Future Volume (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		5.0	6.6	
Lane Util. Factor	1.00	1.00		1.00		1.00	0.95		1.00		0.95	
Flpb, ped/bikes	1.00	0.99		0.99		1.00	1.00		1.00		1.00	
Flpb, ped/bikes	1.00	1.00		1.00		1.00	1.00		1.00		1.00	
Frt	1.00	0.85		0.86		1.00	1.00		1.00		0.99	
Flt Protected	0.95	1.00		1.00		0.95	1.00		1.00		1.00	
Satd. Flow (prot)	1535	1425		1323		1637	3094		3069		3069	
Flt Permitted	0.76	1.00		1.00		0.95	1.00		1.00		1.00	
Satd. Flow (perm)	1222	1425		1323		1637	3094		3069		3069	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	0	213	0	0	2	76	1480	2	0	1305	81
RTOR Reduction (vph)	0	0	161	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	238	52	0	0	0	76	1482	0	0	1383	0
Confl. Peds. (#/hr)	1		1	1		1	7				7	
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		3		8			4
Permitted Phases	2		2	6						4		
Actuated Green, G (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Effective Green, g (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.09	0.63			0.48	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6			6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0			5.0	
Lane Grp Cap (vph)		296	345		320		148	1936			1481	
v/s Ratio Prot					0.00		0.05	c0.48			c0.45	
v/s Ratio Perm		c0.19	0.04									
v/c Ratio		0.80	0.15		0.00		0.51	0.77			0.93	
Uniform Delay, d1		34.1	28.5		27.5		41.5	12.9			23.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		14.6	0.2		0.0		3.0	3.0			12.2	
Delay (s)		48.7	28.7		27.5		44.5	15.8			35.5	
Level of Service		D	C		C		D	B			D	
Approach Delay (s)		39.2			27.5			17.2			35.5	
Approach LOS		D			C			B			D	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	17.6
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

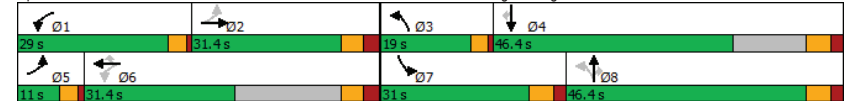
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
Future Volume (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98			0.98	1.00		0.99
Frt	0.901					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1576	2300	0	1492	1743	1219	1429	4848	1417	2749	3312	1229
Flt Permitted	0.583			0.702			0.088			0.950		
Satd. Flow (perm)	960	2300	0	1094	1743	1196	132	4848	1393	2747	3312	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				138			169			122
Link Speed (k/h)	50				50		50			50		
Link Distance (m)	181.6				324.8		266.0			278.1		
Travel Time (s)	13.1				23.4		19.2			20.0		
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
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 (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Adj. Flow (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	80	0	78	23	76	193	1356	185	78	1416	24
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			7.2			7.2		
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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		

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	24.0			24.0	24.0		19.0	19.0		19.0	19.0	19.0
Pedestrian Calls (#/hr)	0			0	0		0	0		0	0	0
Act Effct Green (s)	15.1	7.3		14.8	7.5	7.5	60.5	46.5	46.5	10.1	40.2	40.2
Actuated g/C Ratio	0.17	0.08		0.17	0.09	0.09	0.69	0.53	0.53	0.12	0.46	0.46
v/c Ratio	0.58	0.33		0.36	0.16	0.33	0.63	0.53	0.23	0.25	0.93	0.04
Control Delay	41.7	22.2		33.1	40.4	4.6	27.7	16.6	3.9	39.8	36.5	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	22.2		33.1	40.4	4.6	27.7	16.6	3.9	39.8	36.5	0.1
LOS	D	C		C	D	A	C	B	A	D	D	A
Approach Delay	34.1			21.8			16.5			36.1		
Approach LOS	C			C			B			D		
Intersection Summary												
Area Type:	Other											
Cycle Length: 137.8												
Actuated Cycle Length: 87.7												
Natural Cycle: 120												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.93												
Intersection Signal Delay: 25.9												
Intersection LOS: C												
Intersection Capacity Utilization 82.0%												
ICU Level of Service E												
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	126	80	78	23	76	193	1356	185	78	1416	24
v/c Ratio	0.58	0.33	0.36	0.16	0.33	0.63	0.53	0.23	0.25	0.93	0.04
Control Delay	41.7	22.2	33.1	40.4	4.6	27.7	16.6	3.9	39.8	36.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	22.2	33.1	40.4	4.6	27.7	16.6	3.9	39.8	36.5	0.1
Queue Length 50th (m)	19.3	2.4	11.6	4.0	0.0	18.5	61.9	1.5	6.7	125.6	0.0
Queue Length 95th (m)	35.3	9.7	23.7	11.6	1.9	#49.4	84.8	13.5	14.3	#193.8	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	216	697	427	859	659	314	2569	817	788	1975	772
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.11	0.18	0.03	0.12	0.61	0.53	0.23	0.10	0.72	0.03

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
Future Volume (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	2304		1486	1743	1199	1429	1484	1395	2749	3312	1213
Flt Permitted	0.58	1.00		0.70	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	964	2304		1099	1743	1199	132	4848	1395	2749	3312	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	27	53	78	23	76	193	1356	185	78	1416	24
RTOR Reduction (vph)	0	48	0	0	0	71	0	0	82	0	0	13
Lane Group Flow (vph)	126	32	0	78	23	5	193	1356	103	78	1416	11
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
Heavy Vehicles (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	15.2	7.9		11.8	6.2	6.2	60.2	46.5	46.5	7.7	41.6	41.6
Effective Green, g (s)	15.2	7.9		11.8	6.2	6.2	60.2	46.5	46.5	7.7	41.6	41.6
Actuated g/C Ratio	0.17	0.09		0.13	0.07	0.07	0.67	0.51	0.51	0.09	0.46	0.46
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	210			167	119	82	297	2490	716	233	1522	557
v/s Ratio Prot	c0.05	0.01		0.03	0.01		c0.10	0.28		0.03	c0.43	
v/s Ratio Perm	c0.05			0.03		0.00	0.33		0.07			0.01
v/c Ratio	0.60	0.16		0.47	0.19	0.06	0.65	0.54	0.14	0.33	0.93	0.02
Uniform Delay, d1	34.1	38.2		36.1	39.8	39.4	20.8	14.9	11.5	39.0	23.1	13.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.4		0.8	0.8	0.3	4.8	0.9	0.4	0.9	11.5	0.1
Delay (s)	38.6	38.6		36.9	40.6	39.8	25.6	15.7	12.0	39.8	34.6	13.4
Level of Service	D	D		D	D	D	C	B	B	D	C	B
Approach Delay (s)		38.6			38.6			16.4			34.6	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	22.8
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Future Volume (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1591	0	1458	1441	1776	1365	1561	3406	0	0	4803	1261
Flt Permitted	0.626			0.950			0.115					
Satd. Flow (perm)	1048	0	1458	1441	1776	1365	189	3406	0	0	4803	1261
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			424						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Adj. Flow (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.5		30.5	48.0	44.7	112.3	56.2	53.3			42.8	42.8
Actuated g/C Ratio	0.27		0.27	0.43	0.40	1.00	0.50	0.47			0.38	0.38
v/c Ratio	0.19		0.97	0.37	0.30	0.62	0.36	0.52			0.69	0.05
Control Delay	38.5		57.8	27.3	27.6	2.1	18.2	21.0			31.3	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	38.5		57.8	27.3	27.6	2.1	18.2	21.0			31.3	0.2
LOS	D		E	C	C	A	B	C			C	A
Approach Delay		56.1			10.8			20.8			30.6	
Approach LOS		E			B			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 112.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 25.9

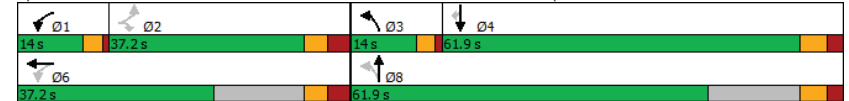
Intersection LOS: C

Intersection Capacity Utilization 89.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp



Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - AM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	54	546	227	210	843	75	837	1254	28
v/c Ratio	0.19	0.97	0.37	0.30	0.62	0.36	0.52	0.69	0.05
Control Delay	38.5	57.8	27.3	27.6	2.1	18.2	21.0	31.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	57.8	27.3	27.6	2.1	18.2	21.0	31.3	0.2
Queue Length 50th (m)	10.1	~85.9	37.6	34.9	0.0	8.6	67.6	91.3	0.0
Queue Length 95th (m)	23.9	#180.8	68.4	62.6	0.0	16.3	84.0	107.2	0.0
Internal Link Dist (m)			459.0			296.0	151.5		
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	284	561	615	707	1365	218	2126	2390	680
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.97	0.37	0.30	0.62	0.34	0.39	0.52	0.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	→	↰	↱	↱
Traffic Volume (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Future Volume (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1591		1458	1441	1776	1365	1561	3406			4803	1261
Flt Permitted	0.63		1.00	0.95	1.00	1.00	0.12	1.00			1.00	1.00
Satd. Flow (perm)	1049		1458	1441	1776	1365	189	3406			4803	1261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	54	0	546	227	210	843	75	837	0	0	1254	28
RTOR Reduction (vph)	0	0	166	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	54	0	380	227	210	843	75	837	0	0	1254	11
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.5		30.5	44.7	44.7	113.1	54.3	54.3			42.8	42.8
Effective Green, g (s)	30.5		30.5	44.7	44.7	113.1	54.3	54.3			42.8	42.8
Actuated g/C Ratio	0.27		0.27	0.40	0.40	1.00	0.48	0.48			0.38	0.38
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	282		393	569	701	1365	181	1635			1817	477
v/s Ratio Prot				0.04	0.12		0.03	0.25			0.26	
v/s Ratio Perm	0.05		c0.26	0.12		c0.62	0.17					0.01
v/c Ratio	0.19		0.97	0.40	0.30	0.62	0.41	0.51			0.69	0.02
Uniform Delay, d1	31.8		40.8	24.5	23.5	0.0	18.6	20.3			29.6	22.0
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	1.5		37.9	1.0	1.1	2.1	3.2	0.5			1.5	0.0
Delay (s)	33.3		78.7	25.5	24.6	2.1	21.8	20.8			31.0	22.1
Level of Service	C		E	C	C	A	C	C			C	C
Approach Delay (s)		74.7			9.9			20.9			30.8	
Approach LOS		E			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.5			HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			113.1			Sum of lost time (s)		22.1				
Intersection Capacity Utilization			89.5%			ICU Level of Service		E				
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

Base Conditions - AM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (vph)	4	590	231	19	64	8	
Future Volume (vph)	4	590	231	19	64	8	
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.990		0.985		
Flt Protected					0.957		
Satd. Flow (prot)	0	1615	1522	0	1664	0	
Flt Permitted					0.957		
Satd. Flow (perm)	0	1615	1522	0	1664	0	
Link Speed (k/h)		50	50		50		
Link Distance (m)		800.9	1202.5		173.1		
Travel Time (s)		57.7	86.6		12.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Heavy Vehicles (%)	25%	2%	7%	11%	0%	0%	
Adj. Flow (vph)	4	590	231	19	64	8	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	594	250	0	72	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		3.6	3.6		3.6		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10	
Turning Speed (k/h)	25			15	25	15	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type:	Unsignalized						
Intersection Capacity Utilization	50.4%			ICU Level of Service A			
Analysis Period (min)	15						

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

Base Conditions - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	4	590	231	19	64	8
Future Volume (Veh/h)	4	590	231	19	64	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	590	231	19	64	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				838	240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				838	240
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				81	99
cM capacity (veh/h)	1192				338	803
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	594	250	72			
Volume Left	4	0	64			
Volume Right	0	19	8			
cSH	1192	1700	361			
Volume to Capacity	0.00	0.15	0.20			
Queue Length 95th (m)	0.1	0.0	5.9			
Control Delay (s)	0.1	0.0	17.4			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	17.4			
Approach LOS			C			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization		50.4%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	64	346	190	96	331	131
Future Volume (vph)	64	346	190	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1637	1845	1528	1311	1613	0
Flt Permitted	0.494				0.965	
Satd. Flow (perm)	851	1845	1528	1311	1613	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				96	21	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Adj. Flow (vph)	64	346	190	96	331	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	346	190	96	462	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	22.9	20.3	13.7	13.7	25.5	
Actuated g/C Ratio	0.39	0.35	0.23	0.23	0.44	
v/c Ratio	0.15	0.54	0.53	0.25	0.65	
Control Delay	10.9	17.9	27.1	7.1	20.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.9	17.9	27.1	7.1	20.7	
LOS	B	B	C	A	C	
Approach Delay		16.8	20.4		20.7	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 58.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 19.2

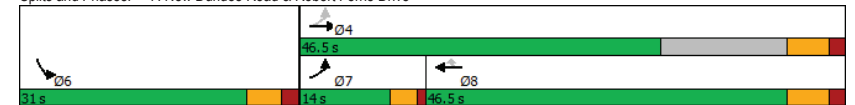
Intersection LOS: B

Intersection Capacity Utilization 57.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	64	346	190	96	462
v/c Ratio	0.15	0.54	0.53	0.25	0.65
Control Delay	10.9	17.9	27.1	7.1	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	17.9	27.1	7.1	20.7
Queue Length 50th (m)	4.3	29.8	20.7	0.0	41.5
Queue Length 95th (m)	10.1	49.4	40.2	10.2	#98.7
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	469	1660	1064	942	714
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.21	0.18	0.10	0.65

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	64	346	190	96	331	131
Future Volume (vph)	64	346	190	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1637	1845	1528	1311	1613	
Flt Permitted	0.49	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	851	1845	1528	1311	1613	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	346	190	96	331	131
RTOR Reduction (vph)	0	0	0	74	12	0
Lane Group Flow (vph)	64	346	190	22	450	0
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	22.1	22.1	13.7	13.7	25.5	
Effective Green, g (s)	22.1	22.1	13.7	13.7	25.5	
Actuated g/C Ratio	0.37	0.37	0.23	0.23	0.42	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	370	678	348	298	684	
v/s Ratio Prot	0.01	c0.19	0.12		c0.28	
v/s Ratio Perm	0.05			0.02		
v/c Ratio	0.17	0.51	0.55	0.07	0.66	
Uniform Delay, d1	12.6	14.8	20.5	18.2	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.7	1.8	0.1	4.9	
Delay (s)	12.9	15.4	22.2	18.3	18.7	
Level of Service	B	B	C	B	B	
Approach Delay (s)		15.0	20.9		18.7	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay			18.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			60.1		Sum of lost time (s)	16.5
Intersection Capacity Utilization			57.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	310	82	13	209	10	45	23	24	12	41	12
Future Volume (vph)	11	310	82	13	209	10	45	23	24	12	41	12
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.994			0.965			0.975	
Flt Protected		0.999			0.997			0.976			0.991	
Satd. Flow (prot)	0	1414	0	0	1422	0	0	1332	0	0	1498	0
Flt Permitted		0.999			0.997			0.976			0.991	
Satd. Flow (perm)	0	1414	0	0	1422	0	0	1332	0	0	1498	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
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 (%)	18%	6%	7%	23%	7%	10%	0%	4%	33%	0%	0%	0%
Adj. Flow (vph)	11	310	82	13	209	10	45	23	24	12	41	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	403	0	0	232	0	0	92	0	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 50.0%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

Base Conditions - AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	310	82	13	209	10	45	23	24	12	41	12
Future Volume (Veh/h)	11	310	82	13	209	10	45	23	24	12	41	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	11	310	82	13	209	10	45	23	24	12	41	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	219			392			646	618	351	648	654	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	219			392			646	618	351	648	654	214
tC, single (s)	4.3			4.3			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99			87	94	96	97	89	99
cM capacity (veh/h)	1261			1061			345	394	628	349	381	831
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	403	232	92	65								
Volume Left	11	13	45	12								
Volume Right	82	10	24	12								
cSH	1261	1061	405	415								
Volume to Capacity	0.01	0.01	0.23	0.16								
Queue Length 95th (m)	0.2	0.3	6.9	4.4								
Control Delay (s)	0.3	0.6	16.5	15.3								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.6	16.5	15.3								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization		50.0%			ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

Base Conditions - AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973				0.932	
Flt Protected	0.962			0.994		
Satd. Flow (prot)	1613	0	0	1585	1458	0
Flt Permitted	0.962			0.994		
Satd. Flow (perm)	1613	0	0	1585	1458	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	4%	9%	2%
Adj. Flow (vph)	221	56	41	292	146	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	333	293	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	66.4%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

Base Conditions - AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	221	56	41	292	146	147
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	277	333	293			
Volume Left (vph)	221	41	0			
Volume Right (vph)	56	0	147			
Hadj (s)	0.08	0.08	-0.21			
Departure Headway (s)	5.6	5.2	5.0			
Degree Utilization, x	0.43	0.48	0.41			
Capacity (veh/h)	603	650	681			
Control Delay (s)	12.7	13.0	11.4			
Approach Delay (s)	12.7	13.0	11.4			
Approach LOS	B	B	B			
Intersection Summary						
Delay	12.4					
Level of Service	B					
Intersection Capacity Utilization	66.4%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

Base Conditions - AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	305	14	4	164	5
Future Volume (vph)	4	305	14	4	164	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867		0.970			
Flt Protected	0.999					0.954
Satd. Flow (prot)	1529	0	1442	0	0	1493
Flt Permitted	0.999					0.954
Satd. Flow (perm)	1529	0	1442	0	0	1493
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	7%	25%	5%	20%
Adj. Flow (vph)	4	305	14	4	164	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	309	0	18	0	0	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

Base Conditions - AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	305	14	4	164	5
Future Volume (Veh/h)	4	305	14	4	164	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	305	14	4	164	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349	16			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	16			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	71			90	
cM capacity (veh/h)	584	1069			1579	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	309	18	169			
Volume Left	4	0	164			
Volume Right	305	4	0			
cSH	1058	1700	1579			
Volume to Capacity	0.29	0.01	0.10			
Queue Length 95th (m)	9.8	0.0	2.8			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		44.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

Base Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	0.99	
Frt	0.965					0.850		0.999			0.962	
Flt Protected	0.950				0.994		0.950			0.950		
Satd. Flow (prot)	1621	1498	0	0	1500	1365	1519	1616	0	1519	1454	0
Flt Permitted	0.728				0.974		0.560			0.486		
Satd. Flow (perm)	1224	1498	0	0	1467	1317	887	1616	0	775	1454	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)	23					74		1			38	
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	184.2				333.0			586.7			311.9	
Travel Time (s)	13.3				24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	98	0	0	44	74	44	385	0	56	309	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2			6		6
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

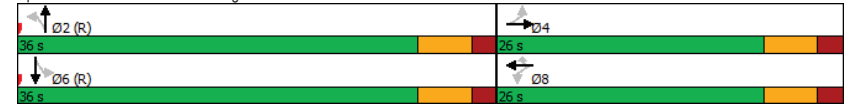
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

Base Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.23	0.20			0.09	0.16	0.10	0.49		0.15	0.43	
Control Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.3			9.1			13.1			11.1	
Approach LOS		B			A			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 62												
Actuated Cycle Length: 62												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 65												
Control Type: Pretimed												
Maximum v/c Ratio: 0.49												
Intersection Signal Delay: 12.4	Intersection LOS: B											
Intersection Capacity Utilization 73.3%	ICU Level of Service D											
Analysis Period (min) 15												

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

Base Conditions - AM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	98	44	74	44	385	56	309
v/c Ratio	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43
Control Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Length 50th (m)	7.7	6.3	3.6	0.0	2.7	29.2	3.5	19.2
Queue Length 95th (m)	17.5	16.1	9.9	7.7	7.6	50.6	9.5	36.9
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	394	498	473	474	429	782	375	723
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	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

Base Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1498			1498	1317	1504	1616		1515	1454	
Flt Permitted	0.73	1.00			0.97	1.00	0.56	1.00		0.49	1.00	
Satd. Flow (perm)	1225	1498			1466	1317	887	1616		774	1454	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
RTOR Reduction (vph)	0	16	0	0	0	50	0	1	0	0	20	0
Lane Group Flow (vph)	89	82	0	0	44	24	44	384	0	56	289	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	395	483			472	424	429	781		374	703	
v/s Ratio Prot		0.06						c0.24			0.20	
v/s Ratio Perm	c0.07				0.03	0.02	0.05			0.07		
v/c Ratio	0.23	0.17			0.09	0.06	0.10	0.49		0.15	0.41	
Uniform Delay, d1	15.3	15.1			14.7	14.5	8.7	10.8		8.9	10.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.8			0.4	0.3	0.5	2.2		0.8	1.8	
Delay (s)	16.7	15.8			15.1	14.7	9.2	13.1		9.7	12.1	
Level of Service	B	B			B	B	A	B		A	B	
Approach Delay (s)		16.2			14.9			12.7			11.7	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,28/11/2015]
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Filename: Robert Ferrie and South Creek.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:35:05 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Existing							
Leg North	0.03	~1	3.67	0.03	A	3.80	A
Leg West	0.12	~1	3.48	0.11	A		
Leg South	0.17	~1	3.69	0.14	A		
Leg East	0.26	~1	4.08	0.20	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:35:05 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.80	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Evens Pond Crescent	
West	West	Robert Ferrie Drive	
South	South	South Creek Drive	
East	East	Robert Ferrie Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW 10-Year+		90.00
West	Percentage	ROW 10-Year+		90.00
South	Percentage	ROW 10-Year+		90.00
East	Percentage	ROW 10-Year+		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	24.00	100.000
West	ONE HOUR	✓	114.00	100.000
South	ONE HOUR	✓	147.00	100.000
East	ONE HOUR	✓	208.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	3.000	8.000	13.000
	West	1.000	0.000	48.000	65.000
	South	8.000	87.000	0.000	52.000
East	9.000	151.000	48.000	0.000	

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.00	0.13	0.33	0.54
	West	0.01	0.00	0.42	0.57
	South	0.05	0.59	0.00	0.35
	East	0.04	0.73	0.23	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.330	1.000	1.000
	West	1.000	1.000	1.040	1.000
	South	1.000	1.050	1.000	1.020
	East	1.000	1.070	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	33.0	0.0	0.0
	West	0.0	0.0	4.0	0.0
	South	0.0	5.0	0.0	2.0
	East	0.0	7.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.03	3.67	0.03	~1	A	22.02	33.03	1.95	3.55	0.02	1.95	3.55
West	0.11	3.48	0.12	~1	A	104.61	156.91	8.85	3.38	0.10	8.85	3.38
South	0.14	3.69	0.17	~1	A	134.89	202.33	12.04	3.57	0.13	12.04	3.57
East	0.20	4.08	0.26	~1	A	190.86	286.30	18.53	3.88	0.21	18.53	3.88

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	18.07	4.52	18.00	13.50	214.45	0.00	1097.59	440.67	0.016	0.00	0.02	3.440	A
West	85.83	21.46	85.51	180.71	51.74	0.00	1191.76	875.44	0.072	0.00	0.08	3.307	A
South	110.67	27.67	110.25	77.99	59.26	0.00	1187.41	790.22	0.093	0.00	0.11	3.461	A
East	156.59	39.15	155.95	97.50	72.00	0.00	1180.03	921.69	0.133	0.00	0.16	3.706	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	21.58	5.39	21.56	16.17	256.90	0.00	1073.02	440.67	0.020	0.02	0.02	3.532	A
West	102.48	25.62	102.41	216.48	61.98	0.00	1185.83	875.44	0.086	0.08	0.10	3.376	A
South	132.15	33.04	132.05	93.42	70.97	0.00	1180.63	790.22	0.112	0.11	0.13	3.557	A
East	186.99	46.75	186.83	116.79	86.24	0.00	1171.79	921.69	0.160	0.16	0.20	3.855	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	26.42	6.61	26.40	19.80	314.58	0.00	1039.63	440.67	0.025	0.02	0.03	3.665	A

West	125.52	31.38	125.42	265.09	75.90	0.00	1177.77	875.44	0.107	0.10	0.12	3.476	A
South	161.85	40.46	161.71	114.40	86.91	0.00	1171.40	790.22	0.138	0.13	0.17	3.694	A
East	229.01	57.25	228.78	143.01	105.61	0.00	1160.58	921.69	0.197	0.20	0.26	4.074	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	26.42	6.61	26.42	19.82	314.89	0.00	1039.46	440.67	0.025	0.03	0.03	3.666	A
West	125.52	31.38	125.52	265.34	75.97	0.00	1177.73	875.44	0.107	0.12	0.12	3.476	A
South	161.85	40.46	161.85	114.50	86.98	0.00	1171.36	790.22	0.138	0.17	0.17	3.694	A
East	229.01	57.25	229.01	143.13	105.70	0.00	1160.53	921.69	0.197	0.26	0.26	4.076	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	21.58	5.39	21.60	16.20	257.41	0.00	1072.72	440.67	0.020	0.03	0.02	3.533	A
West	102.48	25.62	102.58	216.91	62.10	0.00	1185.76	875.44	0.086	0.12	0.10	3.380	A
South	132.15	33.04	132.29	93.60	71.09	0.00	1180.56	790.22	0.112	0.17	0.13	3.558	A
East	186.99	46.75	187.22	116.98	86.39	0.00	1171.70	921.69	0.160	0.26	0.20	3.859	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	18.07	4.52	18.08	13.56	215.52	0.00	1096.96	440.67	0.016	0.02	0.02	3.442	A
West	85.83	21.46	85.89	181.61	52.00	0.00	1191.61	875.44	0.072	0.10	0.08	3.308	A
South	110.67	27.67	110.77	78.37	59.52	0.00	1187.25	790.22	0.093	0.13	0.11	3.465	A
East	156.59	39.15	156.75	97.95	72.34	0.00	1179.83	921.69	0.133	0.20	0.16	3.711	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.25	0.02	3.440	A	A
West	1.16	0.08	3.307	A	A
South	1.56	0.10	3.461	A	A
East	2.36	0.16	3.706	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.31	0.02	3.532	A	A
West	1.42	0.09	3.376	A	A
South	1.93	0.13	3.557	A	A
East	2.95	0.20	3.855	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.40	0.03	3.665	A	A
West	1.79	0.12	3.476	A	A
South	2.45	0.16	3.694	A	A
East	3.81	0.25	4.074	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.40	0.03	3.666	A	A
West	1.81	0.12	3.476	A	A
South	2.48	0.17	3.694	A	A

East	3.88	0.26	4.076	A	A
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Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.32	0.02	3.533	A	A
West	1.47	0.10	3.380	A	A
South	2.00	0.13	3.558	A	A
East	3.07	0.20	3.859	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.26	0.02	3.442	A	A
West	1.20	0.08	3.308	A	A
South	1.63	0.11	3.465	A	A
East	2.47	0.16	3.711	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.03	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.17	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
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North	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]

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Filename: Robert Ferrie and South Creek.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady

Report generation date: 2023-12-13 2:36:43 PM

Summary of intersection performance

PM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Existing							
Leg North	0.01	~1	3.53	0.01	A	3.84	A
Leg West	0.16	~1	3.64	0.14	A		
Leg South	0.14	~1	3.56	0.12	A		
Leg East	0.33	~1	4.10	0.25	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:36:43 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.84	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Evens Pond Crescent	
West	West	Robert Ferrie Drive	
South	South	South Creek Drive	
East	East	Robert Ferrie Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW 10-Year+		90.00
West	Percentage	ROW 10-Year+		90.00
South	Percentage	ROW 10-Year+		90.00
East	Percentage	ROW 10-Year+		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	12.00	100.000
West	ONE HOUR	✓	144.00	100.000
South	ONE HOUR	✓	128.00	100.000
East	ONE HOUR	✓	264.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From	North	0.000	1.000	2.000	9.000
	West	0.000	0.000	52.000	92.000
	South	3.000	55.000	0.000	70.000
	East	22.000	144.000	98.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From	North	0.00	0.08	0.17	0.75
	West	0.00	0.00	0.36	0.64
	South	0.02	0.43	0.00	0.55
	East	0.08	0.55	0.37	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.010	1.000	1.000
	East	1.000	1.020	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	1.0	0.0	0.0
	East	0.0	2.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.01	3.53	0.01	~1	A	11.01	16.52	0.94	3.42	0.01	0.94	3.42
West	0.14	3.64	0.16	~1	A	132.14	198.21	11.60	3.51	0.13	11.60	3.51
South	0.12	3.56	0.14	~1	A	117.46	176.18	10.10	3.44	0.11	10.10	3.44
East	0.25	4.10	0.33	~1	A	242.25	363.38	23.47	3.88	0.26	23.47	3.88

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	9.03	2.26	9.00	18.75	222.70	0.00	1092.81	493.09	0.008	0.00	0.01	3.320	A
West	108.41	27.10	108.00	149.97	81.73	0.00	1174.40	739.01	0.092	0.00	0.10	3.397	A
South	96.37	24.09	96.01	113.98	75.75	0.00	1177.86	734.41	0.082	0.00	0.09	3.342	A
East	198.75	49.69	197.95	128.26	43.50	0.00	1196.52	1029.10	0.166	0.00	0.20	3.667	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	10.79	2.70	10.78	22.46	266.78	0.00	1067.30	493.09	0.010	0.01	0.01	3.406	A
West	129.45	32.36	129.36	179.65	97.91	0.00	1165.04	739.01	0.111	0.10	0.13	3.497	A
South	115.07	28.77	114.99	136.54	90.73	0.00	1169.19	734.41	0.098	0.09	0.11	3.428	A
East	237.33	59.33	237.13	153.62	52.10	0.00	1191.54	1029.10	0.199	0.20	0.25	3.840	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	13.21	3.30	13.20	27.50	326.67	0.00	1032.64	493.09	0.013	0.01	0.01	3.530	A

West	158.55	39.64	158.41	219.98	119.89	0.00	1152.32	739.01	0.138	0.13	0.16	3.644	A
South	140.93	35.23	140.81	167.19	111.11	0.00	1157.40	734.41	0.122	0.11	0.14	3.555	A
East	290.67	72.67	290.36	188.11	63.81	0.00	1184.77	1029.10	0.245	0.25	0.33	4.098	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	13.21	3.30	13.21	27.53	327.00	0.00	1032.45	493.09	0.013	0.01	0.01	3.531	A
West	158.55	39.64	158.55	220.20	120.01	0.00	1152.24	739.01	0.138	0.16	0.16	3.644	A
South	140.93	35.23	140.93	167.35	111.20	0.00	1157.34	734.41	0.122	0.14	0.14	3.556	A
East	290.67	72.67	290.67	188.27	63.86	0.00	1184.74	1029.10	0.245	0.33	0.33	4.099	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	10.79	2.70	10.80	22.50	267.32	0.00	1066.98	493.09	0.010	0.01	0.01	3.410	A
West	129.45	32.36	129.59	180.01	98.11	0.00	1164.92	739.01	0.111	0.16	0.13	3.501	A
South	115.07	28.77	115.18	136.81	90.89	0.00	1169.10	734.41	0.098	0.14	0.11	3.429	A
East	237.33	59.33	237.63	153.88	52.19	0.00	1191.49	1029.10	0.199	0.33	0.25	3.845	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	9.03	2.26	9.04	18.84	223.82	0.00	1092.16	493.09	0.008	0.01	0.01	3.325	A
West	108.41	27.10	108.51	150.72	82.14	0.00	1174.16	739.01	0.092	0.13	0.10	3.401	A
South	96.37	24.09	96.45	114.54	76.10	0.00	1177.65	734.41	0.082	0.11	0.09	3.345	A
East	198.75	49.69	198.96	128.85	43.70	0.00	1196.41	1029.10	0.166	0.25	0.20	3.675	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.12	0.01	3.320	A	A
West	1.50	0.10	3.397	A	A
South	1.31	0.09	3.342	A	A
East	2.96	0.20	3.667	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.15	0.01	3.406	A	A
West	1.86	0.12	3.497	A	A
South	1.62	0.11	3.428	A	A
East	3.72	0.25	3.840	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.19	0.01	3.530	A	A
West	2.36	0.16	3.644	A	A
South	2.05	0.14	3.555	A	A
East	4.85	0.32	4.098	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.19	0.01	3.531	A	A
West	2.40	0.16	3.644	A	A
South	2.08	0.14	3.556	A	A

East	4.95	0.33	4.099	A	A
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Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.16	0.01	3.410	A	A
West	1.92	0.13	3.501	A	A
South	1.67	0.11	3.429	A	A
East	3.88	0.26	3.845	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.13	0.01	3.325	A	A
West	1.56	0.10	3.401	A	A
South	1.36	0.09	3.345	A	A
East	3.10	0.21	3.675	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
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North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

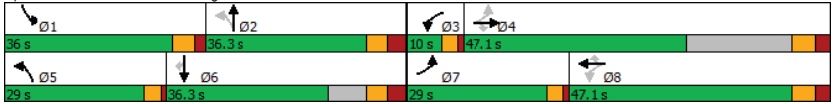
Base Conditions - PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
Future Volume (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.97	1.00		0.98	0.99	1.00		1.00		0.97
Frt			0.850			0.850		0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	3471	1488	1686	3438	1417	1670	3304	0	3146	1863	1458
Flt Permitted	0.089			0.190			0.353			0.950		
Satd. Flow (perm)	156	3471	1447	337	3438	1387	614	3304	0	3130	1863	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			451			461		4				224
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Adj. Flow (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	1057	566	39	990	562	320	330	0	655	350	268
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	61.0	61.0	49.0	40.0	40.0	55.2	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.49	0.41	0.41	0.33	0.27	0.27	0.37	0.20		0.20	0.26	0.26
v/c Ratio	0.95	0.74	0.66	0.24	1.07	0.79	0.82	0.51		1.03	0.73	0.51
Control Delay	80.1	41.4	11.2	25.8	100.6	18.6	46.1	55.9		100.8	61.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	80.1	41.4	11.2	25.8	100.6	18.6	46.1	55.9		100.8	61.3	13.2
LOS	F	D	B	C	F	B	D	E		F	E	B
Approach Delay		38.8			69.8			51.1			71.5	
Approach LOS		D			E			D			E	
Intersection Summary												
Area Type: Other												
Cycle Length: 148.4												
Actuated Cycle Length: 148.4												
Natural Cycle: 145												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.07												
Intersection Signal Delay: 57.0						Intersection LOS: E						
Intersection Capacity Utilization 111.8%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												
												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	312	1057	566	39	990	562	320	330	655	350	268
v/c Ratio	0.95	0.74	0.66	0.24	1.07	0.79	0.82	0.51	1.03	0.73	0.51
Control Delay	80.1	41.4	11.2	25.8	100.6	18.6	46.1	55.9	100.8	61.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	41.4	11.2	25.8	100.6	18.6	46.1	55.9	100.8	61.3	13.2
Queue Length 50th (m)	80.0	148.3	25.2	6.3	~177.9	28.4	65.2	48.0	~111.5	101.9	10.7
Queue Length 95th (m)	#141.4	176.2	70.2	13.3	#222.2	85.2	#93.8	64.7	#151.5	#141.2	39.6
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	330	1426	860	166	926	710	414	648	635	478	528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.74	0.66	0.23	1.07	0.79	0.77	0.51	1.03	0.73	0.51

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
Future Volume (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1670	3471	1447	1686	3438	1387	1664	3304		3146	1863	1410
Flt Permitted	0.09	1.00	1.00	0.19	1.00	1.00	0.35	1.00		0.95	1.00	1.00
Satd. Flow (perm)	157	3471	1447	337	3438	1387	619	3304		3146	1863	1410
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	312	1057	566	39	990	562	320	308	22	655	350	268
RTOR Reduction (vph)	0	0	267	0	0	335	0	3	0	0	0	167
Lane Group Flow (vph)	312	1057	299	39	990	227	320	327	0	655	350	101
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Effective Green, g (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.47	0.41	0.41	0.31	0.27	0.27	0.35	0.19		0.20	0.26	0.26
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	326	1419	591	146	940	379	375	642		632	475	360
v/s Ratio Prot	c0.16	0.30		0.01	c0.29		0.13	0.10		c0.21	0.19	
v/s Ratio Perm	0.29		0.21	0.07		0.16	c0.17					0.07
v/c Ratio	0.96	0.74	0.51	0.27	1.05	0.60	0.85	0.51		1.04	0.74	0.28
Uniform Delay, d1	47.4	37.5	32.9	37.4	54.2	47.1	39.9	53.7		59.6	51.0	44.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.1	2.2	0.7	1.0	44.4	2.5	16.9	2.9		45.5	9.8	1.9
Delay (s)	85.5	39.7	33.6	38.3	98.6	49.6	56.8	56.6		105.1	60.8	46.5
Level of Service	F	D	C	D	F	D	E	E		F	E	D
Approach Delay (s)		45.3			79.8			56.7			80.6	
Approach LOS		D			E			E			F	

Intersection Summary

HCM 2000 Control Delay	65.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	24.4
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
Future Volume (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99										
Frt			0.850					0.999			0.983	
Flt Protected		0.953			0.979		0.950			0.950		
Satd. Flow (prot)	0	1493	1417	0	1517	0	1670	3179	0	1686	3168	0
Flt Permitted		0.726			0.896		0.950			0.144		
Satd. Flow (perm)	0	1131	1417	0	1389	0	1670	3179	0	256	3168	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)			125					1			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	4					4						
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 (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Adj. Flow (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	125	0	7	0	127	1625	0	2	1612	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		17.2			17.2			12.9		63.4		45.4
Actuated g/C Ratio		0.18			0.18			0.14		0.68		0.49
v/c Ratio		0.69			0.35			0.55		0.75		0.02
Control Delay		53.5			8.9			48.1		13.7		17.5
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.5			8.9			48.1		13.7		17.5
LOS		D			A			D		B		E
Approach Delay		32.8			31.1			16.2				60.0
Approach LOS		C			C			B				E
Intersection Summary												
Area Type:		Other										
Cycle Length:		117.6										
Actuated Cycle Length:		93.3										
Natural Cycle:		100										
Control Type:		Semi Act-Uncoord										
Maximum v/c Ratio:		1.04										
Intersection Signal Delay:		36.8						Intersection LOS: D				
Intersection Capacity Utilization		96.6%						ICU Level of Service F				
Analysis Period (min)		15										
Splits and Phases:												
	Ø2			Ø3			Ø4					
	41 s			25 s			51.6 s					
	Ø6			Ø8								
	41 s			51.6 s								

Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	125	7	127	1625	2	1612
v/c Ratio	0.69	0.35	0.03	0.55	0.75	0.02	1.04
Control Delay	53.5	8.9	31.1	48.1	13.7	17.5	60.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	8.9	31.1	48.1	13.7	17.5	60.0
Queue Length 50th (m)	25.3	0.0	1.1	22.5	91.4	0.2	~170.4
Queue Length 95th (m)	48.8	14.7	5.0	44.9	164.4	1.9	#276.5
Internal Link Dist (m)	295.9		64.4		538.4		2438.2
Turn Bay Length (m)				110.0		35.0	
Base Capacity (vph)	428	614	525	361	2407	124	1549
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.01	0.35	0.68	0.02	1.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
Future Volume (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1487	1417		1517		1670	3181		1686	3167	
Flt Permitted		0.73	1.00		0.90		0.95	1.00		0.14	1.00	
Satd. Flow (perm)		1132	1417		1389		1670	3181		256	3167	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	3	125	3	4	0	127	1619	6	2	1425	187
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	144	23	0	7	0	127	1625	0	2	1605	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Actuated Green, G (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Effective Green, g (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Actuated g/C Ratio		0.18	0.18		0.18		0.14	0.68		0.49	0.49	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		208	261		256		231	2163		124	1546	
v/s Ratio Prot							0.08	c0.51			c0.51	
v/s Ratio Perm		c0.13	0.02		0.01					0.01		
v/c Ratio		0.69	0.09		0.03		0.55	0.75		0.02	1.04	
Uniform Delay, d1		35.5	31.5		31.1		37.4	9.7		12.3	23.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.5	0.1		0.0		2.7	2.5		0.2	33.4	
Delay (s)		45.1	31.6		31.2		40.1	12.2		12.5	57.3	
Level of Service		D	C		C		D	B		B	E	
Approach Delay (s)		38.8			31.2			14.2			57.2	
Approach LOS		D			C			B			E	

Intersection Summary

HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	17.6
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

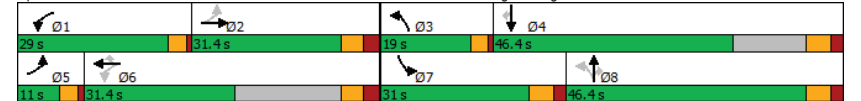
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
Future Volume (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.97			0.99	1.00		0.98
Frt	0.887					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1621	2574	0	1576	1827	1340	1547	4940	1377	2870	3471	1458
Flt Permitted	0.724			0.530			0.091			0.950		
Satd. Flow (perm)	1220	2574	0	868	1827	1306	148	4940	1359	2869	3471	1425
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		86				138			169			122
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.6			324.8			266.0			278.1	
Travel Time (s)		13.1			23.4			19.2			20.0	
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
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 (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Adj. Flow (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	114	0	136	50	107	180	1428	85	96	1403	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	16.8	7.4		20.6	9.5	9.5	56.4	43.9	43.9	10.2	40.6	40.6
Actuated g/C Ratio	0.19	0.08		0.23	0.11	0.11	0.63	0.49	0.49	0.11	0.45	0.45
v/c Ratio	0.84	0.39		0.50	0.26	0.41	0.65	0.59	0.11	0.30	0.90	0.08
Control Delay	60.7	18.9		34.5	40.5	8.3	28.0	19.4	0.3	40.9	33.2	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	18.9		34.5	40.5	8.3	28.0	19.4	0.3	40.9	33.2	0.2
LOS	E	B		C	D	A	C	B	A	D	C	A
Approach Delay		46.3			26.0			19.4			32.5	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length: 137.8												
Actuated Cycle Length: 90												
Natural Cycle: 110												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.90												
Intersection Signal Delay: 27.5												
Intersection LOS: C												
Intersection Capacity Utilization 86.1%												
ICU Level of Service E												
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	217	114	136	50	107	180	1428	85	96	1403	54
v/c Ratio	0.84	0.39	0.50	0.26	0.41	0.65	0.59	0.11	0.30	0.90	0.08
Control Delay	60.7	18.9	34.5	40.5	8.3	28.0	19.4	0.3	40.9	33.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	18.9	34.5	40.5	8.3	28.0	19.4	0.3	40.9	33.2	0.2
Queue Length 50th (m)	33.7	2.5	20.0	8.5	0.0	16.1	69.5	0.0	8.2	117.7	0.0
Queue Length 95th (m)	#74.6	11.4	37.4	19.6	9.1	41.6	99.3	0.0	17.3	#197.5	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	259	779	446	875	698	329	2409	749	799	2012	877
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.15	0.30	0.06	0.15	0.55	0.59	0.11	0.12	0.70	0.06

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
Future Volume (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2584		1569	1827	1312	1547	4940	1359	2870	3471	1430
Flt Permitted	0.72	1.00		0.53	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1229	2584		875	1827	1312	148	4940	1359	2870	3471	1430
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	217	28	86	136	50	107	180	1428	85	96	1403	54
RTOR Reduction (vph)	0	79	0	0	0	96	0	0	44	0	0	29
Lane Group Flow (vph)	217	35	0	136	50	11	180	1428	41	96	1403	25
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
Heavy Vehicles (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	14.4	7.4		18.6	9.5	9.5	55.9	43.9	43.9	8.0	41.9	41.9
Effective Green, g (s)	14.4	7.4		18.6	9.5	9.5	55.9	43.9	43.9	8.0	41.9	41.9
Actuated g/C Ratio	0.16	0.08		0.20	0.10	0.10	0.61	0.48	0.48	0.09	0.46	0.46
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	223	209		247	190	136	274	2377	654	251	1594	656
v/s Ratio Prot	c0.07	0.01		c0.05	0.03		c0.09	0.29		0.03	c0.40	
v/s Ratio Perm	c0.08			0.06		0.01	0.31		0.03			0.02
v/c Ratio	0.97	0.17		0.55	0.26	0.08	0.66	0.60	0.06	0.38	0.88	0.04
Uniform Delay, d1	37.7	39.0		31.7	37.6	36.9	18.9	17.3	12.6	39.3	22.4	13.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.3	0.4		1.5	0.7	0.3	5.6	1.1	0.2	1.0	7.3	0.1
Delay (s)	90.0	39.4		33.2	38.4	37.2	24.5	18.4	12.8	40.2	29.7	13.7
Level of Service	F	D		C	D	D	C	B	B	D	C	B
Approach Delay (s)		72.6			35.5			18.8			29.8	
Approach LOS		E			D			B			C	

Intersection Summary

HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	22.8
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Future Volume (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1621	0	1458	1637	1881	1390	1637	3438	0	0	5036	1458
Flt Permitted	0.317			0.950			0.130					
Satd. Flow (perm)	541	0	1458	1637	1881	1390	224	3438	0	0	5036	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			232			460						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Adj. Flow (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0	7.0			15.0				15.0	15.0
Flash Dont Walk (s)	19.0		19.0	19.0			5.0				5.0	5.0
Pedestrian Calls (#/hr)	0		0	0			0				0	0
Act Effct Green (s)	30.1		30.1	47.4	44.2	109.8	54.4	51.5			37.4	37.4
Actuated g/C Ratio	0.27		0.27	0.43	0.40	1.00	0.50	0.47			0.34	0.34
v/c Ratio	0.31		0.60	0.34	0.75	0.66	0.91	0.46			0.66	0.09
Control Delay	41.6		16.8	24.0	37.0	2.4	59.9	20.4			32.5	0.3
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	41.6		16.8	24.0	37.0	2.4	59.9	20.4			32.5	0.3
LOS	D		B	C	D	A	E	C			C	A
Approach Delay		19.8			16.8		29.5				31.2	
Approach LOS		B			B		C				C	

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 109.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 23.9

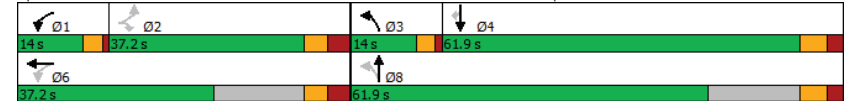
Intersection LOS: C

Intersection Capacity Utilization 86.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp



Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - PM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	46	339	239	567	913	218	734	1137	50
v/c Ratio	0.31	0.60	0.34	0.75	0.66	0.91	0.46	0.66	0.09
Control Delay	41.6	16.8	24.0	37.0	2.4	59.9	20.4	32.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	16.8	24.0	37.0	2.4	59.9	20.4	32.5	0.3
Queue Length 50th (m)	8.2	18.8	34.9	107.0	0.0	27.5	56.8	79.0	0.0
Queue Length 95th (m)	22.1	56.6	65.0	#188.2	0.0	#74.8	72.0	93.7	0.0
Internal Link Dist (m)			459.0				296.0	151.5	
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	148	568	706	756	1390	240	2169	2532	785
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.60	0.34	0.75	0.66	0.91	0.34	0.45	0.06

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Future Volume (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1621		1458	1637	1881	1390	1637	3438			5036	1458
Flt Permitted	0.32		1.00	0.95	1.00	1.00	0.13	1.00			1.00	1.00
Satd. Flow (perm)	542		1458	1637	1881	1390	224	3438			5036	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	0	339	239	567	913	218	734	0	0	1137	50
RTOR Reduction (vph)	0	0	168	0	0	0	0	0	0	0	0	33
Lane Group Flow (vph)	46	0	171	239	567	913	218	734	0	0	1137	17
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.2		30.2	44.2	44.2	109.8	51.5	51.5			37.5	37.5
Effective Green, g (s)	30.2		30.2	44.2	44.2	109.8	51.5	51.5			37.5	37.5
Actuated g/C Ratio	0.28		0.28	0.40	0.40	1.00	0.47	0.47			0.34	0.34
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	149		401	658	757	1390	233	1612			1719	497
v/s Ratio Prot				0.03	0.30		c0.08	0.21			0.23	
v/s Ratio Perm	0.08		0.12	0.11		c0.66	c0.35					0.01
v/c Ratio	0.31		0.43	0.36	0.75	0.66	0.94	0.46			0.66	0.03
Uniform Delay, d1	31.5		32.7	22.9	28.1	0.0	21.3	19.7			30.8	24.1
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	5.3		3.3	0.7	6.7	2.4	42.4	0.4			1.3	0.1
Delay (s)	36.8		36.0	23.7	34.8	2.4	63.7	20.1			32.0	24.1
Level of Service	D		D	C	C	A	E	C			C	C
Approach Delay (s)		36.1			16.0			30.1			31.7	
Approach LOS		D			B			C			C	

Intersection Summary

HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	22.1
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

Base Conditions - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	455	810	97	52	12
Future Volume (vph)	11	455	810	97	52	12
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.986		0.975	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1601	1597	0	1654	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1601	1597	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	1%	0%	0%
Adj. Flow (vph)	11	455	810	97	52	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	466	907	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.4%	ICU Level of Service C					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

Base Conditions - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	455	810	97	52	12
Future Volume (Veh/h)	11	455	810	97	52	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	455	810	97	52	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	907				1336	858
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907				1336	858
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				69	97
cM capacity (veh/h)	759				169	359
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	466	907	64			
Volume Left	11	0	52			
Volume Right	0	97	12			
cSH	759	1700	187			
Volume to Capacity	0.01	0.53	0.34			
Queue Length 95th (m)	0.4	0.0	11.4			
Control Delay (s)	0.4	0.0	33.9			
Lane LOS	A		D			
Approach Delay (s)	0.4	0.0	33.9			
Approach LOS			D			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization 66.4%			ICU Level of Service		C	
Analysis Period (min)			15			

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	105	214	449	296	162	91
Future Volume (vph)	105	214	449	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.951	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1670	1845	1618	1389	1595	0
Flt Permitted	0.267				0.969	
Satd. Flow (perm)	469	1845	1618	1389	1595	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				190	30	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Adj. Flow (vph)	105	214	449	296	162	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	214	449	296	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	38.4	35.8	25.8	25.8	26.0	
Actuated g/C Ratio	0.51	0.48	0.34	0.34	0.35	
v/c Ratio	0.28	0.24	0.81	0.49	0.44	
Control Delay	9.9	10.8	34.4	10.0	23.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.9	10.8	34.4	10.0	23.3	
LOS	A	B	C	B	C	
Approach Delay		10.5	24.7		23.3	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 74.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 21.0

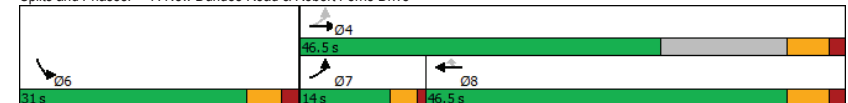
Intersection LOS: C

Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	105	214	449	296	253
v/c Ratio	0.28	0.24	0.81	0.49	0.44
Control Delay	9.9	10.8	34.4	10.0	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	10.8	34.4	10.0	23.3
Queue Length 50th (m)	7.2	17.0	62.4	11.5	27.0
Queue Length 95th (m)	13.8	28.0	96.8	31.0	60.2
Internal Link Dist (m)	2815.6	776.9	201.4		
Turn Bay Length (m)	30.0		25.0		
Base Capacity (vph)	407	1366	900	857	574
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.16	0.50	0.35	0.44
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

Base Conditions - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	105	214	449	296	162	91
Future Volume (vph)	105	214	449	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1670	1845	1618	1389	1595	
Flt Permitted	0.27	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	469	1845	1618	1389	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	214	449	296	162	91
RTOR Reduction (vph)	0	0	0	125	20	0
Lane Group Flow (vph)	105	214	449	171	233	0
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	36.7	36.7	25.7	25.7	26.0	
Effective Green, g (s)	36.7	36.7	25.7	25.7	26.0	
Actuated g/C Ratio	0.49	0.49	0.34	0.34	0.35	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	340	900	552	474	551	
v/s Ratio Prot	c0.03	0.12	c0.28		c0.15	
v/s Ratio Perm	0.12			0.12		
v/c Ratio	0.31	0.24	0.81	0.36	0.42	
Uniform Delay, d1	12.0	11.1	22.6	18.6	18.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.1	8.9	0.5	2.4	
Delay (s)	12.5	11.3	31.5	19.1	21.2	
Level of Service	B	B	C	B	C	
Approach Delay (s)	11.7	26.6	21.2			
Approach LOS	B	C	C			
Intersection Summary						
HCM 2000 Control Delay		21.9		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.58				
Actuated Cycle Length (s)		75.2		Sum of lost time (s)	16.5	
Intersection Capacity Utilization		62.8%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	26	322	89	20	368	18	68	75	19	4	34	19
Future Volume (vph)	26	322	89	20	368	18	68	75	19	4	34	19
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.994			0.984			0.955	
Flt Protected		0.997			0.998			0.979			0.997	
Satd. Flow (prot)	0	1487	0	0	1490	0	0	1475	0	0	1450	0
Flt Permitted		0.997			0.998			0.979			0.997	
Satd. Flow (perm)	0	1487	0	0	1490	0	0	1475	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	2%	10%	3%	0%	3%	0%	0%	0%	3%	0%
Adj. Flow (vph)	26	322	89	20	368	18	68	75	19	4	34	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	437	0	0	406	0	0	162	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 62.8%	ICU Level of Service B											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

Base Conditions - PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	26	322	89	20	368	18	68	75	19	4	34	19	
Future Volume (Veh/h)	26	322	89	20	368	18	68	75	19	4	34	19	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	26	322	89	20	368	18	68	75	19	4	34	19	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type		None				None							
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	386			411				872	844	366	892	880	377
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	386			411				872	844	366	892	880	377
tC, single (s)	4.1			4.2				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2			2.3				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98				70	74	97	98	88	97
cM capacity (veh/h)	1184			1106				230	290	683	200	273	674
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	437	406	162	57									
Volume Left	26	20	68	4									
Volume Right	89	18	19	19									
cSH	1184	1106	279	330									
Volume to Capacity	0.02	0.02	0.58	0.17									
Queue Length 95th (m)	0.5	0.4	27.1	4.9									
Control Delay (s)	0.7	0.6	34.4	18.2									
Lane LOS	A	A	D	C									
Approach Delay (s)	0.7	0.6	34.4	18.2									
Approach LOS			D	C									
Intersection Summary													
Average Delay			6.7										
Intersection Capacity Utilization			62.8%		ICU Level of Service					B			
Analysis Period (min)			15										

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

Base Conditions - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983			0.935		
Flt Protected	0.958			0.991		
Satd. Flow (prot)	1662	0	0	1603	1520	0
Flt Permitted	0.958			0.991		
Satd. Flow (perm)	1662	0	0	1603	1520	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%
Adj. Flow (vph)	215	30	50	226	312	291
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	276	603	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 81.1% ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

Base Conditions - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	30	50	226	312	291
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	245	276	603			
Volume Left (vph)	215	50	0			
Volume Right (vph)	30	0	291			
Hadj (s)	0.10	0.07	-0.26			
Departure Headway (s)	6.2	5.6	4.9			
Degree Utilization, x	0.42	0.43	0.82			
Capacity (veh/h)	546	602	725			
Control Delay (s)	13.6	12.8	25.9			
Approach Delay (s)	13.6	12.8	25.9			
Approach LOS	B	B	D			
Intersection Summary						
Delay		20.0				
Level of Service		C				
Intersection Capacity Utilization		81.1%		ICU Level of Service	D	
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

Base Conditions - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (vph)	7	269	14	2	208	13
Future Volume (vph)	7	269	14	2	208	13
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.983			
Flt Protected	0.999					0.955
Satd. Flow (prot)	1530	0	1622	0	0	1505
Flt Permitted	0.999					0.955
Satd. Flow (perm)	1530	0	1622	0	0	1505
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Confl. Peds. (#/hr)	49			7	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	7	269	14	2	208	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	16	0	0	221
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

Base Conditions - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (veh/h)	7	269	14	2	208	13
Future Volume (Veh/h)	7	269	14	2	208	13
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	269	14	2	208	13
Pedestrians	7		49			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	1		4			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500	22			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	22			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	74			87	
cM capacity (veh/h)	441	1055			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	16	221
Volume Left	7	0	208
Volume Right	269	2	0
cSH	1019	1700	1564
Volume to Capacity	0.27	0.01	0.13
Queue Length 95th (m)	8.8	0.0	3.7
Control Delay (s)	9.8	0.0	7.3
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	7.3
Approach LOS	A		

Intersection Summary

Average Delay	8.4		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

Base Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	1.00	
Frt	0.976					0.850		0.995			0.980	
Flt Protected	0.950				0.990		0.950			0.950		
Satd. Flow (prot)	1653	1587	0	0	1621	1430	1686	1579	0	1621	1574	0
Flt Permitted	0.678				0.935		0.372			0.529		
Satd. Flow (perm)	1164	1587	0	0	1526	1380	656	1579	0	900	1574	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				101		4			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		184.2			333.0			586.7			311.9	
Travel Time (s)		13.3			24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	86	0	0	123	101	13	340	0	135	508	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

Base Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.17			0.25	0.20	0.04	0.44		0.31	0.66	
Control Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.1			11.7			12.6			15.8	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	62											
Actuated Cycle Length:	62											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.66											
Intersection Signal Delay:	14.2											
Intersection Capacity Utilization	73.3%											
ICU Level of Service	D											
Analysis Period (min)	15											

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

Base Conditions - PM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	86	123	101	13	340	135	508
v/c Ratio	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66
Control Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Length 50th (m)	5.3	6.1	10.7	0.0	0.8	24.7	9.2	41.6
Queue Length 95th (m)	13.4	15.0	22.3	8.9	3.3	43.8	20.4	72.9
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	375	521	492	513	317	766	435	770
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	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

Base Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1632	1587			1616	1380	1675	1579		1616	1573	
Flt Permitted	0.68	1.00			0.93	1.00	0.37	1.00		0.53	1.00	
Satd. Flow (perm)	1164	1587			1526	1380	656	1579		901	1573	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
RTOR Reduction (vph)	0	9	0	0	0	68	0	2	0	0	9	0
Lane Group Flow (vph)	63	77	0	0	123	33	13	338	0	135	499	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	4			8		8	2			6		
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	375	511			492	445	317	764		435	761	
v/s Ratio Prot		0.05						0.21			c0.32	
v/s Ratio Perm	0.05				c0.08	0.02	0.02			0.15		
v/c Ratio	0.17	0.15			0.25	0.07	0.04	0.44		0.31	0.66	
Uniform Delay, d1	15.0	14.9			15.5	14.6	8.4	10.5		9.7	12.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6			1.2	0.3	0.2	1.9		1.9	4.4	
Delay (s)	16.0	15.6			16.7	14.9	8.7	12.4		11.6	16.5	
Level of Service	B	B			B	B	A	B		B	B	
Approach Delay (s)		15.8			15.9			12.2			15.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,28/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:54:12 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Existing							
Leg North	0.08	~1	2.43	0.06	A	2.65	A
Leg West	0.58	1.06	2.76	0.36	A		
Leg South	0.15	~1	2.62	0.12	A		
Leg East	0.22	~1	2.52	0.16	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:54:11 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				2.65	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	108.00	100.000
West	ONE HOUR	✓	691.00	100.000
South	ONE HOUR	✓	186.00	100.000
East	ONE HOUR	✓	289.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	64.000	17.000	27.000
	West	190.000	0.000	28.000	473.000
	South	52.000	47.000	0.000	87.000
	East	63.000	203.000	23.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.59	0.16	0.25
	West	0.27	0.00	0.04	0.68
	South	0.28	0.25	0.00	0.47
	East	0.22	0.70	0.08	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.190	1.350	1.370
	West	1.050	1.000	1.210	1.050
	South	1.150	1.040	1.000	1.000
	East	1.250	1.130	1.090	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	19.0	35.0	37.0
	West	5.0	0.0	21.0	5.0
	South	15.0	4.0	0.0	0.0
	East	25.0	13.0	9.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.06	2.43	0.08	~1	A	99.10	148.65	5.86	2.36	0.07	5.86	2.36
West	0.36	2.76	0.58	1.06	A	634.07	951.11	40.22	2.54	0.45	40.22	2.54
South	0.12	2.62	0.15	~1	A	170.68	256.02	10.40	2.44	0.12	10.40	2.44
East	0.16	2.52	0.22	~1	A	265.19	397.79	15.89	2.40	0.18	15.89	2.40

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	81.31	20.33	81.10	229.03	205.01	0.00	2044.50	1177.04	0.040	0.00	0.05	2.300	A
West	520.22	130.06	518.88	235.80	50.31	0.00	2156.34	1756.82	0.241	0.00	0.33	2.318	A
South	140.03	35.01	139.68	51.06	518.13	0.00	1818.13	761.35	0.077	0.00	0.09	2.248	A
East	217.57	54.39	217.03	440.79	217.02	0.00	2035.82	1550.52	0.107	0.00	0.14	2.277	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	97.09	24.27	97.04	274.03	245.29	0.00	2015.38	1177.04	0.048	0.05	0.06	2.354	A
West	621.19	155.30	620.82	282.13	60.20	0.00	2149.19	1756.82	0.289	0.33	0.43	2.486	A
South	167.21	41.80	167.12	61.10	619.93	0.00	1744.53	761.35	0.096	0.09	0.11	2.392	A
East	259.81	64.95	259.67	527.39	259.65	0.00	2004.99	1550.52	0.130	0.14	0.17	2.373	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	118.91	29.73	118.84	335.56	300.38	0.00	1975.55	1177.04	0.060	0.06	0.08	2.432	A

West	760.81	190.20	760.20	345.50	73.72	0.00	2139.41	1756.82	0.356	0.43	0.58	2.753	A
South	204.79	51.20	204.64	74.82	759.10	0.00	1643.92	761.35	0.125	0.11	0.15	2.622	A
East	318.19	79.55	317.99	645.79	317.95	0.00	1962.85	1550.52	0.162	0.17	0.22	2.518	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	118.91	29.73	118.91	335.81	300.58	0.00	1975.41	1177.04	0.060	0.08	0.08	2.432	A
West	760.81	190.20	760.80	345.72	73.77	0.00	2139.38	1756.82	0.356	0.58	0.58	2.756	A
South	204.79	51.20	204.79	74.87	759.70	0.00	1643.49	761.35	0.125	0.15	0.15	2.622	A
East	318.19	79.55	318.19	646.29	318.19	0.00	1962.67	1550.52	0.162	0.22	0.22	2.518	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	97.09	24.27	97.16	274.44	245.62	0.00	2015.14	1177.04	0.048	0.08	0.06	2.354	A
West	621.19	155.30	621.80	282.50	60.27	0.00	2149.13	1756.82	0.289	0.58	0.43	2.490	A
South	167.21	41.80	167.36	61.18	620.89	0.00	1743.84	761.35	0.096	0.15	0.11	2.395	A
East	259.81	64.95	260.01	528.20	260.05	0.00	2004.71	1550.52	0.130	0.22	0.17	2.376	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	81.31	20.33	81.35	229.78	205.66	0.00	2044.03	1177.04	0.040	0.06	0.05	2.300	A
West	520.22	130.06	520.60	236.54	50.47	0.00	2156.22	1756.82	0.241	0.43	0.34	2.323	A
South	140.03	35.01	140.13	51.23	519.84	0.00	1816.89	761.35	0.077	0.11	0.09	2.252	A
East	217.57	54.39	217.71	442.24	217.73	0.00	2035.30	1550.52	0.107	0.17	0.14	2.228	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.77	0.05	2.300	A	A
West	4.94	0.33	2.318	A	A
South	1.29	0.09	2.248	A	A
East	2.03	0.14	2.277	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.94	0.06	2.354	A	A
West	6.34	0.42	2.486	A	A
South	1.65	0.11	2.392	A	A
East	2.54	0.17	2.373	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.19	0.08	2.432	A	A
West	8.57	0.57	2.753	A	A
South	2.21	0.15	2.622	A	A
East	3.29	0.22	2.518	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.20	0.08	2.432	A	A
West	8.71	0.58	2.756	A	A
South	2.23	0.15	2.622	A	A

East	3.33	0.22	2.518	A	A
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Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.96	0.06	2.354	A	A
West	6.55	0.44	2.490	A	A
South	1.69	0.11	2.395	A	A
East	2.61	0.17	2.376	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.79	0.05	2.300	A	A
West	5.11	0.34	2.323	A	A
South	1.33	0.09	2.252	A	A
East	2.09	0.14	2.278	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.33	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.43	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.08	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.58	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.15	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
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North	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.58	0.00	0.00	0.00	1.06			N/A	N/A
South	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2023
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:53:53 PM

Summary of intersection performance

PM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Existing							
Leg North	0.28	~1	2.96	0.21	A	2.79	A
Leg West	0.44	~1	2.57	0.30	A		
Leg South	0.12	~1	2.30	0.11	A		
Leg East	0.66	1.03	3.01	0.39	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:53:53 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				2.79	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	308.00	100.000
West	ONE HOUR	✓	555.00	100.000
South	ONE HOUR	✓	175.00	100.000
East	ONE HOUR	✓	723.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From	North	0.000	207.000	65.000	36.000
	West	113.000	0.000	52.000	390.000
	South	54.000	44.000	0.000	77.000
	East	25.000	609.000	89.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From	North	0.00	0.67	0.21	0.12
	West	0.20	0.00	0.09	0.70
	South	0.31	0.25	0.00	0.44
	East	0.03	0.84	0.12	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.020	1.190
	West	1.040	1.000	1.000	1.020
	South	1.000	1.020	1.000	1.000
	East	1.520	1.020	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	2.0	19.0
	West	4.0	0.0	0.0	2.0
	South	0.0	2.0	0.0	0.0
	East	52.0	2.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.21	2.96	0.28	~1	A	282.63	423.94	18.91	2.68	0.21	18.91	2.68
West	0.30	2.57	0.44	~1	A	509.28	763.92	30.37	2.39	0.34	30.37	2.39
South	0.11	2.30	0.12	~1	A	160.58	240.87	8.73	2.17	0.10	8.73	2.17
East	0.39	3.01	0.66	1.03	A	663.44	995.16	44.97	2.71	0.50	44.98	2.71

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	231.88	57.97	231.26	144.20	557.14	0.00	1789.93	942.48	0.130	0.00	0.15	2.394	A
West	417.83	104.46	416.81	645.74	142.66	0.00	2089.57	1831.03	0.200	0.00	0.25	2.198	A
South	131.75	32.94	131.45	154.68	404.79	0.00	1900.07	913.35	0.069	0.00	0.07	2.045	A
East	544.31	136.08	542.86	377.77	158.48	0.00	2078.14	1553.42	0.262	0.00	0.36	2.411	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	276.89	69.22	276.70	172.51	666.60	0.00	1710.79	942.48	0.162	0.15	0.20	2.603	A
West	498.93	124.73	498.66	772.61	170.69	0.00	2069.31	1831.03	0.241	0.25	0.32	2.342	A
South	157.32	39.33	157.25	185.07	484.28	0.00	1842.60	913.35	0.085	0.07	0.09	2.146	A
East	649.96	162.49	649.52	451.94	189.59	0.00	2055.65	1553.42	0.316	0.36	0.47	2.635	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	339.11	84.78	338.80	211.24	816.20	0.00	1602.64	942.48	0.212	0.20	0.28	2.954	A

West	611.07	152.77	610.62	946.00	209.00	0.00	2041.61	1831.03	0.299	0.32	0.43	2.571	A
South	192.68	48.17	192.56	226.81	593.01	0.00	1783.99	913.35	0.109	0.09	0.12	2.302	A
East	796.04	199.01	795.28	553.41	232.16	0.00	2024.87	1553.42	0.393	0.47	0.66	3.012	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	339.11	84.78	339.11	211.39	816.95	0.00	1602.10	942.48	0.212	0.28	0.28	2.956	A
West	611.07	152.77	611.06	946.87	209.19	0.00	2041.47	1831.03	0.299	0.43	0.44	2.571	A
South	192.68	48.17	192.68	226.81	593.45	0.00	1763.68	913.35	0.109	0.12	0.12	2.302	A
East	796.04	199.01	796.03	553.81	232.31	0.00	2024.76	1553.42	0.393	0.66	0.66	3.014	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	276.89	69.22	277.19	172.76	667.79	0.00	1709.93	942.48	0.162	0.28	0.20	2.606	A
West	498.93	124.73	499.37	773.99	171.00	0.00	2069.09	1831.03	0.241	0.44	0.33	2.344	A
South	157.32	39.33	157.44	185.39	484.98	0.00	1842.09	913.35	0.085	0.12	0.09	2.149	A
East	649.96	162.49	650.71	452.58	189.84	0.00	2055.47	1553.42	0.316	0.66	0.48	2.638	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	231.88	57.97	232.06	144.64	559.07	0.00	1788.53	942.48	0.130	0.20	0.15	2.400	A
West	417.83	104.46	418.11	647.97	143.16	0.00	2089.21	1831.03	0.200	0.33	0.26	2.201	A
South	131.75	32.94	131.83	155.21	406.06	0.00	1899.15	913.35	0.069	0.09	0.08	2.048	A
East	544.31	136.08	544.76	378.94	158.95	0.00	2077.80	1553.42	0.262	0.48	0.37	2.418	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.28	0.15	2.394	A	A
West	3.77	0.25	2.198	A	A
South	1.11	0.07	2.045	A	A
East	5.37	0.36	2.411	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.96	0.20	2.603	A	A
West	4.80	0.32	2.342	A	A
South	1.39	0.09	2.146	A	A
East	7.02	0.47	2.635	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.10	0.27	2.954	A	A
West	6.44	0.43	2.571	A	A
South	1.82	0.12	2.302	A	A
East	9.78	0.65	3.012	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.17	0.28	2.956	A	A
West	6.53	0.44	2.571	A	A
South	1.84	0.12	2.302	A	A

East	9.96	0.66	3.014	A	A
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Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.06	0.20	2.606	A	A
West	4.95	0.33	2.344	A	A
South	1.43	0.10	2.149	A	A
East	7.28	0.49	2.638	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.35	0.16	2.400	A	A
West	3.89	0.26	2.201	A	A
South	1.14	0.08	2.048	A	A
East	5.57	0.37	2.418	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.47	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
-----	------------	-----------	-----------	-----------	-----------	--------------------	----------------	---	--

North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.66	0.00	0.00	0.00	1.03			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Appendix D

2028 Background Traffic Operations Reports



Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

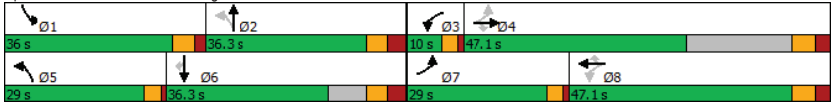
2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
Future Volume (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.96	1.00		0.98	0.99			0.98		0.98
Frt		0.850				0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	3374	1390	1561	3438	1390	1653	3254	0	2895	1759	1417
Flt Permitted	0.086			0.271			0.596			0.950		
Satd. Flow (perm)	140	3374	1337	444	3438	1361	1031	3254	0	2836	1759	1389
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194			450		3				123
Link Speed (k/h)		50			50			50			50	
Link Distance (m)	449.7				2462.2			122.0			383.8	
Travel Time (s)	32.4				177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		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 (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Adj. Flow (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	300	995	229	14	1064	568	366	348	0	294	144	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	65.1	65.1	48.9	40.0	40.0	57.7	30.5		21.3	29.9	29.9
Actuated g/C Ratio	0.51	0.46	0.46	0.35	0.28	0.28	0.41	0.22		0.15	0.21	0.21
v/c Ratio	0.94	0.64	0.32	0.07	1.09	0.80	0.70	0.49		0.67	0.39	0.32
Control Delay	77.4	32.6	6.8	20.7	104.3	19.8	38.0	51.6		64.6	51.6	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	77.4	32.6	6.8	20.7	104.3	19.8	38.0	51.6		64.6	51.6	9.6
LOS	E	C	A	C	F	B	D	D		E	D	A
Approach Delay		37.5			74.4		44.6				49.2	
Approach LOS		D			E		D				D	
Intersection Summary												
Area Type:		Other										
Cycle Length: 148.4												
Actuated Cycle Length: 141.2												
Natural Cycle: 115												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.09												
Intersection Signal Delay: 53.8						Intersection LOS: D						
Intersection Capacity Utilization 112.7%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												
												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	300	995	229	14	1064	568	366	348	294	144	123
v/c Ratio	0.94	0.64	0.32	0.07	1.09	0.80	0.70	0.49	0.67	0.39	0.32
Control Delay	77.4	32.6	6.8	20.7	104.3	19.8	38.0	51.6	64.6	51.6	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.4	32.6	6.8	20.7	104.3	19.8	38.0	51.6	64.6	51.6	9.6
Queue Length 50th (m)	73.2	109.5	5.3	2.0	~185.7	32.7	77.4	47.3	42.7	37.1	0.0
Queue Length 95th (m)	#138.3	159.1	25.7	6.3	#239.6	93.6	108.5	67.1	58.1	58.9	17.4
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	320	1555	720	202	974	707	534	704	615	448	446
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.64	0.32	0.07	1.09	0.80	0.69	0.49	0.48	0.32	0.28

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
Future Volume (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1547	3374	1338	1560	3438	1362	1648	3253		2895	1759	1389
Flt Permitted	0.09	1.00	1.00	0.27	1.00	1.00	0.60	1.00		0.95	1.00	1.00
Satd. Flow (perm)	140	3374	1338	445	3438	1362	1033	3253		2895	1759	1389
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	995	229	14	1064	568	366	333	15	294	144	123
RTOR Reduction (vph)	0	0	106	0	0	317	0	2	0	0	0	97
Lane Group Flow (vph)	300	995	123	14	1064	251	366	346	0	294	144	26
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		5
Heavy Vehicles (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.4	30.5		21.3	29.9	29.9
Effective Green, g (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.4	30.5		21.3	29.9	29.9
Actuated g/C Ratio	0.50	0.45	0.45	0.31	0.30	0.30	0.38	0.21		0.15	0.21	0.21
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	314	1528	606	157	1016	402	493	690		429	365	289
v/s Ratio Prot	c0.17	0.29		0.00	c0.31		c0.12	0.11		0.10	0.08	
v/s Ratio Perm	0.31		0.09	0.03		0.18	c0.16					0.02
v/c Ratio	0.96	0.65	0.20	0.09	1.05	0.62	0.74	0.50		0.69	0.39	0.09
Uniform Delay, d1	45.7	30.5	23.7	34.3	50.6	43.7	35.9	49.9		58.0	49.1	45.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.6	1.0	0.2	0.2	41.4	3.0	6.0	2.6		5.8	3.2	0.6
Delay (s)	84.3	31.5	23.8	34.5	92.0	46.7	41.9	52.5		63.8	52.3	46.5
Level of Service	F	C	C	C	F	D	D	D		E	D	D
Approach Delay (s)		40.7			75.9			47.1			57.0	
Approach LOS		D			E			D			E	

Intersection Summary

HCM 2000 Control Delay	56.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	143.7	Sum of lost time (s)	24.4
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
Future Volume (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99		1.00				1.00	
Frt			0.850		0.865						0.992	
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1537	1444	0	1323	0	1637	3094	0	1775	3070	0
Flt Permitted		0.757					0.950					
Satd. Flow (perm)	0	1223	1425	0	1323	0	1632	3094	0	1775	3070	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213		80						6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	1		1	1		1	7					7
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 (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Adj. Flow (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	213	0	2	0	76	1557	0	0	1453	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm		NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		23.2			23.2			11.4			58.6	
Actuated g/C Ratio		0.24			0.24			0.12			0.62	
v/c Ratio		0.80			0.42			0.39			0.81	
Control Delay		53.8			6.7			48.8			19.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		53.8			6.7			48.8			19.7	
LOS		D			A			D			B	
Approach Delay		31.5						21.0				
Approach LOS		C						C			D	

Intersection Summary

Area Type: Other

Cycle Length: 117.6

Actuated Cycle Length: 94.8

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 100.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Road AM Peak Hour

	→	↘	←	↙	↑	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	238	213	2	76	1557	1453
v/c Ratio	0.80	0.42	0.01	0.39	0.81	0.97
Control Delay	53.8	6.7	0.0	48.8	19.7	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.7	0.0	48.8	19.7	44.6
Queue Length 50th (m)	43.8	0.0	0.0	14.2	111.1	~148.9
Queue Length 95th (m)	75.9	17.2	0.0	31.4	191.8	#257.3
Internal Link Dist (m)	295.9		64.4		538.4	2438.2
Turn Bay Length (m)				110.0		
Base Capacity (vph)	463	672	550	354	2343	1498
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	0.51	0.32	0.00	0.21	0.66	0.97

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Road AM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
Future Volume (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		5.0	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.86		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (prot)		1535	1425		1323		1637	3094		1637	3070	
Flt Permitted		0.76	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (perm)		1222	1425		1323		1637	3094		1637	3070	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	0	213	0	0	2	76	1555	2	0	1372	81
RTOR Reduction (vph)	0	0	161	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	238	52	0	0	0	76	1557	0	0	1450	0
Confl. Peds. (#/hr)	1		1	1		1	7			7		
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Effective Green, g (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.09	0.63			0.48	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6			6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0			5.0	
Lane Grp Cap (vph)		296	345		320		148	1936			1482	
v/s Ratio Prot					0.00		0.05	c0.50			c0.47	
v/s Ratio Perm		c0.19	0.04									
v/c Ratio		0.80	0.15		0.00		0.51	0.80			0.98	
Uniform Delay, d1		34.1	28.5		27.5		41.5	13.5			24.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		14.6	0.2		0.0		3.0	3.7			18.8	
Delay (s)		48.7	28.7		27.5		44.5	17.2			43.0	
Level of Service		D	C		C		D	B			D	
Approach Delay (s)		39.2			27.5			18.4			43.0	
Approach LOS		D			C			B			D	

Intersection Summary

HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	17.6
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
Future Volume (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98			0.98	1.00		0.99
Frt	0.900					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1576	2295	0	1492	1743	1219	1429	4848	1417	2749	3312	1229
Flt Permitted	0.609			0.700			0.088			0.950		
Satd. Flow (perm)	1003	2295	0	1091	1743	1196	132	4848	1393	2747	3312	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56				138			169			122
Link Speed (k/h)	50				50		50			50		
Link Distance (m)	181.6				324.8		266.0			278.1		
Travel Time (s)	13.1				23.4		19.2			20.0		
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
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 (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Adj. Flow (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	84	0	82	24	80	203	1425	194	82	1488	25
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2		7.2		
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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		

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	15.1	7.3		15.2	7.7	7.7	60.9	46.8	46.8	10.1	40.2	40.2
Actuated g/C Ratio	0.17	0.08		0.17	0.09	0.09	0.69	0.53	0.53	0.11	0.46	0.46
v/c Ratio	0.61	0.35		0.37	0.16	0.35	0.65	0.55	0.24	0.26	0.99	0.04
Control Delay	42.7	22.0		33.3	40.3	5.4	29.4	17.2	4.3	40.0	46.5	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	22.0		33.3	40.3	5.4	29.4	17.2	4.3	40.0	46.5	0.1
LOS	D	C		C	D	A	C	B	A	D	D	A
Approach Delay		34.7			22.2			17.2			45.5	
Approach LOS		C			C			B			D	

Intersection Summary

Area Type: Other

Cycle Length: 137.8

Actuated Cycle Length: 88.3

Natural Cycle: 130

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 30.2

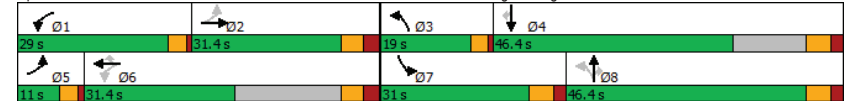
Intersection LOS: C

Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	84	82	24	80	203	1425	194	82	1488	25
v/c Ratio	0.61	0.35	0.37	0.16	0.35	0.65	0.55	0.24	0.26	0.99	0.04
Control Delay	42.7	22.0	33.3	40.3	5.4	29.4	17.2	4.3	40.0	46.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	22.0	33.3	40.3	5.4	29.4	17.2	4.3	40.0	46.5	0.1
Queue Length 50th (m)	20.3	2.5	12.2	4.2	0.0	20.4	66.4	2.3	7.1	~138.3	0.0
Queue Length 95th (m)	36.6	10.0	24.7	11.9	2.8	#54.6	91.7	15.0	15.0	#210.8	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	218	692	425	852	655	312	2569	817	781	1958	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.12	0.19	0.03	0.12	0.65	0.55	0.24	0.10	0.76	0.03

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
Future Volume (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	2300		1486	1743	1199	1429	1484	1395	2749	3312	1213
Flt Permitted	0.61	1.00		0.70	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1007	2300		1095	1743	1199	132	4848	1395	2749	3312	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	132	28	56	82	24	80	203	1425	194	82	1488	25
RTOR Reduction (vph)	0	51	0	0	0	74	0	0	82	0	0	14
Lane Group Flow (vph)	132	33	0	82	24	6	203	1425	112	82	1488	11
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
Heavy Vehicles (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	15.0	7.8		12.2	6.4	6.4	60.6	46.8	46.8	7.8	41.5	41.5
Effective Green, g (s)	15.0	7.8		12.2	6.4	6.4	60.6	46.8	46.8	7.8	41.5	41.5
Actuated g/C Ratio	0.16	0.09		0.13	0.07	0.07	0.67	0.51	0.51	0.09	0.46	0.46
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	210	197		171	122	84	303	2493	717	235	1510	553
v/s Ratio Prot	c0.05	0.01		0.03	0.01		c0.11	0.29		0.03	c0.45	
v/s Ratio Perm	c0.05			0.03		0.00	0.33		0.08			0.01
v/c Ratio	0.63	0.17		0.48	0.20	0.07	0.67	0.57	0.16	0.35	0.99	0.02
Uniform Delay, d1	34.7	38.6		36.1	39.9	39.5	22.1	15.2	11.7	39.2	24.5	13.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	0.4		0.8	0.8	0.3	5.5	1.0	0.5	0.9	19.9	0.1
Delay (s)	40.4	39.0		36.9	40.7	39.8	27.6	16.2	12.1	40.1	44.4	13.7
Level of Service	D	D		D	D	D	C	B	B	D	D	B
Approach Delay (s)		39.9			38.6			17.0			43.7	
Approach LOS		D			D			B			D	

Intersection Summary

HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	22.8
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Future Volume (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1591	0	1458	1441	1776	1365	1561	3406	0	0	4803	1261
Flt Permitted	0.620			0.950			0.105					
Satd. Flow (perm)	1038	0	1458	1441	1776	1365	173	3406	0	0	4803	1261
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			222			412						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2		2		
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 (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Adj. Flow (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm																
Protected Phases				1	6		3	8			4																	
Permitted Phases	2		2	6		Free	8					4																
Detector Phase	2		2	1	6		3	8			4	4																
Switch Phase																												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0																
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9																
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9																
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%																
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0																
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2																
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7																
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0																
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9																
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag																
Lead-Lag Optimize?																												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0																
Recall Mode	Max		Max	None	Max		None	None			None	None																
Walk Time (s)	7.0		7.0	7.0	7.0		15.0				15.0	15.0																
Flash Dont Walk (s)	19.0		19.0	19.0	19.0		5.0				5.0	5.0																
Pedestrian Calls (#/hr)	0		0	0	0		0				0	0																
Act Effct Green (s)	30.5		30.5	48.0	44.7	114.5	58.4	55.4			44.9	44.9																
Actuated g/C Ratio	0.27		0.27	0.42	0.39	1.00	0.51	0.48			0.39	0.39																
v/c Ratio	0.21		1.04	0.40	0.32	0.65	0.39	0.53			0.70	0.05																
Control Delay	39.9		76.8	28.8	29.0	2.4	18.9	21.1			31.3	0.2																
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0																
Total Delay	39.9		76.8	28.8	29.0	2.4	18.9	21.1			31.3	0.2																
LOS	D		E	C	C	A	B	C			C	A																
Approach Delay		73.4			11.4			20.9			30.6																	
Approach LOS		E			B			C			C																	
Intersection Summary																												
Area Type:		Other																										
Cycle Length: 127.1																												
Actuated Cycle Length: 114.5																												
Natural Cycle: 90																												
Control Type: Actuated-Uncoordinated																												
Maximum v/c Ratio: 1.04																												
Intersection Signal Delay: 28.7						Intersection LOS: C																						
Intersection Capacity Utilization 93.3%						ICU Level of Service F																						
Analysis Period (min) 15																												
Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp																												
<table><tr><td></td><td></td><td></td><td></td></tr><tr><td>14 s</td><td>37.2 s</td><td>14 s</td><td>61.9 s</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>37.2 s</td><td></td><td>61.9 s</td><td></td></tr></table>																	14 s	37.2 s	14 s	61.9 s					37.2 s		61.9 s	
14 s	37.2 s	14 s	61.9 s																									
37.2 s		61.9 s																										

Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - AM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	57	574	239	221	886	79	880	1318	29
v/c Ratio	0.21	1.04	0.40	0.32	0.65	0.39	0.53	0.70	0.05
Control Delay	39.9	76.8	28.8	29.0	2.4	18.9	21.1	31.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	76.8	28.8	29.0	2.4	18.9	21.1	31.3	0.2
Queue Length 50th (m)	11.1	~113.2	41.8	38.6	0.0	9.1	72.3	97.8	0.0
Queue Length 95th (m)	25.2	#199.6	72.2	65.8	0.0	16.9	89.4	114.2	0.0
Internal Link Dist (m)			459.0			296.0	151.5		
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	276	551	603	693	1365	211	2086	2345	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	1.04	0.40	0.32	0.65	0.37	0.42	0.56	0.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Future Volume (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1591		1458	1441	1776	1365	1561	3406			4803	1261
Flt Permitted	0.62		1.00	0.95	1.00	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)	1039		1458	1441	1776	1365	172	3406			4803	1261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	0	574	239	221	886	79	880	0	0	1318	29
RTOR Reduction (vph)	0	0	163	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	57	0	411	239	221	886	79	880	0	0	1318	11
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.5		30.5	44.7	44.7	115.3	56.5	56.5			45.0	45.0
Effective Green, g (s)	30.5		30.5	44.7	44.7	115.3	56.5	56.5			45.0	45.0
Actuated g/C Ratio	0.26		0.26	0.39	0.39	1.00	0.49	0.49			0.39	0.39
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	274		385	558	688	1365	174	1669			1874	492
v/s Ratio Prot				0.04	0.12		0.03	0.26				0.27
v/s Ratio Perm	0.05		c0.28	0.13		c0.65	0.19					0.01
v/c Ratio	0.21		1.07	0.43	0.32	0.65	0.45	0.53			0.70	0.02
Uniform Delay, d1	33.0		42.4	25.9	24.7	0.0	18.8	20.2			29.5	21.6
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	1.7		64.7	1.1	1.2	2.4	3.9	0.6			1.5	0.0
Delay (s)	34.7		107.1	27.0	25.9	2.4	22.7	20.8			31.1	21.7
Level of Service	C		F	C	C	A	C	C			C	C
Approach Delay (s)		100.6			10.6			20.9			30.9	
Approach LOS		F			B			C			C	

Intersection Summary

HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	115.3	Sum of lost time (s)	22.1
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2028 Background - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	620	243	19	64	8
Future Volume (vph)	4	620	243	19	64	8
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.990		0.985	
Flt Protected					0.957	
Satd. Flow (prot)	0	1615	1523	0	1664	0
Flt Permitted					0.957	
Satd. Flow (perm)	0	1615	1523	0	1664	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	2%	7%	11%	0%	0%
Adj. Flow (vph)	4	620	243	19	64	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	624	262	0	72	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 52.2%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2028 Background - AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	620	243	19	64	8
Future Volume (Veh/h)	4	620	243	19	64	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	620	243	19	64	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	262				880	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262				880	252
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				80	99
cM capacity (veh/h)	1180				319	791
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	624	262	72			
Volume Left	4	0	64			
Volume Right	0	19	8			
cSH	1180	1700	342			
Volume to Capacity	0.00	0.15	0.21			
Queue Length 95th (m)	0.1	0.0	6.3			
Control Delay (s)	0.1	0.0	18.3			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	18.3			
Approach LOS			C			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization		52.2%		ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Background - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	64	364	200	96	331	131
Future Volume (vph)	64	364	200	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1637	1845	1528	1311	1613	0
Flt Permitted	0.493				0.965	
Satd. Flow (perm)	850	1845	1528	1311	1613	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				96	21	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Adj. Flow (vph)	64	364	200	96	331	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	364	200	96	462	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Background - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	23.4	20.8	14.2	14.2	25.5	
Actuated g/C Ratio	0.40	0.35	0.24	0.24	0.43	
v/c Ratio	0.15	0.56	0.54	0.25	0.65	
Control Delay	10.8	18.2	27.2	6.9	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.8	18.2	27.2	6.9	21.2	
LOS	B	B	C	A	C	
Approach Delay		17.1	20.6		21.2	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 59.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 19.5

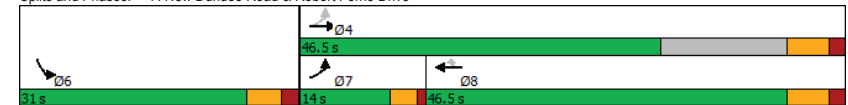
Intersection LOS: B

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2028 Background - AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	64	364	200	96	462
v/c Ratio	0.15	0.56	0.54	0.25	0.65
Control Delay	10.8	18.2	27.2	6.9	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	18.2	27.2	6.9	21.2
Queue Length 50th (m)	4.3	31.8	21.8	0.0	41.9
Queue Length 95th (m)	10.1	52.1	41.9	10.2	#100.3
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	471	1652	1056	935	709
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.22	0.19	0.10	0.65

Intersection Summary

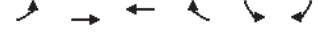
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2028 Background - AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	64	364	200	96	331	131
Future Volume (vph)	64	364	200	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1637	1845	1528	1311	1613	
Flt Permitted	0.49	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	850	1845	1528	1311	1613	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	364	200	96	331	131
RTOR Reduction (vph)	0	0	0	74	12	0
Lane Group Flow (vph)	64	364	200	22	450	0
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	22.6	22.6	14.2	14.2	25.5	
Effective Green, g (s)	22.6	22.6	14.2	14.2	25.5	
Actuated g/C Ratio	0.37	0.37	0.23	0.23	0.42	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	374	688	358	307	678	
v/s Ratio Prot	0.01	c0.20	0.13		c0.28	
v/s Ratio Perm	0.05			0.02		
v/c Ratio	0.17	0.53	0.56	0.07	0.66	
Uniform Delay, d1	12.5	14.8	20.4	18.1	14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.7	1.9	0.1	5.1	
Delay (s)	12.8	15.6	22.3	18.2	19.2	
Level of Service	B	B	C	B	B	
Approach Delay (s)		15.2	21.0		19.2	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			60.6		Sum of lost time (s)	16.5
Intersection Capacity Utilization			58.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	326	82	13	220	10	45	23	24	12	41	12
Future Volume (vph)	11	326	82	13	220	10	45	23	24	12	41	12
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.994			0.965			0.975	
Flt Protected		0.999			0.997			0.976			0.991	
Satd. Flow (prot)	0	1416	0	0	1423	0	0	1332	0	0	1498	0
Flt Permitted		0.999			0.997			0.976			0.991	
Satd. Flow (perm)	0	1416	0	0	1423	0	0	1332	0	0	1498	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
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 (%)	18%	6%	7%	23%	7%	10%	0%	4%	33%	0%	0%	0%
Adj. Flow (vph)	11	326	82	13	220	10	45	23	24	12	41	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	419	0	0	243	0	0	92	0	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 51.2%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2028 Background - AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	11	326	82	13	220	10	45	23	24	12	41	12	
Future Volume (Veh/h)	11	326	82	13	220	10	45	23	24	12	41	12	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	11	326	82	13	220	10	45	23	24	12	41	12	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type		None				None							
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	230			408				672	645	367	676	681	225
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	230			408				672	645	367	676	681	225
tC, single (s)	4.3			4.3				7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.4			2.4				3.5	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99				86	94	96	96	89	99
cM capacity (veh/h)	1249			1046				330	380	614	334	367	819
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	419	243	92	65									
Volume Left	11	13	45	12									
Volume Right	82	10	24	12									
cSH	1249	1046	390	401									
Volume to Capacity	0.01	0.01	0.24	0.16									
Queue Length 95th (m)	0.2	0.3	7.2	4.6									
Control Delay (s)	0.3	0.6	17.1	15.7									
Lane LOS	A	A	C	C									
Approach Delay (s)	0.3	0.6	17.1	15.7									
Approach LOS			C	C									
Intersection Summary													
Average Delay			3.5										
Intersection Capacity Utilization			51.2%		ICU Level of Service		A						
Analysis Period (min)			15										

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2028 Background - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973			0.932		
Flt Protected	0.962			0.994		
Satd. Flow (prot)	1613	0	0	1585	1458	0
Flt Permitted	0.962			0.994		
Satd. Flow (perm)	1613	0	0	1585	1458	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	4%	9%	2%
Adj. Flow (vph)	221	56	41	292	146	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	333	293	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.4% ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2028 Background - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	221	56	41	292	146	147
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	277	333	293			
Volume Left (vph)	221	41	0			
Volume Right (vph)	56	0	147			
Hadj (s)	0.08	0.08	-0.21			
Departure Headway (s)	5.6	5.2	5.0			
Degree Utilization, x	0.43	0.48	0.41			
Capacity (veh/h)	603	650	681			
Control Delay (s)	12.7	13.0	11.4			
Approach Delay (s)	12.7	13.0	11.4			
Approach LOS	B	B	B			
Intersection Summary						
Delay		12.4				
Level of Service		B				
Intersection Capacity Utilization		66.4%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2028 Background - AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	305	14	4	164	5
Future Volume (vph)	4	305	14	4	164	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867		0.970			
Flt Protected	0.999					0.954
Satd. Flow (prot)	1529	0	1442	0	0	1493
Flt Permitted	0.999					0.954
Satd. Flow (perm)	1529	0	1442	0	0	1493
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	7%	25%	5%	20%
Adj. Flow (vph)	4	305	14	4	164	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	309	0	18	0	0	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2028 Background - AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	305	14	4	164	5
Future Volume (Veh/h)	4	305	14	4	164	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	305	14	4	164	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349	16			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	16			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	71			90	
cM capacity (veh/h)	584	1069			1579	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	309	18	169			
Volume Left	4	0	164			
Volume Right	305	4	0			
cSH	1058	1700	1579			
Volume to Capacity	0.29	0.01	0.10			
Queue Length 95th (m)	9.8	0.0	2.8			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		44.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Background - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	0.99	
Frt	0.965					0.850		0.999			0.962	
Flt Protected	0.950				0.994		0.950			0.950		
Satd. Flow (prot)	1621	1498	0	0	1500	1365	1519	1616	0	1519	1454	0
Flt Permitted	0.728				0.974		0.560			0.486		
Satd. Flow (perm)	1224	1498	0	0	1467	1317	887	1616	0	775	1454	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)	23					74		1			38	
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	184.2				333.0			586.7			311.9	
Travel Time (s)	13.3				24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	98	0	0	44	74	44	385	0	56	309	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0				0.0		0.0			0.0	
Crosswalk Width(m)		4.8				4.8		4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

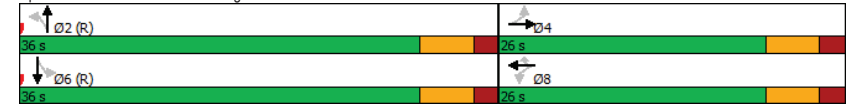
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Background - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.23	0.20			0.09	0.16	0.10	0.49		0.15	0.43	
Control Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.3			9.1			13.1			11.1	
Approach LOS		B			A			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 62												
Actuated Cycle Length: 62												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 65												
Control Type: Pretimed												
Maximum v/c Ratio: 0.49												
Intersection Signal Delay: 12.4	Intersection LOS: B											
Intersection Capacity Utilization 73.3%	ICU Level of Service D											
Analysis Period (min) 15												

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2028 Background - AM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	98	44	74	44	385	56	309
v/c Ratio	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43
Control Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Length 50th (m)	7.7	6.3	3.6	0.0	2.7	29.2	3.5	19.2
Queue Length 95th (m)	17.5	16.1	9.9	7.7	7.6	50.6	9.5	36.9
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	394	498	473	474	429	782	375	723
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	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2028 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1498			1498	1317	1504	1616		1515	1454	
Flt Permitted	0.73	1.00			0.97	1.00	0.56	1.00		0.49	1.00	
Satd. Flow (perm)	1225	1498			1466	1317	887	1616		774	1454	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
RTOR Reduction (vph)	0	16	0	0	0	50	0	1	0	0	20	0
Lane Group Flow (vph)	89	82	0	0	44	24	44	384	0	56	289	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	395	483			472	424	429	781		374	703	
v/s Ratio Prot		0.06						c0.24			0.20	
v/s Ratio Perm	c0.07				0.03	0.02	0.05			0.07		
v/c Ratio	0.23	0.17			0.09	0.06	0.10	0.49		0.15	0.41	
Uniform Delay, d1	15.3	15.1			14.7	14.5	8.7	10.8		8.9	10.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.8			0.4	0.3	0.5	2.2		0.8	1.8	
Delay (s)	16.7	15.8			15.1	14.7	9.2	13.1		9.7	12.1	
Level of Service	B	B			B	B	A	B		A	B	
Approach Delay (s)	16.2				14.9			12.7			11.7	
Approach LOS	B				B			B			B	

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:45:32 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2028							
Leg North	0.48	1.02	3.37	0.32	A	2.85	A
Leg West	0.35	~1	2.69	0.26	A		
Leg East	0.21	~1	2.28	0.16	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM " model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:45:30 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2028, AM	FB 2028	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				2.85	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	462.00	100.000
West	ONE HOUR	✓	428.00	100.000
East	ONE HOUR	✓	296.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.000	131.000	331.000
West	64.000	0.000	364.000
East	96.000	200.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.00	0.28	0.72
West	0.15	0.00	0.85
East	0.32	0.68	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	East

From	North	1.000	1.030	1.010
	West	1.030	1.000	1.030
	East	1.070	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.0	3.0	1.0
West	3.0	0.0	3.0
East	7.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.32	3.37	0.48	1.02	A	423.94	635.91	32.91	3.11	0.37	32.92	3.11
West	0.26	2.69	0.35	~1	A	392.74	589.11	24.62	2.51	0.27	24.62	2.51
East	0.16	2.28	0.21	~1	A	271.61	407.42	14.95	2.20	0.17	14.95	2.20

Main Results for each time segment**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	347.82	86.95	346.72	120.16	150.21	0.00	1631.19	1000.36	0.213	0.00	0.27	2.843	A
West	322.22	80.56	321.39	248.53	248.41	0.00	1918.24	1630.47	0.168	0.00	0.21	2.321	A
East	222.84	55.71	222.32	521.74	48.06	0.00	2041.36	1921.07	0.109	0.00	0.13	2.131	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	415.33	103.83	415.02	143.76	179.72	0.00	1614.97	1000.36	0.257	0.27	0.35	3.046	A
West	384.76	96.19	384.54	297.40	297.34	0.00	1888.17	1630.47	0.204	0.21	0.28	2.465	A
East	266.10	66.52	265.98	624.38	57.50	0.00	2035.56	1921.07	0.131	0.13	0.16	2.190	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	508.67	127.17	508.18	176.05	220.08	0.00	1592.79	1000.35	0.319	0.35	0.47	3.369	A
West	471.24	117.81	470.88	364.18	364.08	0.00	1847.16	1630.47	0.255	0.26	0.35	2.694	A
East	325.90	81.48	325.73	764.55	70.41	0.00	2027.62	1921.07	0.161	0.16	0.21	2.277	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	508.67	127.17	508.67	176.16	220.20	0.00	1592.72	1000.35	0.319	0.47	0.48	3.371	A
West	471.24	117.81	471.23	364.44	364.43	0.00	1846.95	1630.47	0.255	0.35	0.35	2.694	A
East	325.90	81.48	325.90	765.20	70.46	0.00	2027.59	1921.07	0.161	0.21	0.21	2.277	A

Main results: (09:00-09:15)

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Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	415.33	103.83	415.82	143.95	179.91	0.00	1614.86	1000.36	0.257	0.48	0.35	3.052	A
West	384.76	96.19	385.11	297.82	297.91	0.00	1887.82	1630.47	0.204	0.35	0.26	2.467	A
East	266.10	66.52	266.27	625.44	57.59	0.00	2035.51	1921.07	0.131	0.21	0.16	2.192	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	347.82	86.95	348.13	120.53	150.65	0.00	1630.95	1000.36	0.213	0.35	0.28	2.850	A
West	322.22	80.56	322.44	249.36	249.41	0.00	1917.63	1630.47	0.168	0.26	0.21	2.324	A
East	222.84	55.71	222.96	523.64	48.22	0.00	2041.26	1921.07	0.109	0.16	0.13	2.133	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.04	0.27	2.843	A	A
West	3.06	0.20	2.321	A	A
East	1.95	0.13	2.131	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.18	0.35	3.046	A	A
West	3.90	0.26	2.465	A	A
East	2.40	0.16	2.190	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.99	0.47	3.369	A	A
West	5.20	0.35	2.694	A	A
East	3.05	0.20	2.277	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.12	0.47	3.371	A	A
West	5.28	0.35	2.694	A	A
East	3.09	0.21	2.277	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.38	0.36	3.052	A	A
West	4.02	0.27	2.467	A	A
East	2.46	0.16	2.192	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.20	0.28	2.850	A	A
West	3.16	0.21	2.324	A	A
East	2.00	0.13	2.133	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

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Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.13	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.47	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	0.00	0.00	0.00	1.02			N/A	N/A
West	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.13	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821.26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:45:01 PM

Summary of intersection performance

PM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2028							
Leg North	0.25	~1	3.19	0.20	A	2.96	A
Leg West	0.23	~1	2.31	0.19	A		
Leg East	0.74	1.02	3.17	0.42	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:45:00 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2028, PM	FB 2028	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				2.96	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	253.00	100.000
West	ONE HOUR	✓	330.00	100.000
East	ONE HOUR	✓	768.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To		
From		North	West	East
	North	0.000	91.000	162.000
	West	105.000	0.000	225.000
	East	296.000	472.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To		
From		North	West	East
	North	0.00	0.36	0.64
	West	0.32	0.00	0.68
	East	0.39	0.61	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To		
From		North	West	East
	North			
	West			
	East			

From	North	1,000	1,020	1,020
	West	1,010	1,000	1,030
	East	1,010	1,020	1,000

Truck Percentages - Intersection 1 (for whole period)

From	To			
		North	West	East
	North	0.0	2.0	2.0
	West	1.0	0.0	3.0
	East	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.20	3.19	0.25	~1	A	232.16	348.24	17.27	2.98	0.19	17.27	2.98
West	0.19	2.31	0.23	~1	A	302.81	454.22	16.69	2.21	0.19	16.69	2.21
East	0.42	3.17	0.74	1.02	A	704.73	1057.10	50.13	2.85	0.56	50.14	2.85

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	190.47	47.62	189.89	301.08	354.35	0.00	1518.99	1121.86	0.125	0.00	0.15	2.761	A
West	248.44	62.11	247.86	422.65	121.59	0.00	1996.18	1629.46	0.124	0.00	0.15	2.108	A
East	578.19	144.55	576.57	290.58	78.86	0.00	2022.43	1752.29	0.286	0.00	0.41	2.528	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	227.44	56.86	227.29	360.26	424.02	0.00	1480.71	1121.86	0.154	0.15	0.18	2.929	A
West	296.66	74.17	296.52	505.77	145.54	0.00	1981.46	1629.46	0.150	0.15	0.18	2.186	A
East	690.42	172.60	689.92	347.71	94.35	0.00	2012.92	1752.29	0.343	0.41	0.53	2.765	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	278.56	69.64	278.31	441.12	519.68	0.00	1428.42	1121.86	0.195	0.18	0.25	3.192	A
West	363.34	90.83	363.13	619.27	178.21	0.00	1961.38	1629.46	0.185	0.18	0.23	2.305	A
East	845.58	211.40	844.74	425.79	115.54	0.00	1999.89	1752.29	0.423	0.53	0.74	3.165	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	278.56	69.64	278.56	441.51	519.68	0.00	1428.13	1121.86	0.195	0.25	0.25	3.193	A
West	363.34	90.83	363.34	619.87	178.36	0.00	1961.29	1629.46	0.185	0.23	0.23	2.305	A
East	845.58	211.40	845.57	426.09	115.61	0.00	1999.85	1752.29	0.423	0.74	0.74	3.168	A

Main results: (17:00-17:15)

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Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	227.44	56.86	227.68	360.88	424.83	0.00	1480.26	1121.86	0.154	0.25	0.19	2.933	A
West	296.66	74.17	296.87	506.73	145.79	0.00	1981.30	1629.46	0.150	0.23	0.18	2.189	A
East	690.42	172.60	691.25	348.20	94.46	0.00	2012.85	1752.29	0.343	0.74	0.53	2.771	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	190.47	47.62	190.63	302.13	355.65	0.00	1518.28	1121.86	0.125	0.19	0.15	2.767	A
West	248.44	62.11	248.58	424.22	122.06	0.00	1995.89	1629.46	0.124	0.18	0.15	2.110	A
East	578.19	144.55	578.69	291.55	79.09	0.00	2022.29	1752.29	0.286	0.53	0.41	2.536	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.15	0.14	2.761	A	A
West	2.15	0.14	2.108	A	A
East	5.97	0.40	2.528	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.73	0.18	2.929	A	A
West	2.67	0.18	2.186	A	A
East	7.81	0.52	2.765	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.64	0.24	3.192	A	A
West	3.44	0.23	2.305	A	A
East	10.90	0.73	3.165	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.70	0.25	3.193	A	A
West	3.48	0.23	2.305	A	A
East	11.12	0.74	3.168	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.83	0.19	2.933	A	A
West	2.74	0.18	2.189	A	A
East	8.12	0.54	2.771	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.23	0.15	2.767	A	A
West	2.21	0.15	2.110	A	A
East	6.21	0.41	2.536	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

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Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.74	0.00	0.00	0.00	1.02			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩↩	↩	↩	↩↩	↩	↩	↩↩	↩	↩↩	↩	↩
Traffic Volume (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
Future Volume (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.97	1.00		0.98	0.99	1.00		1.00		0.97
Frt			0.850			0.850		0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	3471	1488	1686	3438	1417	1670	3304	0	3146	1863	1458
Flt Permitted	0.089			0.161			0.353			0.950		
Satd. Flow (perm)	156	3471	1447	285	3438	1387	614	3304	0	3130	1863	1410
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)			451			461		4				235
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Adj. Flow (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	1111	595	41	1040	562	320	330	0	688	350	282
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	61.0	61.0	49.0	40.0	40.0	55.2	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.49	0.41	0.41	0.33	0.27	0.27	0.37	0.20		0.20	0.26	0.26
v/c Ratio	0.95	0.78	0.69	0.28	1.12	0.79	0.82	0.51		1.08	0.73	0.53
Control Delay	80.1	43.1	13.1	27.1	118.1	18.6	46.1	55.9		114.7	61.3	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	80.1	43.1	13.1	27.1	118.1	18.6	46.1	55.9		114.7	61.3	13.5
LOS	F	D	B	C	F	B	D	E		F	E	B
Approach Delay		40.0			81.8			51.1			78.9	
Approach LOS		D			F			D			E	
Intersection Summary												
Area Type:		Other										
Cycle Length: 148.4												
Actuated Cycle Length: 148.4												
Natural Cycle: 145												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.12												
Intersection Signal Delay: 62.6						Intersection LOS: E						
Intersection Capacity Utilization 113.8%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	312	1111	595	41	1040	562	320	330	688	350	282
v/c Ratio	0.95	0.78	0.69	0.28	1.12	0.79	0.82	0.51	1.08	0.73	0.53
Control Delay	80.1	43.1	13.1	27.1	118.1	18.6	46.1	55.9	114.7	61.3	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	43.1	13.1	27.1	118.1	18.6	46.1	55.9	114.7	61.3	13.5
Queue Length 50th (m)	80.0	159.3	35.3	6.6	~194.8	28.4	65.2	48.0	~122.4	101.9	11.5
Queue Length 95th (m)	#141.4	188.9	84.4	13.8	#239.1	85.2	#93.8	64.7	#163.1	#141.2	41.2
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	330	1426	860	150	926	710	414	648	635	478	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.78	0.69	0.27	1.12	0.79	0.77	0.51	1.08	0.73	0.53

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
Future Volume (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1670	3471	1447	1686	3438	1387	1664	3304		3146	1863	1410
Flt Permitted	0.09	1.00	1.00	0.16	1.00	1.00	0.35	1.00		0.95	1.00	1.00
Satd. Flow (perm)	157	3471	1447	286	3438	1387	619	3304		3146	1863	1410
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	312	1111	595	41	1040	562	320	308	22	688	350	282
RTOR Reduction (vph)	0	0	267	0	0	335	0	3	0	0	0	175
Lane Group Flow (vph)	312	1111	328	41	1040	227	320	327	0	688	350	107
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Effective Green, g (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.47	0.41	0.41	0.31	0.27	0.27	0.35	0.19		0.20	0.26	0.26
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	326	1419	591	132	940	379	375	642		632	475	360
v/s Ratio Prot	c0.16	0.32		0.01	c0.30		0.13	0.10		c0.22	0.19	
v/s Ratio Perm	0.29		0.23	0.08		0.16	c0.17					0.08
v/c Ratio	0.96	0.78	0.56	0.31	1.11	0.60	0.85	0.51		1.09	0.74	0.30
Uniform Delay, d1	47.4	38.3	33.7	37.7	54.2	47.1	39.9	53.7		59.6	51.0	44.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.1	2.9	1.1	1.3	63.0	2.5	16.9	2.9		62.3	9.8	2.1
Delay (s)	85.5	41.2	34.9	39.1	117.2	49.6	56.8	56.6		121.9	60.8	46.9
Level of Service	F	D	C	D	F	D	E	E		F	E	D
Approach Delay (s)		46.2			92.1			56.7			89.6	
Approach LOS		D			F			E			F	

Intersection Summary

HCM 2000 Control Delay	71.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	24.4
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
Future Volume (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99										
Frt		0.850					0.999			0.983		
Flt Protected		0.953			0.979		0.950			0.950		
Satd. Flow (prot)	0	1493	1417	0	1517	0	1670	3179	0	1686	3167	0
Flt Permitted		0.726			0.896		0.950			0.124		
Satd. Flow (perm)	0	1131	1417	0	1389	0	1670	3179	0	220	3167	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		125					1			13		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		319.9			88.4		562.4			2462.2		
Travel Time (s)		23.0			6.4		40.5			177.3		
Confl. Peds. (#/hr)	4				4							
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 (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Adj. Flow (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	125	0	7	0	127	1708	0	2	1685	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		17.2			17.2			12.9		63.4		45.4
Actuated g/C Ratio		0.18			0.18			0.14		0.68		0.49
v/c Ratio		0.69			0.35			0.55		0.79		0.02
Control Delay		53.5			8.9			48.1		15.0		17.5
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.5			8.9			48.1		15.0		17.5
LOS		D			A			D		B		E
Approach Delay		32.8			31.1			17.3				76.5
Approach LOS		C			C			B				E
Intersection Summary												
Area Type:		Other										
Cycle Length:		117.6										
Actuated Cycle Length:		93.3										
Natural Cycle:		100										
Control Type:		Semi Act-Uncoord										
Maximum v/c Ratio:		1.09										
Intersection Signal Delay:		44.7						Intersection LOS: D				
Intersection Capacity Utilization		99.1%						ICU Level of Service F				
Analysis Period (min)		15										

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road Traffic PM Peak Hour

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	125	7	127	1708	2	1685
v/c Ratio	0.69	0.35	0.03	0.55	0.79	0.02	1.09
Control Delay	53.5	8.9	31.1	48.1	15.0	17.5	76.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	8.9	31.1	48.1	15.0	17.5	76.6
Queue Length 50th (m)	25.3	0.0	1.1	22.5	101.5	0.2	~185.9
Queue Length 95th (m)	48.8	14.7	5.0	44.9	183.3	1.9	#295.1
Internal Link Dist (m)	295.9		64.4		538.4		2438.2
Turn Bay Length (m)				110.0		35.0	
Base Capacity (vph)	428	614	525	361	2407	107	1548
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.01	0.35	0.71	0.02	1.09

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road Traffic PM Peak Hour

	↘	→	↗	↙	←	↖	↗	↑	↖	↗	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
Future Volume (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.98	0.95		1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1487	1417		1517	1670		3181	3181		1686	3168	
Flt Permitted	0.73	1.00		0.90	0.95		1.00	1.00		0.12	1.00	
Satd. Flow (perm)	1132	1417		1389	1670		3181	3181		220	3168	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	3	125	3	4	0	127	1702	6	2	1498	187
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	144	23	0	7	0	127	1708	0	2	1678	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases	2				6		3	8			4	
Permitted Phases	2		2	6						4		
Actuated Green, G (s)	17.2	17.2		17.2	12.9		63.4	63.4		45.5	45.5	
Effective Green, g (s)	17.2	17.2		17.2	12.9		63.4	63.4		45.5	45.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.14		0.68	0.68		0.49	0.49	
Clearance Time (s)	6.0	6.0		6.0	5.0		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	208	261		256	231		2163	2163		107	1546	
v/s Ratio Prot							0.08	c0.54			c0.53	
v/s Ratio Perm	c0.13	0.02		0.01						0.01		
v/c Ratio	0.69	0.09		0.03	0.55		0.79	0.79		0.02	1.09	
Uniform Delay, d1	35.5	31.5		31.1	37.4		10.3	10.3		12.3	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.5	0.1		0.0	2.7		3.0	3.0		0.3	49.9	
Delay (s)	45.1	31.6		31.2	40.1		13.3	13.3		12.6	73.8	
Level of Service	D	C		C	D		B	B		B	E	
Approach Delay (s)	38.8			31.2			15.2				73.7	
Approach LOS	D			C			B				E	

Intersection Summary

HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	17.6
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

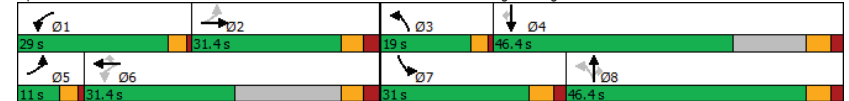
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
Future Volume (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.97			0.99	1.00		0.98
Frt	0.887					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1621	2574	0	1576	1827	1340	1547	4940	1377	2870	3471	1458
Flt Permitted	0.722			0.504			0.097			0.950		
Satd. Flow (perm)	1217	2574	0	826	1827	1306	158	4940	1359	2869	3471	1425
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				138			169			122
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		181.6			324.8		266.0			278.1		
Travel Time (s)		13.1			23.4		19.2			20.0		
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
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 (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Adj. Flow (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	119	0	143	53	112	189	1501	89	101	1475	57
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	16.8	7.3		21.2	9.8	9.8	56.5	41.4	41.4	10.2	40.9	40.9
Actuated g/C Ratio	0.18	0.08		0.23	0.11	0.11	0.62	0.45	0.45	0.11	0.45	0.45
v/c Ratio	0.90	0.41		0.53	0.27	0.43	0.65	0.67	0.13	0.31	0.95	0.08
Control Delay	70.4	18.9		35.5	40.6	9.2	27.3	22.0	0.4	41.6	39.9	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.4	18.9		35.5	40.6	9.2	27.3	22.0	0.4	41.6	39.9	0.2
LOS	E	B		D	A	C	C	A	A	D	D	A
Approach Delay		52.8			26.8			21.5			38.6	
Approach LOS		D			C			C			D	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 91.3												
Natural Cycle: 120												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.95												
Intersection Signal Delay: 31.4								Intersection LOS: C				
Intersection Capacity Utilization 89.0%								ICU Level of Service E				
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	228	119	143	53	112	189	1501	89	101	1475	57
v/c Ratio	0.90	0.41	0.53	0.27	0.43	0.65	0.67	0.13	0.31	0.95	0.08
Control Delay	70.4	18.9	35.5	40.6	9.2	27.3	22.0	0.4	41.6	39.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.4	18.9	35.5	40.6	9.2	27.3	22.0	0.4	41.6	39.9	0.2
Queue Length 50th (m)	36.6	2.6	21.7	9.2	0.0	16.3	75.3	0.0	8.9	133.6	0.0
Queue Length 95th (m)	#81.2	11.6	39.1	20.6	10.2	43.6	107.9	0.0	18.1	#216.1	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	254	772	441	862	689	330	2237	708	787	1982	866
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.15	0.32	0.06	0.16	0.57	0.67	0.13	0.13	0.74	0.07

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
Future Volume (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2583		1570	1827	1312	1547	4940	1359	2870	3471	1430
Flt Permitted	0.72	1.00		0.50	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1226	2583		833	1827	1312	157	4940	1359	2870	3471	1430
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	228	29	90	143	53	112	189	1501	89	101	1475	57
RTOR Reduction (vph)	0	83	0	0	0	100	0	0	49	0	0	31
Lane Group Flow (vph)	228	36	0	143	53	12	189	1501	40	101	1475	26
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
Heavy Vehicles (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	14.3	7.3		19.3	9.8	9.8	54.1	41.4	41.4	10.2	40.9	40.9
Effective Green, g (s)	14.3	7.3		19.3	9.8	9.8	54.1	41.4	41.4	10.2	40.9	40.9
Actuated g/C Ratio	0.16	0.08		0.21	0.11	0.11	0.59	0.45	0.45	0.11	0.45	0.45
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	221	206		253	196	140	286	2242	616	320	1556	641
v/s Ratio Prot	c0.08	0.01		c0.06	0.03		c0.09	0.30		0.04	c0.42	
v/s Ratio Perm	c0.08			0.06		0.01	0.30		0.03			0.02
v/c Ratio	1.03	0.18		0.57	0.27	0.09	0.66	0.67	0.07	0.32	0.95	0.04
Uniform Delay, d1	37.9	39.1		31.2	37.4	36.7	19.5	19.5	14.0	37.3	24.1	14.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.0	0.4		1.7	0.7	0.3	5.6	1.6	0.2	0.6	13.4	0.1
Delay (s)	107.0	39.6		32.9	38.2	36.9	25.1	21.1	14.2	37.9	37.5	14.2
Level of Service	F	D		C	D	D	C	C	B	D	D	B
Approach Delay (s)		83.8			35.3			21.2			36.7	
Approach LOS		F			D			C			D	

Intersection Summary

HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	22.8
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	↱	↰	↰	↱	↱
Traffic Volume (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Future Volume (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0			180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1621	0	1458	1637	1881	1390	1637	3438	0	0	5036	1458
Flt Permitted	0.254			0.950			0.121					
Satd. Flow (perm)	434	0	1458	1637	1881	1390	209	3438	0	0	5036	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			225			448						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Adj. Flow (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.2		30.2	47.5	44.2	112.8	57.3	54.4			40.3	40.3
Actuated g/C Ratio	0.27		0.27	0.42	0.39	1.00	0.51	0.48			0.36	0.36
v/c Ratio	0.42		0.64	0.36	0.81	0.69	0.98	0.47			0.66	0.09
Control Delay	50.4		20.2	25.9	42.0	2.8	78.3	20.2			32.1	0.3
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	50.4		20.2	25.9	42.0	2.8	78.3	20.2			32.1	0.3
LOS	D		C	C	D	A	E	C			C	A
Approach Delay		23.8			19.0		33.5				30.8	
Approach LOS		C			B		C				C	
Intersection Summary												
Area Type: Other												
Cycle Length: 127.1												
Actuated Cycle Length: 112.8												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.98												
Intersection Signal Delay: 26.0												
Intersection LOS: C												
Intersection Capacity Utilization 89.8%												
ICU Level of Service E												
Analysis Period (min) 15												
Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp												
Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø13
14 s	37.2 s	14 s	61.9 s									
37.2 s		61.9 s										

Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - PM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	48	356	251	596	960	229	771	1195	53
v/c Ratio	0.42	0.64	0.36	0.81	0.69	0.98	0.47	0.66	0.09
Control Delay	50.4	20.2	25.9	42.0	2.8	78.3	20.2	32.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	20.2	25.9	42.0	2.8	78.3	20.2	32.1	0.3
Queue Length 50th (m)	9.1	25.3	38.6	119.8	0.0	31.5	60.5	84.3	0.0
Queue Length 95th (m)	25.1	67.3	71.8	#215.3	0.0	#86.4	75.9	99.3	0.0
Internal Link Dist (m)			459.0				296.0	151.5	
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	115	554	688	737	1390	233	2114	2468	768
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.64	0.36	0.81	0.69	0.98	0.36	0.48	0.07

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Future Volume (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2	7.2	4.0	7.2	4.0	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95				0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00				1.00	1.00
Satd. Flow (prot)	1621	1458	1637	1881	1390	1637	3438				5036	1458
Flt Permitted	0.25	1.00	0.95	1.00	1.00	0.12	1.00				1.00	1.00
Satd. Flow (perm)	434	1458	1637	1881	1390	209	3438				5036	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	0	356	251	596	960	229	771	0	0	1195	53
RTOR Reduction (vph)	0	0	165	0	0	0	0	0	0	0	0	34
Lane Group Flow (vph)	48	0	191	251	596	960	229	771	0	0	1195	19
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Turn Type	Perm	Perm	pm+pt	NA	Free	pm+pt	NA				NA	Perm
Protected Phases			1	6		3	8				4	
Permitted Phases	2		2	6	Free	8						4
Actuated Green, G (s)	30.2		30.2	44.2	44.2	112.7	54.4	54.4			40.4	40.4
Effective Green, g (s)	30.2		30.2	44.2	44.2	112.7	54.4	54.4			40.4	40.4
Actuated g/C Ratio	0.27		0.27	0.39	0.39	1.00	0.48	0.48			0.36	0.36
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	116		390	642	737	1390	227	1659			1805	522
v/s Ratio Prot				0.03	c0.32		c0.09	0.22				0.24
v/s Ratio Perm	0.11		0.13	0.12		c0.69	c0.40					0.01
v/c Ratio	0.41		0.49	0.39	0.81	0.69	1.01	0.46			0.66	0.04
Uniform Delay, d1	34.0		34.8	24.6	30.5	0.0	24.0	19.4			30.4	23.5
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.5		4.4	0.8	9.3	2.8	62.0	0.4			1.2	0.1
Delay (s)	44.5		39.1	25.4	39.8	2.8	86.0	19.9			31.6	23.6
Level of Service	D		D	C	D	A	F	B			C	C
Approach Delay (s)		39.8			18.2			35.0			31.3	
Approach LOS		D			B			D			C	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	112.7	Sum of lost time (s)	22.1
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2028 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	11	478	851	97	52	12
Future Volume (vph)	11	478	851	97	52	12
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.986		0.975	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1601	1597	0	1654	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1601	1597	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	1%	0%	0%
Adj. Flow (vph)	11	478	851	97	52	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	489	948	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 68.9%	ICU Level of Service C					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2028 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	11	478	851	97	52	12
Future Volume (Veh/h)	11	478	851	97	52	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	478	851	97	52	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	948				1400	900
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	948				1400	900
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				66	96
cM capacity (veh/h)	732				154	340
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	489	948	64			
Volume Left	11	0	52			
Volume Right	0	97	12			
cSH	732	1700	172			
Volume to Capacity	0.02	0.56	0.37			
Queue Length 95th (m)	0.4	0.0	12.8			
Control Delay (s)	0.4	0.0	37.9			
Lane LOS	A		E			
Approach Delay (s)	0.4	0.0	37.9			
Approach LOS			E			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization 68.9%			ICU Level of Service		C	
Analysis Period (min)			15			

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Background - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	105	225	472	296	162	91
Future Volume (vph)	105	225	472	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.951	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1670	1845	1618	1389	1595	0
Flt Permitted	0.251				0.969	
Satd. Flow (perm)	441	1845	1618	1389	1595	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				181	30	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Adj. Flow (vph)	105	225	472	296	162	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	225	472	296	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Background - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	39.4	36.8	26.8	26.8	26.0	
Actuated g/C Ratio	0.52	0.49	0.35	0.35	0.34	
v/c Ratio	0.28	0.25	0.83	0.49	0.45	
Control Delay	9.9	10.8	35.6	10.4	23.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.9	10.8	35.6	10.4	23.9	
LOS	A	B	D	B	C	
Approach Delay		10.5	25.9		23.9	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 75.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 21.8

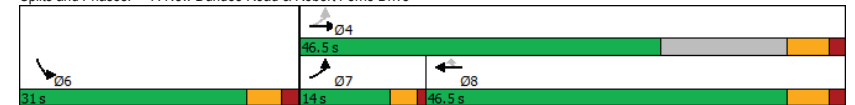
Intersection LOS: C

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2028 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	105	225	472	296	253
v/c Ratio	0.28	0.25	0.83	0.49	0.45
Control Delay	9.9	10.8	35.6	10.4	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	10.8	35.6	10.4	23.9
Queue Length 50th (m)	7.2	18.0	67.2	12.6	27.9
Queue Length 95th (m)	13.8	29.4	103.3	32.5	60.2
Internal Link Dist (m)	2815.6		776.9		201.4
Turn Bay Length (m)	30.0				25.0
Base Capacity (vph)	397	1351	888	843	566
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.17	0.53	0.35	0.45
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2028 Background - PM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	225	472	296	162	91
Future Volume (vph)	105	225	472	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1670	1845	1618	1389	1595	
Flt Permitted	0.25	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	442	1845	1618	1389	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	225	472	296	162	91
RTOR Reduction (vph)	0	0	0	117	20	0
Lane Group Flow (vph)	105	225	472	179	233	0
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	37.8	37.8	26.8	26.8	26.0	
Effective Green, g (s)	37.8	37.8	26.8	26.8	26.0	
Actuated g/C Ratio	0.50	0.50	0.35	0.35	0.34	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	331	914	568	487	543	
v/s Ratio Prot	c0.03	0.12	c0.29		c0.15	
v/s Ratio Perm	0.13			0.13		
v/c Ratio	0.32	0.25	0.83	0.37	0.43	
Uniform Delay, d1	12.1	11.1	22.7	18.4	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.1	10.0	0.5	2.5	
Delay (s)	12.6	11.2	32.7	18.9	21.9	
Level of Service	B	B	C	B	C	
Approach Delay (s)		11.7	27.4		21.9	
Approach LOS		B	C		C	
Intersection Summary						
HCM 2000 Control Delay	22.5			HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio	0.60					
Actuated Cycle Length (s)	76.3			Sum of lost time (s)		16.5
Intersection Capacity Utilization	64.2%			ICU Level of Service		C
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	26	338	89	20	387	18	68	75	19	4	34	19
Future Volume (vph)	26	338	89	20	387	18	68	75	19	4	34	19
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.994			0.984			0.955	
Flt Protected		0.997			0.998			0.979			0.997	
Satd. Flow (prot)	0	1487	0	0	1490	0	0	1475	0	0	1450	0
Flt Permitted		0.997			0.998			0.979			0.997	
Satd. Flow (perm)	0	1487	0	0	1490	0	0	1475	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	2%	10%	3%	0%	3%	0%	0%	0%	3%	0%
Adj. Flow (vph)	26	338	89	20	387	18	68	75	19	4	34	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	0	0	425	0	0	162	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	64.1%											
ICU Level of Service	C											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2028 Background - PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	338	89	20	387	18	68	75	19	4	34	19
Future Volume (Veh/h)	26	338	89	20	387	18	68	75	19	4	34	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	338	89	20	387	18	68	75	19	4	34	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	405			427			906	880	382	927	915	396
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	405			427			906	880	382	927	915	396
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			69	73	97	98	87	97
cM capacity (veh/h)	1165			1091			217	277	669	187	261	658
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	453	425	162	57								
Volume Left	26	20	68	4								
Volume Right	89	18	19	19								
cSH	1165	1091	264	315								
Volume to Capacity	0.02	0.02	0.61	0.18								
Queue Length 95th (m)	0.5	0.4	29.5	5.2								
Control Delay (s)	0.7	0.6	38.1	18.9								
Lane LOS	A	A	E	C								
Approach Delay (s)	0.7	0.6	38.1	18.9								
Approach LOS			E	C								
Intersection Summary												
Average Delay			7.1									
Intersection Capacity Utilization			64.1%		ICU Level of Service				C			
Analysis Period (min)			15									

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2028 Background - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983				0.935	
Flt Protected	0.958			0.991		
Satd. Flow (prot)	1662	0	0	1603	1520	0
Flt Permitted	0.958			0.991		
Satd. Flow (perm)	1662	0	0	1603	1520	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%
Adj. Flow (vph)	215	30	50	226	312	291
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	276	603	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 81.1% ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2028 Background - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	30	50	226	312	291
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	245	276	603			
Volume Left (vph)	215	50	0			
Volume Right (vph)	30	0	291			
Hadj (s)	0.10	0.07	-0.26			
Departure Headway (s)	6.2	5.6	4.9			
Degree Utilization, x	0.42	0.43	0.82			
Capacity (veh/h)	546	602	725			
Control Delay (s)	13.6	12.8	25.9			
Approach Delay (s)	13.6	12.8	25.9			
Approach LOS	B	B	D			
Intersection Summary						
Delay		20.0				
Level of Service		C				
Intersection Capacity Utilization		81.1%		ICU Level of Service	D	
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2028 Background - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (vph)	7	269	14	2	208	13
Future Volume (vph)	7	269	14	2	208	13
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.983			
Flt Protected	0.999					0.955
Satd. Flow (prot)	1530	0	1622	0	0	1505
Flt Permitted	0.999					0.955
Satd. Flow (perm)	1530	0	1622	0	0	1505
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Confl. Peds. (#/hr)	49			7	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	7	269	14	2	208	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	16	0	0	221
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2028 Background - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (veh/h)	7	269	14	2	208	13
Future Volume (Veh/h)	7	269	14	2	208	13
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	269	14	2	208	13
Pedestrians	7		49			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	1		4			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500	22			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	22			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	74			87	
cM capacity (veh/h)	441	1055			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	16	221
Volume Left	7	0	208
Volume Right	269	2	0
cSH	1019	1700	1564
Volume to Capacity	0.27	0.01	0.13
Queue Length 95th (m)	8.8	0.0	3.7
Control Delay (s)	9.8	0.0	7.3
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	7.3
Approach LOS	A		

Intersection Summary

Average Delay	8.4		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	1.00	
Frt	0.976					0.850		0.995			0.980	
Flt Protected	0.950				0.990		0.950			0.950		
Satd. Flow (prot)	1653	1587	0	0	1621	1430	1686	1579	0	1621	1574	0
Flt Permitted	0.678				0.935		0.372			0.529		
Satd. Flow (perm)	1164	1587	0	0	1526	1380	656	1579	0	900	1574	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				101		4			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		184.2			333.0			586.7			311.9	
Travel Time (s)		13.3			24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	86	0	0	123	101	13	340	0	135	508	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

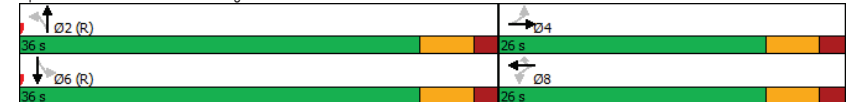
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.17			0.25	0.20	0.04	0.44		0.31	0.66	
Control Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.1			11.7			12.6			15.8	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	62											
Actuated Cycle Length:	62											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.66											
Intersection Signal Delay:	14.2											
Intersection Capacity Utilization	73.3%											
ICU Level of Service	D											
Analysis Period (min)	15											

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2028 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	86	123	101	13	340	135	508
v/c Ratio	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66
Control Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Length 50th (m)	5.3	6.1	10.7	0.0	0.8	24.7	9.2	41.6
Queue Length 95th (m)	13.4	15.0	22.3	8.9	3.3	43.8	20.4	72.9
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	375	521	492	513	317	766	435	770
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	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2028 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1632	1587			1616	1380	1675	1579		1616	1573	
Flt Permitted	0.68	1.00			0.93	1.00	0.37	1.00		0.53	1.00	
Satd. Flow (perm)	1164	1587			1526	1380	656	1579		901	1573	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
RTOR Reduction (vph)	0	9	0	0	0	68	0	2	0	0	9	0
Lane Group Flow (vph)	63	77	0	0	123	33	13	338	0	135	499	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	4			8		8		2		6		
Permitted Phases	4			8		8		2		6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	375	511			492	445	317	764		435	761	
v/s Ratio Prot		0.05						0.21			c0.32	
v/s Ratio Perm	0.05				c0.08	0.02	0.02			0.15		
v/c Ratio	0.17	0.15			0.25	0.07	0.04	0.44		0.31	0.66	
Uniform Delay, d1	15.0	14.9			15.5	14.6	8.4	10.5		9.7	12.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6			1.2	0.3	0.2	1.9		1.9	4.4	
Delay (s)	16.0	15.6			16.7	14.9	8.7	12.4		11.6	16.5	
Level of Service	B	B			B	B	A	B		B	B	
Approach Delay (s)		15.8			15.9			12.2			15.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:53:31 PM

Summary of intersection performance

AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	
A1 - FB 2028						
Leg North	0.08	~1	2.45	0.06	A	2.72
Leg West	0.63	1.06	2.84	0.37	A	
Leg South	0.16	~1	2.69	0.13	A	
Leg East	0.24	~1	2.56	0.17	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:53:30 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2028, AM	FB 2028	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				2.72	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	113.00	100.000
West	ONE HOUR	✓	726.00	100.000
South	ONE HOUR	✓	195.00	100.000
East	ONE HOUR	✓	303.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	67.000	18.000	28.000
	West	200.000	0.000	29.000	497.000
	South	55.000	49.000	0.000	91.000
	East	66.000	213.000	24.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.59	0.16	0.25
	West	0.28	0.00	0.04	0.68
	South	0.28	0.25	0.00	0.47
	East				

East	0.22	0.70	0.08	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.190	1.350	1.370
	West	1.050	1.000	1.210	1.050
	South	1.150	1.040	1.000	1.000
	East	1.250	1.130	1.090	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	19.0	35.0	37.0
	West	5.0	0.0	21.0	5.0
	South	15.0	4.0	0.0	0.0
	East	25.0	13.0	9.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.06	2.45	0.08	~1	A	103.69	155.54	6.17	2.38	0.07	6.17	2.38
West	0.37	2.84	0.63	1.06	A	666.19	999.29	43.28	2.60	0.48	43.29	2.60
South	0.13	2.69	0.16	~1	A	178.94	268.40	11.14	2.49	0.12	11.14	2.49
East	0.17	2.56	0.24	~1	A	278.04	417.06	16.89	2.43	0.19	16.89	2.43

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	85.07	21.27	84.85	241.04	214.77	0.00	2037.44	1178.40	0.042	0.00	0.05	2.312	A
West	546.57	136.64	545.14	247.06	52.56	0.00	2154.71	1757.21	0.254	0.00	0.36	2.358	A
South	146.81	36.70	146.43	53.31	544.39	0.00	1799.14	761.98	0.082	0.00	0.09	2.284	A
East	228.11	57.03	227.53	462.55	228.27	0.00	2027.68	1548.94	0.113	0.00	0.15	2.301	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	101.58	25.40	101.54	288.40	256.97	0.00	2006.93	1178.40	0.051	0.05	0.07	2.369	A
West	652.66	163.16	652.25	295.61	62.90	0.00	2147.24	1757.21	0.304	0.36	0.46	2.542	A
South	175.30	43.83	175.20	63.79	651.36	0.00	1721.81	761.98	0.102	0.09	0.12	2.440	A
East	272.39	68.10	272.25	553.43	273.12	0.00	1995.26	1548.94	0.137	0.15	0.18	2.404	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
--	-------	--------------	-------	-----------	-------------	------------	----------	------------	-----	-------	-----	-------	--

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	124.42	31.10	124.34	353.15	314.68	0.00	1965.21	1178.40	0.063	0.07	0.08	2.452	A
West	799.34	199.84	798.67	362.00	77.02	0.00	2137.03	1757.21	0.374	0.46	0.63	2.837	A
South	214.70	53.67	214.53	78.12	797.58	0.00	1616.10	761.98	0.133	0.12	0.16	2.693	A
East	333.61	83.40	333.39	677.67	334.44	0.00	1950.93	1548.94	0.171	0.18	0.24	2.560	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	124.42	31.10	124.41	353.43	314.89	0.00	1965.06	1178.40	0.063	0.08	0.08	2.453	A
West	799.34	199.84	799.33	362.23	77.07	0.00	2136.99	1757.21	0.374	0.63	0.63	2.840	A
South	214.70	53.67	214.70	78.17	798.23	0.00	1615.63	761.98	0.133	0.16	0.16	2.694	A
East	333.61	83.40	333.61	678.22	334.71	0.00	1950.73	1548.94	0.171	0.24	0.24	2.561	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	101.58	25.40	101.66	288.85	257.32	0.00	2006.68	1178.40	0.051	0.08	0.07	2.372	A
West	652.66	163.16	653.32	296.00	62.97	0.00	2147.18	1757.21	0.304	0.63	0.46	2.546	A
South	175.30	43.83	175.47	63.88	652.42	0.00	1721.05	761.98	0.102	0.16	0.12	2.442	A
East	272.39	68.10	272.61	554.32	273.56	0.00	1994.94	1548.94	0.137	0.24	0.18	2.405	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	85.07	21.27	85.12	241.84	215.45	0.00	2036.95	1178.40	0.042	0.07	0.05	2.313	A
West	546.57	136.64	546.98	247.85	52.73	0.00	2154.59	1757.21	0.254	0.46	0.36	2.363	A
South	146.81	36.70	146.91	53.49	546.22	0.00	1797.82	761.98	0.082	0.12	0.09	2.288	A
East	228.11	57.03	228.26	464.10	229.04	0.00	2027.13	1548.94	0.113	0.18	0.15	2.304	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.81	0.05	2.312	A	A
West	5.28	0.35	2.358	A	A
South	1.38	0.09	2.284	A	A
East	2.15	0.14	2.301	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.99	0.07	2.369	A	A
West	6.80	0.45	2.542	A	A
South	1.76	0.12	2.440	A	A
East	2.69	0.18	2.404	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.26	0.08	2.452	A	A
West	9.27	0.62	2.837	A	A
South	2.37	0.16	2.693	A	A
East	3.51	0.23	2.560	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	1.27	0.08	2.453	A	A
West	9.43	0.63	2.840	A	A
South	2.40	0.16	2.694	A	A
East	3.55	0.24	2.561	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.02	0.07	2.372	A	A
West	7.04	0.47	2.546	A	A
South	1.81	0.12	2.442	A	A
East	2.77	0.18	2.405	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.83	0.06	2.313	A	A
West	5.47	0.36	2.363	A	A
South	1.42	0.09	2.288	A	A
East	2.22	0.15	2.304	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.63	0.00	0.00	0.00	1.06			N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821.26/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:52:48 PM

Summary of intersection performance

PM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2028							
Leg North	0.30	~1	3.07	0.23	A	2.89	A
Leg West	0.47	1.02	2.65	0.32	A		
Leg South	0.13	~1	2.35	0.12	A		
Leg East	0.73	1.03	3.14	0.42	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:52:48 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2028, PM	FB 2028	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				2.89	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	324.00	100.000
West	ONE HOUR	✓	584.00	100.000
South	ONE HOUR	✓	184.00	100.000
East	ONE HOUR	✓	760.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	218.000	68.000	38.000
	West	119.000	0.000	55.000	410.000
	South	57.000	46.000	0.000	81.000
	East	26.000	640.000	94.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.00	0.67	0.21	0.12
	West	0.20	0.00	0.09	0.70
	South	0.31	0.25	0.00	0.44
	East				

	East	0.03	0.84	0.12	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	1.000	1.020	1.020	1.190
	West	1.040	1.000	1.000	1.020
	South	1.000	1.020	1.000	1.000
	East	1.520	1.020	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.0	2.0	2.0	19.0
	West	4.0	0.0	0.0	2.0
	South	0.0	2.0	0.0	0.0
	East	52.0	2.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.23	3.07	0.30	~1	A	297.31	445.96	20.51	2.76	0.23	20.51	2.76
West	0.32	2.65	0.47	1.02	A	535.89	803.83	32.69	2.44	0.36	32.69	2.44
South	0.12	2.35	0.13	~1	A	168.84	253.26	9.33	2.21	0.10	9.33	2.21
East	0.42	3.14	0.73	1.03	A	897.39	1046.08	48.83	2.80	0.54	48.83	2.80

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	243.92	60.98	243.26	151.70	585.63	0.00	1769.33	943.08	0.138	0.00	0.17	2.445	A
West	439.67	109.92	438.58	678.74	150.16	0.00	2084.15	1830.77	0.211	0.00	0.27	2.235	A
South	138.52	34.63	138.21	162.93	425.80	0.00	1884.88	913.84	0.073	0.00	0.08	2.071	A
East	572.17	143.04	570.60	397.28	166.73	0.00	2072.17	1553.19	0.276	0.00	0.39	2.465	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	291.27	72.82	291.07	181.49	700.71	0.00	1686.13	943.08	0.173	0.17	0.22	2.676	A
West	525.00	131.25	524.70	812.11	179.67	0.00	2062.82	1830.77	0.255	0.27	0.35	2.392	A
South	165.41	41.35	165.33	194.95	509.42	0.00	1824.42	913.84	0.091	0.08	0.10	2.180	A
East	683.22	170.81	682.74	475.29	199.47	0.00	2048.51	1553.19	0.334	0.39	0.51	2.712	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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file:///C:/Users/AdamMorrison/OneDrive%20-%20Paradigm/Desktop/Projects/230376%... 2023-12-13

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	356.73	89.18	356.38	222.24	857.94	0.00	1572.46	943.08	0.227	0.22	0.30	3.071	A
West	643.00	160.75	642.50	994.34	219.98	0.00	2033.67	1830.77	0.316	0.35	0.47	2.645	A
South	202.59	50.65	202.46	238.70	623.79	0.00	1741.74	913.84	0.116	0.10	0.13	2.350	A
East	836.78	209.19	835.92	582.00	244.25	0.00	2016.13	1553.19	0.415	0.51	0.73	3.137	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	356.73	89.18	356.73	222.40	858.79	0.00	1571.85	943.08	0.227	0.30	0.30	3.072	A
West	643.00	160.75	642.99	995.31	220.20	0.00	2033.52	1830.77	0.316	0.47	0.47	2.645	A
South	202.59	50.65	202.59	238.92	624.27	0.00	1741.39	913.84	0.116	0.13	0.13	2.350	A
East	836.78	209.19	836.77	582.44	244.43	0.00	2016.00	1553.19	0.415	0.73	0.73	3.140	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	291.27	72.82	291.61	181.76	702.05	0.00	1685.16	943.08	0.173	0.30	0.22	2.682	A
West	525.00	131.25	525.49	813.65	180.01	0.00	2062.57	1830.77	0.255	0.47	0.35	2.396	A
South	165.41	41.35	165.54	195.30	510.20	0.00	1823.86	913.84	0.091	0.13	0.10	2.183	A
East	683.22	170.81	684.07	476.00	199.74	0.00	2048.31	1553.19	0.334	0.73	0.52	2.718	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	243.92	60.98	244.13	152.18	587.72	0.00	1767.82	943.08	0.138	0.22	0.17	2.452	A
West	439.67	109.92	439.97	681.15	150.70	0.00	2083.76	1830.77	0.211	0.35	0.27	2.240	A
South	138.52	34.63	138.61	163.50	427.17	0.00	1883.89	913.84	0.074	0.10	0.08	2.072	A
East	572.17	143.04	572.66	398.53	167.24	0.00	2071.60	1553.19	0.276	0.52	0.39	2.471	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.44	0.16	2.445	A	A
West	4.03	0.27	2.235	A	A
South	1.18	0.08	2.071	A	A
East	5.77	0.38	2.465	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.20	0.21	2.676	A	A
West	5.16	0.34	2.392	A	A
South	1.49	0.10	2.180	A	A
East	7.59	0.51	2.712	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.48	0.30	3.071	A	A
West	6.96	0.46	2.645	A	A
South	1.96	0.13	2.350	A	A
East	10.70	0.71	3.137	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
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North	4.55	0.30	3.072	A	A
West	7.07	0.47	2.645	A	A
South	1.98	0.13	2.350	A	A
East	10.91	0.73	3.140	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.31	0.22	2.682	A	A
West	5.32	0.35	2.396	A	A
South	1.52	0.10	2.183	A	A
East	7.88	0.53	2.718	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.53	0.17	2.452	A	A
West	4.16	0.28	2.240	A	A
South	1.21	0.08	2.072	A	A
East	5.99	0.40	2.471	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.47	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.73	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.47	0.00	0.00	0.00	1.02			N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.73	0.00	0.00	0.00	1.03			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Appendix E

2033 Background Traffic Operations Reports



Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

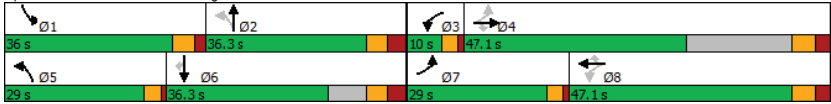
2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
Future Volume (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.96	1.00		0.98	0.99			0.98		0.98
Frt			0.850			0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	3374	1390	1561	3438	1390	1653	3254	0	2895	1759	1417
Flt Permitted	0.086			0.241			0.610			0.950		
Satd. Flow (perm)	140	3374	1337	395	3438	1361	1055	3254	0	2836	1759	1389
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194			450		3				129
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		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 (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Adj. Flow (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	300	1046	241	14	1118	568	366	348	0	309	144	129
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.2	65.1	65.1	49.0	40.0	40.0	57.3	30.1		22.0	30.2	30.2
Actuated g/C Ratio	0.51	0.46	0.46	0.35	0.28	0.28	0.40	0.21		0.16	0.21	0.21
v/c Ratio	0.94	0.67	0.34	0.08	1.15	0.80	0.69	0.50		0.69	0.38	0.32
Control Delay	78.1	33.9	7.7	21.1	124.9	20.0	37.9	52.3		64.6	51.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	78.1	33.9	7.7	21.1	124.9	20.0	37.9	52.3		64.6	51.3	9.4
LOS	E	C	A	C	F	B	D	D		E	D	A
Approach Delay		38.3			89.0		44.9				49.1	
Approach LOS		D			F		D				D	
Intersection Summary												
Area Type: Other												
Cycle Length: 148.4												
Actuated Cycle Length: 141.6												
Natural Cycle: 125												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.15												
Intersection Signal Delay: 59.5						Intersection LOS: E						
Intersection Capacity Utilization 113.8%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												
												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	300	1046	241	14	1118	568	366	348	309	144	129
v/c Ratio	0.94	0.67	0.34	0.08	1.15	0.80	0.69	0.50	0.69	0.38	0.32
Control Delay	78.1	33.9	7.7	21.1	124.9	20.0	37.9	52.3	64.6	51.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	33.9	7.7	21.1	124.9	20.0	37.9	52.3	64.6	51.3	9.4
Queue Length 50th (m)	73.2	117.7	7.2	2.0	~203.1	32.7	77.4	47.6	44.9	37.1	0.0
Queue Length 95th (m)	#139.6	172.5	29.6	6.4	#260.6	94.3	108.2	67.5	60.9	58.9	17.7
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	320	1551	719	186	971	707	536	693	613	447	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.67	0.34	0.08	1.15	0.80	0.68	0.50	0.50	0.32	0.29

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
Future Volume (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3	6.0	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1547	3374	1338	1560	3438	1362	1647	3253	2895	1759	1389	1389
Flt Permitted	0.09	1.00	1.00	0.24	1.00	1.00	0.61	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	140	3374	1338	396	3438	1362	1058	3253	2895	1759	1389	1389
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	1046	241	14	1118	568	366	333	15	309	144	129
RTOR Reduction (vph)	0	0	106	0	0	317	0	2	0	0	0	102
Lane Group Flow (vph)	300	1046	135	14	1118	251	366	346	0	309	144	27
Confl. Peds. (#/hr)	8	10	10	8	5	13	13	5	13	13	5	5
Heavy Vehicles (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.0	30.1	22.0	30.2	30.2	30.2
Effective Green, g (s)	71.5	65.1	65.1	44.9	42.5	42.5	54.0	30.1	22.0	30.2	30.2	30.2
Actuated g/C Ratio	0.50	0.45	0.45	0.31	0.30	0.30	0.38	0.21	0.15	0.21	0.21	0.21
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3	6.0	7.3	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.0	3.0
Lane Grp Cap (vph)	313	1525	604	142	1014	401	494	679	442	368	291	291
v/s Ratio Prot	c0.17	0.31		0.00	c0.33		c0.12	0.11	0.11	0.08		
v/s Ratio Perm	0.31		0.10	0.03		0.18	c0.15				0.02	
v/c Ratio	0.96	0.69	0.22	0.10	1.10	0.63	0.74	0.51	0.70	0.39	0.09	0.09
Uniform Delay, d1	45.8	31.3	24.0	34.5	50.8	43.9	36.4	50.4	57.9	49.0	45.9	45.9
Progression 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
Incremental Delay, d2	39.3	1.3	0.2	0.3	60.7	3.0	5.9	2.7	6.0	3.1	0.6	0.6
Delay (s)	85.2	32.6	24.2	34.8	111.4	46.9	42.3	53.1	63.9	52.1	46.5	46.5
Level of Service	F	C	C	C	F	D	D	D	E	D	D	D
Approach Delay (s)		41.3			89.2			47.6		57.1		
Approach LOS		D			F			D		E		

Intersection Summary

HCM 2000 Control Delay	62.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	144.0	Sum of lost time (s)	24.4
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	←	→	↶	↷	←	↶	↷	↶	↷	↶	↷	↶	↷
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↶	↷		↶	↷	↶	↷		↶	↷	↶	↷
Traffic Volume (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81	
Future Volume (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81	
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0	
Storage Lanes	0		1	0		0	1		0	1		0	
Taper Length (m)	7.5			7.5			70.0			55.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	
Ped Bike Factor		1.00	0.99		0.99		1.00				1.00		
Frt			0.850		0.865						0.992		
Flt Protected		0.950					0.950						
Satd. Flow (prot)	0	1537	1444	0	1323	0	1637	3094	0	1775	3070	0	
Flt Permitted		0.757					0.950						
Satd. Flow (perm)	0	1223	1425	0	1323	0	1633	3094	0	1775	3070	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			213		80						6		
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		319.9			88.4			562.4			2462.2		
Travel Time (s)		23.0			6.4			40.5			177.3		
Confl. Peds. (#/hr)	1		1	1		1	7					7	
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 (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%	
Adj. Flow (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	238	213	0	2	0	76	1637	0	0	1523	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	←	→	↶	↷	←	↶	↷	↶	↷	↶	↷	↶	↷
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	Perm	NA	Perm		NA		Prot	NA		Perm	NA		
Protected Phases		2			6		3	8			4		
Permitted Phases	2		2	6						4			
Detector Phase	2	2	2	6	6		3	8		4	4		
Switch Phase													
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0		
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6		
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6		
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%		
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2		
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4		
Lost Time Adjust (s)	0.0	0.0		0.0			0.0	0.0		0.0	0.0		
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6		
Lead/Lag							Lead			Lag	Lag		
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0		
Recall Mode	None	None	None	None	None		None	Max		Max	Max		
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0		
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0		
Act Effct Green (s)		23.2			23.2			11.4		58.6		46.2	
Actuated g/C Ratio		0.24			0.24			0.12		0.62		0.49	
v/c Ratio		0.80			0.42			0.39		0.86		1.02	
Control Delay		53.8			6.7			48.8		21.8		55.4	
Queue Delay		0.0			0.0			0.0		0.0		0.0	
Total Delay		53.8			6.7			48.8		21.8		55.4	
LOS		D			A			D		C		E	
Approach Delay		31.5						23.0				55.4	
Approach LOS		C						C				E	
Intersection Summary													
Area Type:		Other											
Cycle Length: 117.6													
Actuated Cycle Length: 94.8													
Natural Cycle: 100													
Control Type: Semi Act-Uncoord													
Maximum v/c Ratio: 1.02													
Intersection Signal Delay: 37.4								Intersection LOS: D					
Intersection Capacity Utilization 100.0%								ICU Level of Service F					
Analysis Period (min) 15													

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road East Park AM Peak Hour

	→	↘	←	↙	↑	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	238	213	2	76	1637	1523
v/c Ratio	0.80	0.42	0.01	0.39	0.86	1.02
Control Delay	53.8	6.7	0.0	48.8	21.8	55.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.7	0.0	48.8	21.8	55.4
Queue Length 50th (m)	43.8	0.0	0.0	14.2	123.2	~173.7
Queue Length 95th (m)	75.9	17.2	0.0	31.4	#222.1	#275.4
Internal Link Dist (m)	295.9		64.4		538.4	2438.2
Turn Bay Length (m)				110.0		
Base Capacity (vph)	463	672	550	354	2343	1498
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	0.51	0.32	0.00	0.21	0.70	1.02

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road East Park AM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81
Future Volume (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		5.0	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.86		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (prot)		1535	1425		1323		1637	3094		1637	3071	
Flt Permitted		0.76	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (perm)		1222	1425		1323		1637	3094		1637	3071	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	0	213	0	0	2	76	1635	2	0	1442	81
RTOR Reduction (vph)	0	0	161	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	238	52	0	0	0	76	1637	0	0	1520	0
Confl. Peds. (#/hr)	1		1	1		1	7			7		
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Effective Green, g (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.09	0.63			0.48	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6			6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0			5.0	
Lane Grp Cap (vph)		296	345		320		148	1936			1482	
v/s Ratio Prot					0.00		0.05	c0.53			c0.49	
v/s Ratio Perm		c0.19	0.04									
v/c Ratio		0.80	0.15		0.00		0.51	0.85			1.03	
Uniform Delay, d1		34.1	28.5		27.5		41.5	14.2			24.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		14.6	0.2		0.0		3.0	4.8			30.1	
Delay (s)		48.7	28.7		27.5		44.5	19.0			54.9	
Level of Service		D	C		C		D	B			D	
Approach Delay (s)		39.2			27.5			20.1			54.9	
Approach LOS		D			C			C			D	

Intersection Summary

HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	17.6
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

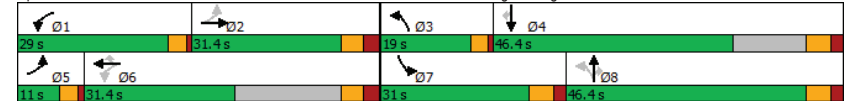
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
Future Volume (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99			0.98		0.98	1.00		0.99
Frt	0.901						0.850			0.850		0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1576	2300	0	1492	1743	1219	1429	4848	1417	2749	3312	1229
Flt Permitted	0.627			0.696			0.088			0.950		
Satd. Flow (perm)	1033	2300	0	1084	1743	1196	132	4848	1393	2747	3312	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		59				138			169			122
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		181.6			324.8		266.0			278.1		
Travel Time (s)		13.1			23.4		19.2			20.0		
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
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 (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Adj. Flow (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	89	0	86	25	84	213	1498	204	86	1564	27
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2		7.2		
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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		

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	15.1	7.3		15.5	7.8	7.8	60.8	46.8	46.8	10.1	40.2	40.2
Actuated g/C Ratio	0.17	0.08		0.18	0.09	0.09	0.69	0.53	0.53	0.11	0.45	0.45
v/c Ratio	0.63	0.37		0.39	0.16	0.36	0.68	0.58	0.25	0.27	1.04	0.04
Control Delay	44.1	22.1		33.5	40.2	6.0	32.0	17.8	4.7	40.2	60.6	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	22.1		33.5	40.2	6.0	32.0	17.8	4.7	40.2	60.6	0.1
LOS	D	C		C	D	A	C	B	A	D	E	A
Approach Delay		35.5			22.5			18.0			58.6	
Approach LOS		D			C			B			E	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 88.5												
Natural Cycle: 140												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.04												
Intersection Signal Delay: 36.2					Intersection LOS: D							
Intersection Capacity Utilization 87.9%					ICU Level of Service E							
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	139	89	86	25	84	213	1498	204	86	1564	27
v/c Ratio	0.63	0.37	0.39	0.16	0.36	0.68	0.58	0.25	0.27	1.04	0.04
Control Delay	44.1	22.1	33.5	40.2	6.0	32.0	17.8	4.7	40.2	60.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	22.1	33.5	40.2	6.0	32.0	17.8	4.7	40.2	60.6	0.1
Queue Length 50th (m)	21.5	2.7	12.9	4.3	0.0	22.5	71.5	3.2	7.4	~164.8	0.0
Queue Length 95th (m)	38.3	10.5	25.6	12.1	3.6	#60.8	99.5	16.7	15.5	#229.2	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	221	694	425	851	654	311	2563	816	780	1955	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.13	0.20	0.03	0.13	0.68	0.58	0.25	0.11	0.80	0.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
Future Volume (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	2304		1486	1743	1199	1429	4848	1395	2749	3312	1213
Flt Permitted	0.63	1.00		0.70	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1037	2304		1090	1743	1199	132	4848	1395	2749	3312	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	139	30	59	86	25	84	213	1498	204	86	1564	27
RTOR Reduction (vph)	0	54	0	0	0	78	0	0	82	0	0	15
Lane Group Flow (vph)	139	35	0	86	25	6	213	1498	122	86	1564	12
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
Heavy Vehicles (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	15.0	7.8		12.6	6.6	6.6	60.6	46.8	46.8	7.8	41.5	41.5
Effective Green, g (s)	15.0	7.8		12.6	6.6	6.6	60.6	46.8	46.8	7.8	41.5	41.5
Actuated g/C Ratio	0.16	0.09		0.14	0.07	0.07	0.66	0.51	0.51	0.09	0.46	0.46
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	212	197		176	126	86	302	2487	715	235	1507	551
v/s Ratio Prot	c0.05	0.02		0.03	0.01		c0.12	0.31		0.03	c0.47	
v/s Ratio Perm	c0.06			0.04		0.01	0.35		0.09			0.01
v/c Ratio	0.66	0.18		0.49	0.20	0.07	0.71	0.60	0.17	0.37	1.04	0.02
Uniform Delay, d1	35.0	38.7		36.0	39.8	39.4	23.5	15.6	11.8	39.4	24.9	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.4		0.8	0.8	0.3	7.3	1.1	0.5	1.0	33.6	0.1
Delay (s)	42.1	39.2		36.7	40.6	39.8	30.8	16.7	12.4	40.3	58.5	13.8
Level of Service	D	D		D	D	D	C	B	B	D	E	B
Approach Delay (s)		40.9			38.5			17.8			56.8	
Approach LOS		D			D			B			E	

Intersection Summary

HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	22.8
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Future Volume (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0			0.0	180.0		0.0	0.0	65.0
Storage Lanes	1		1	1			1	1		0	0	1
Taper Length (m)	25.0			7.5				100.0			7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1591	0	1458	1441	1776	1365	1561	3406	0	0	4803	1261
Flt Permitted	0.614			0.950			0.095					
Satd. Flow (perm)	1028	0	1458	1441	1776	1365	156	3406	0	0	4803	1261
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			216			399						105
Link Speed (k/h)		50			50			50				50
Link Distance (m)		1202.5			483.0			320.0				175.5
Travel Time (s)		86.6			34.8			23.0				12.6
Confl. Peds. (#/hr)								2		2		
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 (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Adj. Flow (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

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Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.5		30.5	48.0	44.7	116.9	60.8	57.9			47.3	47.3
Actuated g/C Ratio	0.26		0.26	0.41	0.38	1.00	0.52	0.50			0.40	0.40
v/c Ratio	0.22		1.12	0.42	0.34	0.68	0.42	0.55			0.71	0.05
Control Delay	41.2		102.7	30.4	30.3	2.8	19.8	21.1			31.4	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	41.2		102.7	30.4	30.3	2.8	19.8	21.1			31.4	0.2
LOS	D		F	C	C	A	B	C			C	A
Approach Delay		97.1			12.2			21.0				30.7
Approach LOS		F			B			C				C

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 116.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 32.5

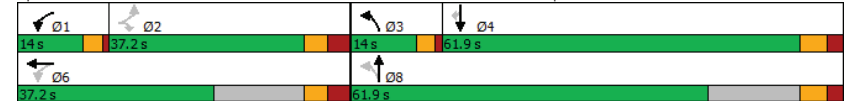
Intersection LOS: C

Intersection Capacity Utilization 97.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp



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Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - AM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	60	603	251	232	931	83	925	1385	31
v/c Ratio	0.22	1.12	0.42	0.34	0.68	0.42	0.55	0.71	0.05
Control Delay	41.2	102.7	30.4	30.3	2.8	19.8	21.1	31.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	102.7	30.4	30.3	2.8	19.8	21.1	31.4	0.2
Queue Length 50th (m)	12.3	~137.5	47.1	43.2	0.0	9.6	77.4	104.7	0.0
Queue Length 95th (m)	26.2	#218.9	76.3	69.2	0.0	17.8	95.3	122.0	0.0
Internal Link Dist (m)			459.0			296.0	151.5		
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	268	539	591	679	1365	203	2042	2296	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	1.12	0.42	0.34	0.68	0.41	0.45	0.60	0.05

Intersection Summary

~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	→	↰	↱	↱
Traffic Volume (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Future Volume (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1591		1458	1441	1776	1365	1561	3406			4803	1261
Flt Permitted	0.61		1.00	0.95	1.00	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)	1028		1458	1441	1776	1365	156	3406			4803	1261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	0	603	251	232	931	83	925	0	0	1385	31
RTOR Reduction (vph)	0	0	160	0	0	0	0	0	0	0	0	19
Lane Group Flow (vph)	60	0	443	251	232	931	83	925	0	0	1385	12
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.5		30.5	44.7	44.7	117.6	58.8	58.8			47.3	47.3
Effective Green, g (s)	30.5		30.5	44.7	44.7	117.6	58.8	58.8			47.3	47.3
Actuated g/C Ratio	0.26		0.26	0.38	0.38	1.00	0.50	0.50			0.40	0.40
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	266		378	547	675	1365	167	1703			1931	507
v/s Ratio Prot				0.04	0.13		0.03	0.27			0.29	
v/s Ratio Perm	0.06		c0.30	0.13		c0.68	0.22					0.01
v/c Ratio	0.23		1.17	0.46	0.34	0.68	0.50	0.54			0.72	0.02
Uniform Delay, d1	34.3		43.5	27.4	26.0	0.0	19.1	20.2			29.5	21.2
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0		102.0	1.3	1.4	2.8	4.8	0.6			1.6	0.0
Delay (s)	36.2		145.6	28.6	27.4	2.8	23.9	20.8			31.1	21.3
Level of Service	D		F	C	C	A	C	C			C	C
Approach Delay (s)		135.7			11.4			21.1			30.9	
Approach LOS		F			B			C			C	

Intersection Summary

HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	22.1
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2033 Background - AM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	652	255	19	64	8
Future Volume (vph)	4	652	255	19	64	8
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.985	
Flt Protected					0.957	
Satd. Flow (prot)	0	1615	1524	0	1664	0
Flt Permitted					0.957	
Satd. Flow (perm)	0	1615	1524	0	1664	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	2%	7%	11%	0%	0%
Adj. Flow (vph)	4	652	255	19	64	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	656	274	0	72	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2033 Background - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	4	652	255	19	64	8
Future Volume (Veh/h)	4	652	255	19	64	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	652	255	19	64	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	274				924	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274				924	264
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				79	99
cM capacity (veh/h)	1168				300	779
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	656	274	72			
Volume Left	4	0	64			
Volume Right	0	19	8			
cSH	1168	1700	322			
Volume to Capacity	0.00	0.16	0.22			
Queue Length 95th (m)	0.1	0.0	6.7			
Control Delay (s)	0.1	0.0	19.4			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	19.4			
Approach LOS			C			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization		54.2%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Background - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	64	382	210	96	331	131
Future Volume (vph)	64	382	210	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.962	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1637	1845	1528	1311	1613	0
Flt Permitted	0.492				0.965	
Satd. Flow (perm)	848	1845	1528	1311	1613	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				96	21	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Adj. Flow (vph)	64	382	210	96	331	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	382	210	96	462	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Background - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	23.9	21.3	14.7	14.7	25.5	
Actuated g/C Ratio	0.40	0.36	0.25	0.25	0.43	
v/c Ratio	0.15	0.58	0.56	0.24	0.66	
Control Delay	10.7	18.4	27.2	6.8	21.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.7	18.4	27.2	6.8	21.7	
LOS	B	B	C	A	C	
Approach Delay		17.3	20.8		21.7	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 59.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.9

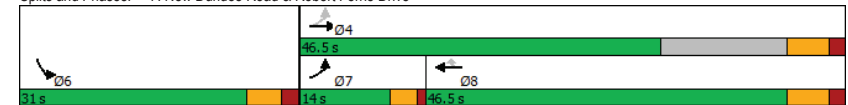
Intersection LOS: B

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2033 Background - AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	64	382	210	96	462
v/c Ratio	0.15	0.58	0.56	0.24	0.66
Control Delay	10.7	18.4	27.2	6.8	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	18.4	27.2	6.8	21.7
Queue Length 50th (m)	4.3	33.8	23.1	0.0	42.6
Queue Length 95th (m)	10.0	55.0	43.9	10.1	#102.3
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	474	1645	1046	928	702
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.20	0.10	0.66

Intersection Summary

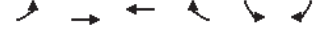
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2033 Background - AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	64	382	210	96	331	131
Future Volume (vph)	64	382	210	96	331	131
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1637	1845	1528	1311	1613	
Flt Permitted	0.49	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	849	1845	1528	1311	1613	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	382	210	96	331	131
RTOR Reduction (vph)	0	0	0	73	12	0
Lane Group Flow (vph)	64	382	210	23	450	0
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	23.1	23.1	14.7	14.7	25.5	
Effective Green, g (s)	23.1	23.1	14.7	14.7	25.5	
Actuated g/C Ratio	0.38	0.38	0.24	0.24	0.42	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	377	697	367	315	673	
v/s Ratio Prot	0.01	c0.21	0.14		c0.28	
v/s Ratio Perm	0.05			0.02		
v/c Ratio	0.17	0.55	0.57	0.07	0.67	
Uniform Delay, d1	12.4	14.9	20.4	17.9	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.9	2.2	0.1	5.2	
Delay (s)	12.7	15.8	22.6	18.0	19.6	
Level of Service	B	B	C	B	B	
Approach Delay (s)		15.3	21.2		19.6	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay		18.4		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.67				
Actuated Cycle Length (s)		61.1		Sum of lost time (s)	16.5	
Intersection Capacity Utilization		59.0%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2033 Background - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	342	82	13	231	10	45	23	24	12	41	12
Future Volume (vph)	11	342	82	13	231	10	45	23	24	12	41	12
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.995			0.965			0.975	
Flt Protected		0.999			0.997			0.976			0.991	
Satd. Flow (prot)	0	1418	0	0	1425	0	0	1332	0	0	1498	0
Flt Permitted		0.999			0.997			0.976			0.991	
Satd. Flow (perm)	0	1418	0	0	1425	0	0	1332	0	0	1498	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
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 (%)	18%	6%	7%	23%	7%	10%	0%	4%	33%	0%	0%	0%
Adj. Flow (vph)	11	342	82	13	231	10	45	23	24	12	41	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	435	0	0	254	0	0	92	0	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.3%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	11	342	82	13	231	10	45	23	24	12	41	12
Future Volume (Veh/h)	11	342	82	13	231	10	45	23	24	12	41	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	11	342	82	13	231	10	45	23	24	12	41	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	241			424			700	672	383	702	708	236
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	241			424			700	672	383	702	708	236
tC, single (s)	4.3			4.3			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99			86	94	96	96	88	99
cM capacity (veh/h)	1237			1031			315	367	601	319	354	808
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	435	254	92	65								
Volume Left	11	13	45	12								
Volume Right	82	10	24	12								
cSH	1237	1031	375	387								
Volume to Capacity	0.01	0.01	0.25	0.17								
Queue Length 95th (m)	0.2	0.3	7.6	4.8								
Control Delay (s)	0.3	0.6	17.7	16.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.6	17.7	16.2								
Approach LOS		C	C									
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization		52.3%										
Analysis Period (min)			15									
ICU Level of Service A												

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2033 Background - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973			0.932		
Flt Protected	0.962			0.994		
Satd. Flow (prot)	1613	0	0	1585	1458	0
Flt Permitted	0.962			0.994		
Satd. Flow (perm)	1613	0	0	1585	1458	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	4%	9%	2%
Adj. Flow (vph)	221	56	41	292	146	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	333	293	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.4% ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2033 Background - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	221	56	41	292	146	147
Future Volume (vph)	221	56	41	292	146	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	221	56	41	292	146	147
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	277	333	293			
Volume Left (vph)	221	41	0			
Volume Right (vph)	56	0	147			
Hadj (s)	0.08	0.08	-0.21			
Departure Headway (s)	5.6	5.2	5.0			
Degree Utilization, x	0.43	0.48	0.41			
Capacity (veh/h)	603	650	681			
Control Delay (s)	12.7	13.0	11.4			
Approach Delay (s)	12.7	13.0	11.4			
Approach LOS	B	B	B			
Intersection Summary						
Delay		12.4				
Level of Service		B				
Intersection Capacity Utilization		66.4%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2033 Background - AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	305	14	4	164	5
Future Volume (vph)	4	305	14	4	164	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867		0.970			
Flt Protected	0.999					0.954
Satd. Flow (prot)	1529	0	1442	0	0	1493
Flt Permitted	0.999					0.954
Satd. Flow (perm)	1529	0	1442	0	0	1493
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	7%	25%	5%	20%
Adj. Flow (vph)	4	305	14	4	164	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	309	0	18	0	0	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2033 Background - AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	305	14	4	164	5
Future Volume (Veh/h)	4	305	14	4	164	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	305	14	4	164	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349	16			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	16			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	71			90	
cM capacity (veh/h)	584	1069			1579	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	309	18	169			
Volume Left	4	0	164			
Volume Right	305	4	0			
cSH	1058	1700	1579			
Volume to Capacity	0.29	0.01	0.10			
Queue Length 95th (m)	9.8	0.0	2.8			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		44.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Background - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	0.99	
Frt	0.965					0.850		0.999			0.962	
Flt Protected	0.950				0.994		0.950			0.950		
Satd. Flow (prot)	1621	1498	0	0	1500	1365	1519	1616	0	1519	1454	0
Flt Permitted	0.728				0.974		0.560			0.486		
Satd. Flow (perm)	1224	1498	0	0	1467	1317	887	1616	0	775	1454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	23					74		1			38	
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	184.2				333.0			586.7			311.9	
Travel Time (s)	13.3				24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	98	0	0	44	74	44	385	0	56	309	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2			6		6
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

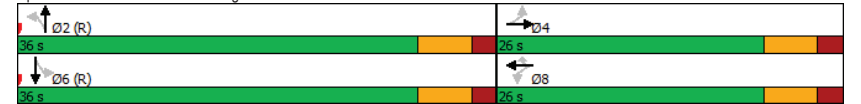
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Background - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.23	0.20			0.09	0.16	0.10	0.49		0.15	0.43	
Control Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.3	13.5			15.4	5.4	9.5	13.5		10.2	11.3	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.3			9.1			13.1			11.1	
Approach LOS		B			A			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	62											
Actuated Cycle Length:	62											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.49											
Intersection Signal Delay:	12.4											
Intersection Capacity Utilization	73.3%											
ICU Level of Service	D											
Analysis Period (min)	15											

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2033 Background - AM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	98	44	74	44	385	56	309
v/c Ratio	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43
Control Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	13.5	15.4	5.4	9.5	13.5	10.2	11.3
Queue Length 50th (m)	7.7	6.3	3.6	0.0	2.7	29.2	3.5	19.2
Queue Length 95th (m)	17.5	16.1	9.9	7.7	7.6	50.6	9.5	36.9
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	394	498	473	474	429	782	375	723
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	0.23	0.20	0.09	0.16	0.10	0.49	0.15	0.43

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2033 Background - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Future Volume (vph)	89	75	23	5	39	74	44	382	3	56	231	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1498			1498	1317	1504	1616		1515	1454	
Flt Permitted	0.73	1.00			0.97	1.00	0.56	1.00		0.49	1.00	
Satd. Flow (perm)	1225	1498			1466	1317	887	1616		774	1454	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	75	23	5	39	74	44	382	3	56	231	78
RTOR Reduction (vph)	0	16	0	0	0	50	0	1	0	0	20	0
Lane Group Flow (vph)	89	82	0	0	44	24	44	384	0	56	289	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	395	483			472	424	429	781		374	703	
v/s Ratio Prot		0.06						c0.24			0.20	
v/s Ratio Perm	c0.07				0.03	0.02	0.05			0.07		
v/c Ratio	0.23	0.17			0.09	0.06	0.10	0.49		0.15	0.41	
Uniform Delay, d1	15.3	15.1			14.7	14.5	8.7	10.8		8.9	10.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.8			0.4	0.3	0.5	2.2		0.8	1.8	
Delay (s)	16.7	15.8			15.1	14.7	9.2	13.1		9.7	12.1	
Level of Service	B	B			B	B	A	B		A	B	
Approach Delay (s)	16.2				14.9			12.7			11.7	
Approach LOS	B				B			B			B	

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:44:48 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2033							
Leg North	0.48	1.02	3.39	0.32	A	2.87	A
Leg West	0.37	~1	2.73	0.27	A		
Leg East	0.21	~1	2.29	0.17	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:44:47 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2033, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2033, AM	FB 2033	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				2.87	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	462.00	100.000
West	ONE HOUR	✓	446.00	100.000
East	ONE HOUR	✓	306.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.000	131.000	331.000
West	64.000	0.000	382.000
East	96.000	210.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.00	0.28	0.72
West	0.14	0.00	0.86
East	0.31	0.69	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	East

From	North	1.000	1.030	1.010
	West	1.030	1.000	1.030
	East	1.070	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.0	3.0	1.0
West	3.0	0.0	3.0
East	7.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.32	3.39	0.48	1.02	A	423.94	635.91	33.06	3.12	0.37	33.06	3.12
West	0.27	2.73	0.37	~1	A	409.26	613.89	25.96	2.54	0.29	25.96	2.54
East	0.17	2.29	0.21	~1	A	280.79	421.19	15.54	2.21	0.17	15.54	2.21

Main Results for each time segment**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	347.82	86.95	346.72	120.16	157.72	0.00	1627.06	987.08	0.214	0.00	0.28	2.852	A
West	335.77	83.94	334.90	256.04	248.41	0.00	1918.25	1636.32	0.175	0.00	0.22	2.340	A
East	230.37	57.59	229.83	535.25	48.06	0.00	2041.36	1926.60	0.113	0.00	0.14	2.140	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	415.33	103.83	415.02	143.76	188.70	0.00	1610.03	987.08	0.258	0.28	0.35	3.059	A
West	400.94	100.24	400.71	306.38	297.34	0.00	1888.17	1636.32	0.212	0.22	0.28	2.492	A
East	275.09	68.77	274.96	640.55	57.50	0.00	2035.56	1926.60	0.135	0.14	0.17	2.201	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	508.67	127.17	508.17	176.05	231.09	0.00	1586.74	987.08	0.321	0.35	0.48	3.387	A
West	491.06	122.76	490.68	375.18	364.08	0.00	1847.16	1636.32	0.266	0.28	0.37	2.733	A
East	336.91	84.23	336.73	784.34	70.41	0.00	2027.63	1926.60	0.166	0.17	0.21	2.292	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	508.67	127.17	508.67	176.16	231.21	0.00	1586.67	987.08	0.321	0.48	0.48	3.390	A
West	491.06	122.76	491.05	375.45	364.43	0.00	1846.95	1636.32	0.266	0.37	0.37	2.734	A
East	336.91	84.23	336.91	785.02	70.46	0.00	2027.59	1926.60	0.166	0.21	0.21	2.292	A

Main results: (09:00-09:15)

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Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	415.33	103.83	415.82	143.95	188.91	0.00	1609.92	987.08	0.258	0.48	0.35	3.062	A
West	400.94	100.24	401.32	306.82	297.92	0.00	1887.82	1636.32	0.212	0.37	0.28	2.494	A
East	275.09	68.77	275.27	641.65	57.59	0.00	2035.50	1926.60	0.135	0.21	0.17	2.203	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	347.82	86.95	348.13	120.53	158.19	0.00	1626.81	987.08	0.214	0.35	0.28	2.861	A
West	335.77	83.94	336.01	256.90	249.42	0.00	1917.63	1636.32	0.175	0.28	0.22	2.344	A
East	230.37	57.59	230.50	537.21	48.22	0.00	2041.26	1926.60	0.113	0.17	0.14	2.140	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.05	0.27	2.852	A	A
West	3.22	0.21	2.340	A	A
East	2.02	0.13	2.140	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.20	0.35	3.059	A	A
West	4.10	0.27	2.492	A	A
East	2.49	0.17	2.201	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.03	0.47	3.387	A	A
West	5.50	0.37	2.733	A	A
East	3.18	0.21	2.292	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.16	0.48	3.390	A	A
West	5.58	0.37	2.734	A	A
East	3.21	0.21	2.292	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.40	0.36	3.062	A	A
West	4.23	0.28	2.494	A	A
East	2.56	0.17	2.203	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.21	0.28	2.861	A	A
West	3.33	0.22	2.344	A	A
East	2.08	0.14	2.140	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

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Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.22	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.37	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	0.00	0.00	0.00	1.02			N/A	N/A
West	0.37	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.22	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8							
ARCADY 8 - Roundabout Module							
Version: 8.0.6.541 [19821.26/11/2015] © Copyright TRL Limited, 2023							
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:44:34 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2033							
Leg North	0.25	~1	3.23	0.20	A	3.01	A
Leg West	0.24	~1	2.32	0.19	A		
Leg East	0.78	1.02	3.24	0.44	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:44:34 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2033, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2033, PM	FB 2033	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				3.01	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	253.00	100.000
West	ONE HOUR	✓	341.00	100.000
East	ONE HOUR	✓	792.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To		
From		North	West	East
	North	0.000	91.000	162.000
	West	105.000	0.000	236.000
	East	296.000	496.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To		
From		North	West	East
	North	0.00	0.36	0.64
	West	0.31	0.00	0.69
	East	0.37	0.63	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To		
From		North	West	East
	North			
	West			
	East			

From	North	1,000	1,020	1,020
	West	1,010	1,000	1,030
	East	1,010	1,020	1,000

Truck Percentages - Intersection 1 (for whole period)

From	To			
		North	West	East
	North	0.0	2.0	2.0
	West	1.0	0.0	3.0
	East	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.20	3.23	0.25	~1	A	232.16	348.24	17.45	3.01	0.19	17.45	3.01
West	0.19	2.32	0.24	~1	A	312.91	469.36	17.36	2.22	0.19	17.36	2.22
East	0.44	3.24	0.78	1.02	A	726.75	1090.13	52.66	2.90	0.59	52.66	2.90

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	190.47	47.62	189.88	301.08	372.35	0.00	1509.10	1107.45	0.126	0.00	0.15	2.781	A
West	256.72	64.18	256.12	440.65	121.59	0.00	1996.18	1635.14	0.129	0.00	0.15	2.118	A
East	596.26	149.06	594.57	298.84	78.86	0.00	2022.43	1761.50	0.295	0.00	0.42	2.558	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	227.44	56.86	227.28	360.25	445.57	0.00	1468.86	1107.44	0.155	0.15	0.19	2.957	A
West	306.55	76.64	306.41	527.32	145.53	0.00	1981.46	1635.14	0.155	0.15	0.19	2.200	A
East	711.99	178.00	711.47	357.59	94.35	0.00	2012.92	1761.50	0.354	0.42	0.55	2.809	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	278.56	69.64	278.31	441.10	545.54	0.00	1413.92	1107.45	0.197	0.19	0.25	3.233	A
West	375.45	93.86	375.23	645.64	178.20	0.00	1961.39	1635.14	0.191	0.19	0.24	2.323	A
East	872.01	218.00	871.10	437.89	115.54	0.00	1999.89	1761.50	0.436	0.55	0.78	3.237	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	278.56	69.64	278.56	441.51	546.10	0.00	1413.61	1107.45	0.197	0.25	0.25	3.234	A
West	375.45	93.86	375.45	646.29	178.36	0.00	1961.29	1635.14	0.191	0.24	0.24	2.323	A
East	872.01	218.00	872.00	438.20	115.61	0.00	1999.85	1761.50	0.436	0.78	0.78	3.243	A

Main results: (17:00-17:15)

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Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	227.44	56.86	227.69	360.89	446.46	0.00	1468.37	1107.44	0.155	0.25	0.19	2.959	A
West	306.55	76.64	306.77	528.35	145.79	0.00	1981.30	1635.14	0.155	0.24	0.19	2.202	A
East	711.99	178.00	712.89	358.10	94.46	0.00	2012.85	1761.50	0.354	0.78	0.56	2.817	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	190.47	47.62	190.63	302.14	373.75	0.00	1508.33	1107.45	0.126	0.19	0.15	2.788	A
West	256.72	64.18	256.87	442.31	122.06	0.00	1995.88	1635.14	0.129	0.19	0.15	2.120	A
East	596.26	149.06	596.79	299.84	79.09	0.00	2022.29	1761.50	0.295	0.56	0.43	2.566	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.17	0.14	2.781	A	A
West	2.23	0.15	2.118	A	A
East	6.23	0.42	2.558	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.76	0.18	2.957	A	A
West	2.78	0.19	2.200	A	A
East	8.19	0.55	2.809	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.69	0.25	3.233	A	A
West	3.59	0.24	2.323	A	A
East	11.50	0.77	3.237	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.74	0.25	3.234	A	A
West	3.63	0.24	2.323	A	A
East	11.73	0.78	3.243	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.85	0.19	2.959	A	A
West	2.85	0.19	2.202	A	A
East	8.52	0.57	2.817	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.25	0.15	2.788	A	A
West	2.29	0.15	2.120	A	A
East	6.49	0.43	2.566	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

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Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.42	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.19	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.55	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.78	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.78	0.00	0.00	0.00	1.02			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.19	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.43	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
Future Volume (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.97	1.00		0.98	0.99	1.00		1.00		0.97
Frt			0.850			0.850		0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	3471	1488	1686	3438	1417	1670	3304	0	3146	1863	1458
Flt Permitted	0.089			0.133			0.353			0.950		
Satd. Flow (perm)	156	3471	1447	236	3438	1387	614	3304	0	3130	1863	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			450			461		4				247
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Adj. Flow (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	1168	625	43	1094	562	320	330	0	724	350	296
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

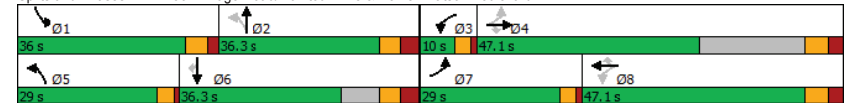
Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Background - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	61.0	61.0	49.0	40.0	40.0	55.2	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.49	0.41	0.41	0.33	0.27	0.27	0.37	0.20		0.20	0.26	0.26
v/c Ratio	0.95	0.82	0.73	0.32	1.18	0.79	0.82	0.51		1.14	0.73	0.54
Control Delay	80.1	45.1	15.4	28.9	139.3	18.6	46.1	55.9		132.8	61.3	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	80.1	45.1	15.4	28.9	139.3	18.6	46.1	55.9		132.8	61.3	13.6
LOS	F	D	B	C	F	B	D	E		F	E	B
Approach Delay		41.5			96.6			51.1			88.8	
Approach LOS		D			F			D			F	
Intersection Summary												
Area Type:	Other											
Cycle Length:	148.4											
Actuated Cycle Length:	148.4											
Natural Cycle:	145											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	1.18											
Intersection Signal Delay:	69.8					Intersection LOS: E						
Intersection Capacity Utilization	116.1%					ICU Level of Service H						
Analysis Period (min)	15											

Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard



Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard 2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	312	1168	625	43	1094	562	320	330	724	350	296
v/c Ratio	0.95	0.82	0.73	0.32	1.18	0.79	0.82	0.51	1.14	0.73	0.54
Control Delay	80.1	45.1	15.4	28.9	139.3	18.6	46.1	55.9	132.8	61.3	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	45.1	15.4	28.9	139.3	18.6	46.1	55.9	132.8	61.3	13.6
Queue Length 50th (m)	80.0	171.7	46.6	6.9	~213.1	28.4	65.2	48.0	~134.3	101.9	12.0
Queue Length 95th (m)	#141.4	202.8	100.2	14.2	#257.6	85.2	#93.8	64.7	#175.4	#141.2	43.0
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	330	1426	859	136	926	710	414	648	635	478	545
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.82	0.73	0.32	1.18	0.79	0.77	0.51	1.14	0.73	0.54

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard 2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
Future Volume (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1670	3471	1447	1686	3438	1387	1664	3304		3146	1863	1410
Flt Permitted	0.09	1.00	1.00	0.13	1.00	1.00	0.35	1.00		0.95	1.00	1.00
Satd. Flow (perm)	157	3471	1447	236	3438	1387	619	3304		3146	1863	1410
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	312	1168	625	43	1094	562	320	308	22	724	350	296
RTOR Reduction (vph)	0	0	266	0	0	335	0	3	0	0	0	184
Lane Group Flow (vph)	312	1168	359	43	1094	227	320	327	0	724	350	112
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Effective Green, g (s)	69.8	61.0	61.0	45.6	40.8	40.8	51.9	29.0		30.0	38.1	38.1
Actuated g/C Ratio	0.47	0.41	0.41	0.31	0.27	0.27	0.35	0.19		0.20	0.26	0.26
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	326	1419	591	118	940	379	375	642		632	475	360
v/s Ratio Prot	c0.16	0.34		0.01	c0.32		0.13	0.10		c0.23	0.19	
v/s Ratio Perm	0.29		0.25	0.10		0.16	c0.17					0.08
v/c Ratio	0.96	0.82	0.61	0.36	1.16	0.60	0.85	0.51		1.15	0.74	0.31
Uniform Delay, d1	47.4	39.3	34.7	38.2	54.2	47.1	39.9	53.7		59.6	51.0	44.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.1	4.0	1.8	1.9	85.5	2.5	16.9	2.9		83.2	9.8	2.2
Delay (s)	85.5	43.3	36.5	40.1	139.7	49.6	56.8	56.6		142.8	60.8	47.2
Level of Service	F	D	D	D	F	D	E	E		F	E	D
Approach Delay (s)		47.5			107.4			56.7			101.2	
Approach LOS		D			F			E			F	

Intersection Summary

HCM 2000 Control Delay	78.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	24.4
Intersection Capacity Utilization	116.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
Future Volume (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0			0.0	110.0		0.0	35.0	0.0
Storage Lanes	0		1	0			0	1		0	1	0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99										
Frt		0.850					0.999			0.984		
Flt Protected		0.953			0.979		0.950			0.950		
Satd. Flow (prot)	0	1493	1417	0	1517	0	1670	3179	0	1686	3170	0
Flt Permitted		0.726			0.896		0.950			0.105		
Satd. Flow (perm)	0	1131	1417	0	1389	0	1670	3179	0	186	3170	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		125								13		
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	4				4							
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 (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Adj. Flow (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	125	0	7	0	127	1794	0	2	1761	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25			15	25		15	25	15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		17.2			17.2			12.9		63.4		45.4
Actuated g/C Ratio		0.18			0.18			0.14		0.68		0.49
v/c Ratio		0.69			0.35			0.55		0.83		0.02
Control Delay		53.5			8.9			48.1		16.7		18.0
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.5			8.9			48.1		16.7		18.0
LOS		D			A			C		B		F
Approach Delay		32.8			31.1			18.8				95.1
Approach LOS		C			C			B				F
Intersection Summary												
Area Type:		Other										
Cycle Length:		117.6										
Actuated Cycle Length:		93.3										
Natural Cycle:		110										
Control Type:		Semi Act-Uncoord										
Maximum v/c Ratio:		1.14										
Intersection Signal Delay:		53.7						Intersection LOS: D				
Intersection Capacity Utilization		101.6%						ICU Level of Service G				
Analysis Period (min)		15										

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road PM Peak Hour

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	125	7	127	1794	2	1761
v/c Ratio	0.69	0.35	0.03	0.55	0.83	0.02	1.14
Control Delay	53.5	8.9	31.1	48.1	16.7	18.0	95.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	8.9	31.1	48.1	16.7	18.0	95.2
Queue Length 50th (m)	25.3	0.0	1.1	22.5	113.4	0.2	~201.7
Queue Length 95th (m)	48.8	14.7	5.0	44.9	205.5	1.9	#313.5
Internal Link Dist (m)	295.9		64.4		538.4		2438.2
Turn Bay Length (m)				110.0		35.0	
Base Capacity (vph)	428	614	525	361	2407	90	1550
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.01	0.35	0.75	0.02	1.14

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand Road PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
Future Volume (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1487	1417		1517		1670	3181		1686	3170	
Flt Permitted		0.73	1.00		0.90		0.95	1.00		0.10	1.00	
Satd. Flow (perm)		1132	1417		1389		1670	3181		186	3170	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	3	125	3	4	0	127	1788	6	2	1574	187
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	144	23	0	7	0	127	1794	0	2	1754	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Actuated Green, G (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Effective Green, g (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Actuated g/C Ratio		0.18	0.18		0.18		0.14	0.68		0.49	0.49	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		208	261		256		231	2163		90	1547	
v/s Ratio Prot							0.08	c0.56			c0.55	
v/s Ratio Perm		c0.13	0.02		0.01					0.01		
v/c Ratio		0.69	0.09		0.03		0.55	0.83		0.02	1.13	
Uniform Delay, d1		35.5	31.5		31.1		37.4	10.9		12.3	23.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.5	0.1		0.0		2.7	3.9		0.5	68.9	
Delay (s)		45.1	31.6		31.2		40.1	14.8		12.8	92.8	
Level of Service		D	C		C		D	B		B	F	
Approach Delay (s)		38.8			31.2			16.5			92.7	
Approach LOS		D			C			B			F	

Intersection Summary

HCM 2000 Control Delay	51.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	17.6
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

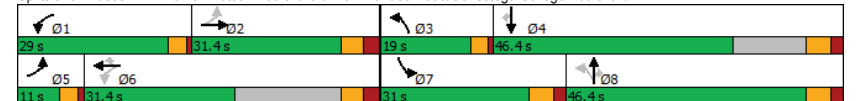
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
Future Volume (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.97			0.99	1.00		0.98
Frt	0.887					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1621	2574	0	1576	1827	1340	1547	4940	1377	2870	3471	1458
Flt Permitted	0.721			0.481			0.096			0.950		
Satd. Flow (perm)	1215	2574	0	788	1827	1306	156	4940	1359	2869	3471	1425
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95				138			169			122
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		181.6			324.8		266.0			278.1		
Travel Time (s)		13.1			23.4		19.2			20.0		
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
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 (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Adj. Flow (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	240	126	0	150	55	118	199	1577	94	106	1550	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2		7.2		
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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		

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	16.8	7.3		21.8	10.2	10.2	57.9	41.8	41.8	10.3	40.4	40.4
Actuated g/C Ratio	0.18	0.08		0.24	0.11	0.11	0.63	0.45	0.45	0.11	0.44	0.44
v/c Ratio	0.96	0.43		0.56	0.27	0.44	0.65	0.70	0.13	0.33	1.02	0.09
Control Delay	82.5	19.1		36.4	40.6	10.2	28.1	23.0	0.4	42.2	56.1	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.5	19.1		36.4	40.6	10.2	28.1	23.0	0.4	42.2	56.1	0.2
LOS	F	B		D	B	C	C	A	D	E	A	A
Approach Delay		60.7			27.5			22.4			53.3	
Approach LOS		E			C			C			D	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 92.2												
Natural Cycle: 130												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.02												
Intersection Signal Delay: 38.5								Intersection LOS: D				
Intersection Capacity Utilization 97.8%								ICU Level of Service F				
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	240	126	150	55	118	199	1577	94	106	1550	60
v/c Ratio	0.96	0.43	0.56	0.27	0.44	0.65	0.70	0.13	0.33	1.02	0.09
Control Delay	82.5	19.1	36.4	40.6	10.2	28.1	23.0	0.4	42.2	56.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.5	19.1	36.4	40.6	10.2	28.1	23.0	0.4	42.2	56.1	0.2
Queue Length 50th (m)	39.7	2.9	23.4	9.7	0.0	18.2	81.8	0.0	9.6	~165.2	0.0
Queue Length 95th (m)	#88.4	12.2	40.7	20.9	11.7	#48.2	117.7	0.3	18.9	#235.6	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	251	769	439	854	684	327	2238	708	781	1964	859
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.16	0.34	0.06	0.17	0.61	0.70	0.13	0.14	0.79	0.07

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
Future Volume (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.89		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2584		1570	1827	1312	1547	4940	1359	2870	3471	1430
Flt Permitted	0.72	1.00		0.48	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1224	2584		795	1827	1312	156	4940	1359	2870	3471	1430
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	31	95	150	55	118	199	1577	94	106	1550	60
RTOR Reduction (vph)	0	87	0	0	0	105	0	0	51	0	0	34
Lane Group Flow (vph)	240	39	0	150	55	13	199	1577	43	106	1550	26
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
Heavy Vehicles (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	14.3	7.3		20.1	10.2	10.2	55.5	41.8	41.8	10.3	40.4	40.4
Effective Green, g (s)	14.3	7.3		20.1	10.2	10.2	55.5	41.8	41.8	10.3	40.4	40.4
Actuated g/C Ratio	0.16	0.08		0.22	0.11	0.11	0.60	0.45	0.45	0.11	0.44	0.44
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	219	204		256	202	145	300	2242	616	320	1522	627
v/s Ratio Prot	c0.08	0.01		c0.06	0.03		c0.10	0.32		0.04	c0.45	
v/s Ratio Perm	c0.09			0.06		0.01	0.30		0.03			0.02
v/c Ratio	1.10	0.19		0.59	0.27	0.09	0.66	0.70	0.07	0.33	1.02	0.04
Uniform Delay, d1	38.4	39.6		31.2	37.5	36.8	21.3	20.2	14.2	37.7	25.8	14.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	88.8	0.5		2.2	0.7	0.3	5.4	1.9	0.2	0.6	27.8	0.1
Delay (s)	127.2	40.1		33.4	38.3	37.1	26.8	22.1	14.4	38.3	53.6	14.9
Level of Service	F	D		C	D	D	C	C	B	D	D	B
Approach Delay (s)		97.2			35.6			22.2			51.3	
Approach LOS		F			D			C			D	

Intersection Summary

HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	22.8
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	↱	↰	↰	↱	↱
Traffic Volume (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Future Volume (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1621	0	1458	1637	1881	1390	1637	3438	0	0	5036	1458
Flt Permitted	0.193			0.950			0.111					
Satd. Flow (perm)	329	0	1458	1637	1881	1390	191	3438	0	0	5036	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			219			434						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Adj. Flow (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0	7.0			15.0				15.0	15.0
Flash Dont Walk (s)	19.0		19.0	19.0			5.0				5.0	5.0
Pedestrian Calls (#/hr)	0		0	0			0				0	0
Act Effct Green (s)	30.1		30.1	47.4	44.2	115.1	59.7	56.7			42.7	42.7
Actuated g/C Ratio	0.26		0.26	0.41	0.38	1.00	0.52	0.49			0.37	0.37
v/c Ratio	0.59		0.69	0.39	0.87	0.73	1.07	0.48			0.67	0.09
Control Delay	70.7		23.8	27.5	48.1	3.3	105.2	20.1			32.0	0.4
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	70.7		23.8	27.5	48.1	3.3	105.2	20.1			32.0	0.4
LOS	E		C	C	D	A	F	C			C	A
Approach Delay		29.4			21.4		39.6				30.7	
Approach LOS		C			C		D				C	

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 115.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 28.8

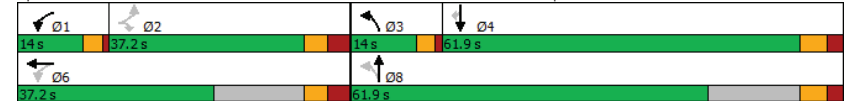
Intersection LOS: C

Intersection Capacity Utilization 93.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp



Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - PM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	51	374	264	626	1009	241	811	1256	55
v/c Ratio	0.59	0.69	0.39	0.87	0.73	1.07	0.48	0.67	0.09
Control Delay	70.7	23.8	27.5	48.1	3.3	105.2	20.1	32.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.7	23.8	27.5	48.1	3.3	105.2	20.1	32.0	0.4
Queue Length 50th (m)	10.5	32.3	42.8	134.0	0.0	~42.3	64.7	90.0	0.0
Queue Length 95th (m)	#35.1	77.9	77.2	#238.3	0.0	#99.6	80.5	105.3	0.5
Internal Link Dist (m)			459.0				296.0	151.5	
Turn Bay Length (m)	75.0					180.0			65.0
Base Capacity (vph)	86	543	674	722	1390	225	2070	2417	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.69	0.39	0.87	0.73	1.07	0.39	0.52	0.07

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp 2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Future Volume (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1621		1458	1637	1881	1390	1637	3438			5036	1458
Flt Permitted	0.19		1.00	0.95	1.00	1.00	0.11	1.00			1.00	1.00
Satd. Flow (perm)	330		1458	1637	1881	1390	192	3438			5036	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	0	374	264	626	1009	241	811	0	0	1256	55
RTOR Reduction (vph)	0	0	161	0	0	0	0	0	0	0	0	35
Lane Group Flow (vph)	51	0	213	264	626	1009	241	811	0	0	1256	20
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.2		30.2	44.2	44.2	115.0	56.7	56.7			42.7	42.7
Effective Green, g (s)	30.2		30.2	44.2	44.2	115.0	56.7	56.7			42.7	42.7
Actuated g/C Ratio	0.26		0.26	0.38	0.38	1.00	0.49	0.49			0.37	0.37
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	86		382	629	722	1390	220	1695			1869	541
v/s Ratio Prot				0.04	c0.33		c0.10	0.24			0.25	
v/s Ratio Perm	0.15		0.15	0.12		c0.73	c0.44					0.01
v/c Ratio	0.59		0.56	0.42	0.87	0.73	1.10	0.48			0.67	0.04
Uniform Delay, d1	37.0		36.6	26.0	32.7	0.0	25.7	19.3			30.3	23.1
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	26.6		5.7	0.9	13.3	3.3	88.5	0.4			1.3	0.1
Delay (s)	63.7		42.4	26.9	46.0	3.3	114.2	19.8			31.5	23.1
Level of Service	E		D	C	D	A	F	B			C	C
Approach Delay (s)		44.9			20.7			41.4			31.2	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	22.1
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2033 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	11	503	895	97	52	12
Future Volume (vph)	11	503	895	97	52	12
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.987		0.975	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1601	1598	0	1654	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1601	1598	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	1%	0%	0%
Adj. Flow (vph)	11	503	895	97	52	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	514	992	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 71.6% ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2033 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	11	503	895	97	52	12
Future Volume (Veh/h)	11	503	895	97	52	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	503	895	97	52	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	992				1468	944
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992				1468	944
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				63	96
cM capacity (veh/h)	705				140	321

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	514	992	64
Volume Left	11	0	52
Volume Right	0	97	12
cSH	705	1700	156
Volume to Capacity	0.02	0.58	0.41
Queue Length 95th (m)	0.4	0.0	14.4
Control Delay (s)	0.4	0.0	43.1
Lane LOS	A		E
Approach Delay (s)	0.4	0.0	43.1
Approach LOS			E

Intersection Summary

Average Delay		1.9	
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)		15	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Background - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	105	236	496	296	162	91
Future Volume (vph)	105	236	496	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.951	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1670	1845	1618	1389	1595	0
Flt Permitted	0.235				0.969	
Satd. Flow (perm)	413	1845	1618	1389	1595	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				172	30	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Adj. Flow (vph)	105	236	496	296	162	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	236	496	296	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Background - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	40.5	37.9	27.9	27.9	26.0	
Actuated g/C Ratio	0.53	0.49	0.36	0.36	0.34	
v/c Ratio	0.29	0.26	0.84	0.48	0.45	
Control Delay	9.9	10.8	36.9	10.7	24.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.9	10.8	36.9	10.7	24.5	
LOS	A	B	D	B	C	
Approach Delay		10.5	27.1		24.5	
Approach LOS		B	C		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 76.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 22.5

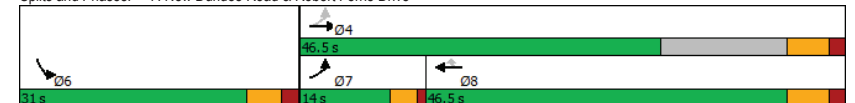
Intersection LOS: C

Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2033 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	105	236	496	296	253
v/c Ratio	0.29	0.26	0.84	0.48	0.45
Control Delay	9.9	10.8	36.9	10.7	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	10.8	36.9	10.7	24.5
Queue Length 50th (m)	7.2	19.0	72.3	13.8	28.8
Queue Length 95th (m)	13.8	30.9	110.8	34.0	60.2
Internal Link Dist (m)	2815.6		776.9		201.4
Turn Bay Length (m)	30.0				25.0
Base Capacity (vph)	387	1336	874	829	558
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.18	0.57	0.36	0.45
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2033 Background - PM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	236	496	296	162	91
Future Volume (vph)	105	236	496	296	162	91
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1670	1845	1618	1389	1595	
Flt Permitted	0.24	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	413	1845	1618	1389	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	236	496	296	162	91
RTOR Reduction (vph)	0	0	0	110	20	0
Lane Group Flow (vph)	105	236	496	186	233	0
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	38.9	38.9	27.9	27.9	26.0	
Effective Green, g (s)	38.9	38.9	27.9	27.9	26.0	
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.34	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	321	927	583	500	535	
v/s Ratio Prot	c0.03	0.13	c0.31		c0.15	
v/s Ratio Perm	0.13			0.13		
v/c Ratio	0.33	0.25	0.85	0.37	0.44	
Uniform Delay, d1	12.2	11.0	22.8	18.3	20.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.1	11.4	0.5	2.6	
Delay (s)	12.8	11.1	34.3	18.7	22.6	
Level of Service	B	B	C	B	C	
Approach Delay (s)	11.6		28.5		22.6	
Approach LOS	B		C		C	
Intersection Summary						
HCM 2000 Control Delay	23.2			HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio	0.61					
Actuated Cycle Length (s)	77.4			Sum of lost time (s)		16.5
Intersection Capacity Utilization	65.7%			ICU Level of Service		C
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	26	356	89	20	407	18	68	75	19	4	34	19
Future Volume (vph)	26	356	89	20	407	18	68	75	19	4	34	19
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.995			0.984			0.955	
Flt Protected		0.997			0.998			0.979			0.997	
Satd. Flow (prot)	0	1488	0	0	1492	0	0	1475	0	0	1450	0
Flt Permitted		0.997			0.998			0.979			0.997	
Satd. Flow (perm)	0	1488	0	0	1492	0	0	1475	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	2%	10%	3%	0%	3%	0%	0%	0%	3%	0%
Adj. Flow (vph)	26	356	89	20	407	18	68	75	19	4	34	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	471	0	0	445	0	0	162	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	26	356	89	20	407	18	68	75	19	4	34	19
Future Volume (Veh/h)	26	356	89	20	407	18	68	75	19	4	34	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	356	89	20	407	18	68	75	19	4	34	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	425			445			944	918	400	965	953	416
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	425			445			944	918	400	965	953	416
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			66	71	97	98	86	97
cM capacity (veh/h)	1145			1074			203	263	654	174	247	641

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	471	445	162	57
Volume Left	26	20	68	4
Volume Right	89	18	19	19
cSH	1145	1074	249	300
Volume to Capacity	0.02	0.02	0.65	0.19
Queue Length 95th (m)	0.6	0.5	32.5	5.5
Control Delay (s)	0.7	0.6	42.8	19.8
Lane LOS	A	A	E	C
Approach Delay (s)	0.7	0.6	42.8	19.8
Approach LOS		E	C	

Intersection Summary

Average Delay	7.6
Intersection Capacity Utilization	65.6%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2033 Background - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983				0.935	
Flt Protected	0.958			0.991		
Satd. Flow (prot)	1662	0	0	1603	1520	0
Flt Permitted	0.958			0.991		
Satd. Flow (perm)	1662	0	0	1603	1520	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%
Adj. Flow (vph)	215	30	50	226	312	291
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	276	603	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2033 Background - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	215	30	50	226	312	291
Future Volume (vph)	215	30	50	226	312	291
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	30	50	226	312	291
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	245	276	603			
Volume Left (vph)	215	50	0			
Volume Right (vph)	30	0	291			
Hadj (s)	0.10	0.07	-0.26			
Departure Headway (s)	6.2	5.6	4.9			
Degree Utilization, x	0.42	0.43	0.82			
Capacity (veh/h)	546	602	725			
Control Delay (s)	13.6	12.8	25.9			
Approach Delay (s)	13.6	12.8	25.9			
Approach LOS	B	B	D			
Intersection Summary						
Delay		20.0				
Level of Service		C				
Intersection Capacity Utilization		81.1%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2033 Background - PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	269	14	2	208	13
Future Volume (vph)	7	269	14	2	208	13
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.983			
Flt Protected	0.999					0.955
Satd. Flow (prot)	1530	0	1622	0	0	1505
Flt Permitted	0.999					0.955
Satd. Flow (perm)	1530	0	1622	0	0	1505
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Confl. Peds. (#/hr)	49			7	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	7	269	14	2	208	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	16	0	0	221
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	45.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2033 Background - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		R			R
Traffic Volume (veh/h)	7	269	14	2	208	13
Future Volume (Veh/h)	7	269	14	2	208	13
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	269	14	2	208	13
Pedestrians	7		49			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	1		4			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500	22			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	22			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	74			87	
cM capacity (veh/h)	441	1055			1564	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	276	16	221			
Volume Left	7	0	208			
Volume Right	269	2	0			
cSH	1019	1700	1564			
Volume to Capacity	0.27	0.01	0.13			
Queue Length 95th (m)	8.8	0.0	3.7			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay			8.4			
Intersection Capacity Utilization			45.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	1.00	
Frt	0.976					0.850		0.995			0.980	
Flt Protected	0.950				0.990		0.950			0.950		
Satd. Flow (prot)	1653	1587	0	0	1621	1430	1686	1579	0	1621	1574	0
Flt Permitted	0.678				0.935		0.372			0.529		
Satd. Flow (perm)	1164	1587	0	0	1526	1380	656	1579	0	900	1574	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				101		4			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		184.2			333.0			586.7			311.9	
Travel Time (s)		13.3			24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	86	0	0	123	101	13	340	0	135	508	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2			6		6
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

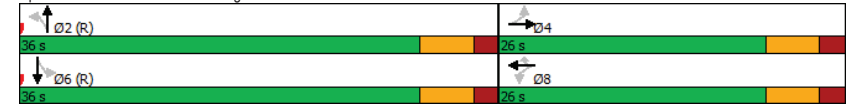
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Background - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.17			0.25	0.20	0.04	0.44		0.31	0.66	
Control Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.6	14.1			17.2	5.0	9.0	12.7		12.2	16.8	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.1			11.7			12.6			15.8	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	62											
Actuated Cycle Length:	62											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.66											
Intersection Signal Delay:	14.2											
Intersection Capacity Utilization	73.3%											
ICU Level of Service	D											
Analysis Period (min)	15											

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2033 Background - PM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	86	123	101	13	340	135	508
v/c Ratio	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66
Control Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	14.1	17.2	5.0	9.0	12.7	12.2	16.8
Queue Length 50th (m)	5.3	6.1	10.7	0.0	0.8	24.7	9.2	41.6
Queue Length 95th (m)	13.4	15.0	22.3	8.9	3.3	43.8	20.4	72.9
Internal Link Dist (m)		160.2	309.0			562.7		287.9
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	375	521	492	513	317	766	435	770
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	0.17	0.17	0.25	0.20	0.04	0.44	0.31	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2033 Background - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Future Volume (vph)	63	72	14	25	98	101	13	328	12	135	439	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1632	1587			1616	1380	1675	1579		1616	1573	
Flt Permitted	0.68	1.00			0.93	1.00	0.37	1.00		0.53	1.00	
Satd. Flow (perm)	1164	1587			1526	1380	656	1579		901	1573	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	72	14	25	98	101	13	328	12	135	439	69
RTOR Reduction (vph)	0	9	0	0	0	68	0	2	0	0	9	0
Lane Group Flow (vph)	63	77	0	0	123	33	13	338	0	135	499	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	375	511			492	445	317	764		435	761	
v/s Ratio Prot		0.05						0.21			c0.32	
v/s Ratio Perm	0.05				c0.08	0.02	0.02			0.15		
v/c Ratio	0.17	0.15			0.25	0.07	0.04	0.44		0.31	0.66	
Uniform Delay, d1	15.0	14.9			15.5	14.6	8.4	10.5		9.7	12.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6			1.2	0.3	0.2	1.9		1.9	4.4	
Delay (s)	16.0	15.6			16.7	14.9	8.7	12.4		11.6	16.5	
Level of Service	B	B			B	B	A	B		B	B	
Approach Delay (s)		15.8			15.9			12.2			15.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:52:11 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2033							
Leg North	0.09	~1	2.48	0.07	A	2.80	A
Leg West	0.68	1.06	2.94	0.39	A		
Leg South	0.17	~1	2.77	0.14	A		
Leg East	0.25	~1	2.61	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM " model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:52:10 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2033, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2033, AM	FB 2033	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				2.80	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	120.00	100.000
West	ONE HOUR	✓	763.00	100.000
South	ONE HOUR	✓	205.00	100.000
East	ONE HOUR	✓	319.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	71.000	19.000	30.000
	West	210.000	0.000	31.000	522.000
	South	57.000	52.000	0.000	96.000
	East	70.000	224.000	25.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.59	0.16	0.25
	West	0.28	0.00	0.04	0.68
	South	0.28	0.25	0.00	0.47
	East				

East	0.22	0.70	0.08	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.190	1.350	1.370
	West	1.050	1.000	1.210	1.050
	South	1.150	1.040	1.000	1.000
	East	1.250	1.130	1.090	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	19.0	35.0	37.0
	West	5.0	0.0	21.0	5.0
	South	15.0	4.0	0.0	0.0
	East	25.0	13.0	9.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.07	2.48	0.09	~1	A	110.11	165.17	6.61	2.40	0.07	6.61	2.40
West	0.39	2.94	0.68	1.06	A	700.14	1050.21	46.72	2.67	0.52	46.72	2.67
South	0.14	2.77	0.17	~1	A	188.11	282.17	11.99	2.55	0.13	11.99	2.55
East	0.18	2.61	0.25	~1	A	292.72	439.08	18.06	2.47	0.20	18.06	2.47

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	90.34	22.59	90.11	253.04	226.02	0.00	2029.31	1178.16	0.045	0.00	0.06	2.329	A
West	574.43	143.61	572.89	260.57	55.57	0.00	2152.54	1757.06	0.267	0.00	0.38	2.404	A
South	154.33	38.58	153.94	56.32	572.15	0.00	1779.08	761.11	0.087	0.00	0.10	2.322	A
East	240.16	60.04	239.54	486.56	239.53	0.00	2019.54	1550.52	0.119	0.00	0.15	2.328	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	107.88	26.97	107.82	302.77	270.44	0.00	1997.19	1178.16	0.054	0.06	0.07	2.390	A
West	685.92	171.48	685.48	311.78	66.49	0.00	2144.64	1757.06	0.320	0.38	0.49	2.604	A
South	184.29	46.07	184.18	67.38	684.58	0.00	1697.79	761.11	0.109	0.10	0.13	2.492	A
East	286.77	71.69	286.62	582.17	286.59	0.00	1985.52	1550.52	0.144	0.15	0.19	2.438	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	132.12	33.03	132.05	370.73	331.17	0.00	1953.29	1178.16	0.068	0.07	0.09	2.479	A
West	840.08	210.02	839.33	381.79	81.43	0.00	2133.84	1757.06	0.394	0.49	0.68	2.934	A
South	225.71	56.43	225.53	82.52	838.24	0.00	1586.71	761.11	0.142	0.13	0.17	2.772	A
East	351.23	87.81	350.99	712.84	350.92	0.00	1939.01	1550.52	0.181	0.19	0.25	2.609	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	132.12	33.03	132.12	371.04	331.41	0.00	1953.12	1178.16	0.068	0.09	0.09	2.480	A
West	840.08	210.02	840.07	382.05	81.48	0.00	2133.81	1757.06	0.394	0.68	0.68	2.936	A
South	225.71	56.43	225.71	82.58	838.97	0.00	1586.18	761.11	0.142	0.17	0.17	2.773	A
East	351.23	87.81	351.22	713.46	351.22	0.00	1938.79	1550.52	0.181	0.25	0.25	2.609	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	107.88	26.97	107.95	303.26	270.82	0.00	1996.92	1178.16	0.054	0.09	0.07	2.390	A
West	685.92	171.48	686.66	312.20	66.57	0.00	2144.58	1757.06	0.320	0.68	0.50	2.607	A
South	184.29	46.07	184.47	67.48	685.75	0.00	1696.95	761.11	0.109	0.17	0.13	2.494	A
East	286.77	71.69	287.01	583.15	287.08	0.00	1985.17	1550.52	0.144	0.25	0.19	2.441	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	90.34	22.59	90.40	253.90	226.76	0.00	2028.77	1178.16	0.045	0.07	0.06	2.330	A
West	574.43	143.61	574.88	261.41	55.74	0.00	2152.41	1757.06	0.267	0.50	0.39	2.411	A
South	154.33	38.58	154.45	56.50	574.12	0.00	1777.65	761.11	0.087	0.13	0.10	2.326	A
East	240.16	60.04	240.32	488.22	240.34	0.00	2018.95	1550.52	0.119	0.19	0.16	2.331	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.86	0.06	2.329	A	A
West	5.65	0.38	2.404	A	A
South	1.47	0.10	2.322	A	A
East	2.29	0.15	2.328	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.06	0.07	2.390	A	A
West	7.32	0.49	2.604	A	A
South	1.89	0.13	2.492	A	A
East	2.88	0.19	2.438	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.35	0.09	2.479	A	A
West	10.06	0.67	2.934	A	A
South	2.57	0.17	2.772	A	A
East	3.76	0.25	2.609	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	1.36	0.09	2.480	A	A
West	10.24	0.68	2.936	A	A
South	2.60	0.17	2.773	A	A
East	3.81	0.25	2.609	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.09	0.07	2.390	A	A
West	7.59	0.51	2.607	A	A
South	1.94	0.13	2.494	A	A
East	2.96	0.20	2.441	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.89	0.06	2.330	A	A
West	5.86	0.39	2.411	A	A
South	1.51	0.10	2.326	A	A
East	2.36	0.16	2.331	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.49	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.68	0.00	0.00	0.00	1.06			N/A	N/A
South	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8							
ARCADY 8 - Roundabout Module							
Version: 8.0.6.541 [19821.26/11/2015] © Copyright TRL Limited, 2023							
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:48:20 PM

Summary of intersection performance

PM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FB 2033							
Leg North	0.33	~1	3.21	0.24	A	3.01	A
Leg West	0.51	1.02	2.72	0.33	A		
Leg South	0.14	~1	2.40	0.12	A		
Leg East	0.80	1.03	3.29	0.44	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:48:19 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FB 2033, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FB 2033, PM	FB 2033	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.01	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	341.00	100.000
West	ONE HOUR	✓	613.00	100.000
South	ONE HOUR	✓	194.00	100.000
East	ONE HOUR	✓	799.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	229.000	72.000	40.000
	West	125.000	0.000	57.000	431.000
	South	60.000	49.000	0.000	85.000
	East	28.000	673.000	98.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.00	0.67	0.21	0.12
	West	0.20	0.00	0.09	0.70
	South	0.31	0.25	0.00	0.44
	East				

	East	0.04	0.84	0.12	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.020	1.190
	West	1.040	1.000	1.000	1.020
	South	1.000	1.020	1.000	1.000
	East	1.520	1.020	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	2.0	19.0
	West	4.0	0.0	0.0	2.0
	South	0.0	2.0	0.0	0.0
	East	52.0	2.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.24	3.21	0.33	~1	A	312.91	469.36	22.33	2.85	0.25	22.33	2.85
West	0.33	2.72	0.51	1.02	A	562.50	843.75	35.13	2.50	0.39	35.13	2.50
South	0.12	2.40	0.14	~1	A	178.02	267.03	10.02	2.25	0.11	10.02	2.25
East	0.44	3.29	0.80	1.03	A	733.18	1099.76	53.21	2.90	0.59	53.21	2.90

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	256.72	64.18	256.01	159.96	615.63	0.00	1747.64	943.26	0.147	0.00	0.18	2.502	A
West	461.50	115.37	460.34	713.98	157.66	0.00	2078.73	1831.09	0.222	0.00	0.29	2.273	A
South	146.05	36.51	145.71	170.43	447.56	0.00	1869.15	912.03	0.078	0.00	0.08	2.099	A
East	601.53	150.38	599.84	417.54	175.74	0.00	2065.66	1552.31	0.291	0.00	0.42	2.526	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	306.55	76.64	306.33	191.37	736.62	0.00	1660.17	943.26	0.185	0.18	0.23	2.758	A
West	551.07	137.77	550.75	854.30	188.65	0.00	2056.33	1831.09	0.268	0.29	0.37	2.444	A
South	174.40	43.60	174.31	203.92	535.47	0.00	1805.59	912.03	0.097	0.08	0.11	2.217	A
East	718.28	179.57	717.74	499.54	210.24	0.00	2040.71	1552.31	0.352	0.42	0.56	2.799	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	375.45	93.86	375.05	234.33	901.87	0.00	1540.71	943.26	0.244	0.23	0.33	3.204	A
West	674.93	168.73	674.38	1045.95	230.97	0.00	2025.73	1831.09	0.333	0.37	0.51	2.721	A
South	213.60	53.40	213.46	249.68	655.67	0.00	1718.69	912.03	0.124	0.11	0.14	2.403	A
East	879.72	219.93	878.75	611.68	257.45	0.00	2006.59	1552.31	0.438	0.56	0.80	3.282	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	375.45	93.86	375.44	234.52	902.83	0.00	1540.01	943.26	0.244	0.33	0.33	3.206	A
West	674.93	168.73	674.92	1047.06	231.21	0.00	2025.56	1831.09	0.333	0.51	0.51	2.723	A
South	213.60	53.40	213.60	249.93	656.20	0.00	1718.31	912.03	0.124	0.14	0.14	2.403	A
East	879.72	219.93	879.70	612.16	257.64	0.00	2006.45	1552.31	0.438	0.80	0.80	3.288	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	306.55	76.64	306.94	191.67	738.12	0.00	1659.09	943.26	0.185	0.33	0.24	2.762	A
West	551.07	137.77	551.61	856.03	189.03	0.00	2056.05	1831.09	0.268	0.51	0.38	2.448	A
South	174.40	43.60	174.54	204.32	536.32	0.00	1804.98	912.03	0.097	0.14	0.11	2.218	A
East	718.28	179.57	719.24	500.32	210.55	0.00	2040.49	1552.31	0.352	0.80	0.56	2.808	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	256.72	64.18	256.95	160.47	617.89	0.00	1746.01	943.26	0.147	0.24	0.18	2.507	A
West	461.50	115.37	461.83	716.60	158.24	0.00	2078.31	1831.09	0.222	0.38	0.29	2.276	A
South	146.05	36.51	146.14	171.04	449.03	0.00	1868.09	912.03	0.078	0.11	0.09	2.102	A
East	601.53	150.38	602.08	418.88	176.29	0.00	2065.26	1552.31	0.291	0.56	0.42	2.533	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.63	0.18	2.502	A	A
West	4.30	0.29	2.273	A	A
South	1.26	0.08	2.099	A	A
East	6.21	0.41	2.526	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.47	0.23	2.758	A	A
West	5.53	0.37	2.444	A	A
South	1.59	0.11	2.217	A	A
East	8.23	0.55	2.799	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.92	0.33	3.204	A	A
West	7.52	0.50	2.721	A	A
South	2.11	0.14	2.403	A	A
East	11.75	0.78	3.282	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
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North	5.00	0.33	3.206	A	A
West	7.64	0.51	2.723	A	A
South	2.14	0.14	2.403	A	A
East	12.00	0.80	3.288	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.59	0.24	2.762	A	A
West	5.71	0.38	2.448	A	A
South	1.63	0.11	2.218	A	A
East	8.57	0.57	2.808	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.72	0.18	2.507	A	A
West	4.44	0.30	2.276	A	A
South	1.29	0.09	2.102	A	A
East	6.46	0.43	2.533	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.42	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.80	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	0.00	0.00	0.00	1.02	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.80	0.00	0.00	0.00	1.03	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.42	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Appendix F

2028 Total Traffic Operations Reports



Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
Future Volume (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.96	1.00		0.98	0.99	1.00		0.98		0.98
Frt			0.850			0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	3374	1390	1561	3438	1390	1653	3254	0	2895	1759	1417
Flt Permitted	0.086			0.207			0.561			0.950		
Satd. Flow (perm)	140	3374	1337	339	3438	1361	970	3254	0	2838	1759	1389
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193			416		2				146
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		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 (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Adj. Flow (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	1107	254	14	1168	621	408	380	0	299	156	146
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	65.1	65.1	48.9	40.0	40.0	58.7	30.9		21.6	30.0	30.0
Actuated g/C Ratio	0.51	0.46	0.46	0.34	0.28	0.28	0.41	0.22		0.15	0.21	0.21
v/c Ratio	1.43	0.72	0.35	0.08	1.21	0.91	0.79	0.54		0.68	0.42	0.36
Control Delay	242.7	35.4	8.6	21.1	146.2	34.9	43.6	52.8		64.8	52.5	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	242.7	35.4	8.6	21.1	146.2	34.9	43.6	52.8		64.8	52.5	9.3
LOS	F	D	A	C	F	C	D	D		E	D	A
Approach Delay		83.5			106.9			48.0			48.1	
Approach LOS		F			F			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 148.4

Actuated Cycle Length: 142

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.43

Intersection Signal Delay: 82.1

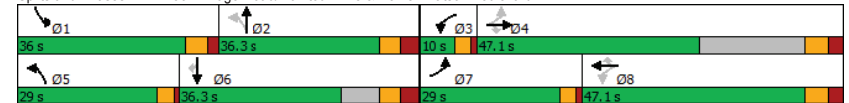
Intersection LOS: F

Intersection Capacity Utilization 126.5%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard



Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	454	1107	254	14	1168	621	408	380	299	156	146
v/c Ratio	1.43	0.72	0.35	0.08	1.21	0.91	0.79	0.54	0.68	0.42	0.36
Control Delay	242.7	35.4	8.6	21.1	146.2	34.9	43.6	52.8	64.8	52.5	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	242.7	35.4	8.6	21.1	146.2	34.9	43.6	52.8	64.8	52.5	9.3
Queue Length 50th (m)	~166.1	128.0	9.4	2.0	~219.2	69.7	89.3	52.5	43.4	40.5	0.0
Queue Length 95th (m)	#245.7	185.2	33.5	6.3	#275.2	#158.2	#131.2	73.4	59.0	63.2	18.8
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	318	1546	717	168	968	682	520	710	611	445	461
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.43	0.72	0.35	0.08	1.21	0.91	0.78	0.54	0.49	0.35	0.32

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
Future Volume (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1547	3374	1338	1560	3438	1362	1648	3255		2895	1759	1389
Flt Permitted	0.09	1.00	1.00	0.21	1.00	1.00	0.56	1.00		0.95	1.00	1.00
Satd. Flow (perm)	140	3374	1338	340	3438	1362	974	3255		2895	1759	1389
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	454	1107	254	14	1168	621	408	365	15	299	156	146
RTOR Reduction (vph)	0	0	106	0	0	294	0	2	0	0	0	116
Lane Group Flow (vph)	454	1107	148	14	1168	327	408	378	0	299	156	30
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		5
Heavy Vehicles (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	71.5	65.1	65.1	44.9	42.5	42.5	55.6	31.0		21.6	30.0	30.0
Effective Green, g (s)	71.5	65.1	65.1	44.9	42.5	42.5	55.6	31.0		21.6	30.0	30.0
Actuated g/C Ratio	0.49	0.45	0.45	0.31	0.29	0.29	0.38	0.21		0.15	0.21	0.21
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	312	1520	602	125	1011	400	489	698		432	365	288
v/s Ratio Prot	c0.25	0.33		0.00	0.34		c0.14	0.12		0.10	0.09	
v/s Ratio Perm	c0.47		0.11	0.03		0.24	c0.18					0.02
Uniform Delay, d1	47.1	32.5	24.5	34.9	51.0	47.4	37.3	50.4		58.3	49.8	46.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	221.8	1.8	0.2	0.4	81.3	12.3	11.7	3.0		6.0	3.6	0.7
Delay (s)	268.9	34.2	24.7	35.3	132.3	59.7	49.0	53.5		64.3	53.4	47.1
Level of Service	F	C	C	D	F	E	D	D		E	D	D
Approach Delay (s)		91.6			106.5			51.1			57.3	
Approach LOS		F			F			D			E	
Intersection Summary												
HCM 2000 Control Delay		86.5								F		
HCM 2000 Volume to Capacity ratio		1.23										
Actuated Cycle Length (s)		144.5						24.4				
Intersection Capacity Utilization		126.5%								H		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
Future Volume (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99		1.00				1.00	
Frt			0.850		0.865						0.992	
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1537	1444	0	1323	0	1637	3094	0	1775	3070	0
Flt Permitted		0.757					0.950					
Satd. Flow (perm)	0	1223	1425	0	1323	0	1633	3094	0	1775	3070	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213		80						5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	1		1	1		1	7					7
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 (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Adj. Flow (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	213	0	2	0	76	1714	0	0	1570	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm		NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		23.2	23.2		23.2		11.4	58.6			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.12	0.62			0.49	
v/c Ratio		0.80	0.42		0.01		0.39	0.90			1.05	
Control Delay		53.8	6.7		0.0		48.8	24.6			64.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		53.8	6.7		0.0		48.8	24.6			64.7	
LOS		D	A		A		D	C			E	
Approach Delay		31.5						25.6			64.7	
Approach LOS		C						C			E	
Intersection Summary												
Area Type:	Other											
Cycle Length: 117.6												
Actuated Cycle Length: 94.8												
Natural Cycle: 100												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.05												
Intersection Signal Delay: 42.4												
Intersection LOS: D												
Intersection Capacity Utilization 100.0%												
ICU Level of Service F												
Analysis Period (min) 15												

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	→	↘	←	↙	↑	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	238	213	2	76	1714	1570
v/c Ratio	0.80	0.42	0.01	0.39	0.90	1.05
Control Delay	53.8	6.7	0.0	48.8	24.6	64.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.7	0.0	48.8	24.6	64.7
Queue Length 50th (m)	43.8	0.0	0.0	14.2	136.2	~184.2
Queue Length 95th (m)	75.9	17.2	0.0	31.4	#253.1	#287.9
Internal Link Dist (m)	295.9		64.4		538.4	2438.2
Turn Bay Length (m)				110.0		
Base Capacity (vph)	463	672	550	354	2343	1497
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	0.51	0.32	0.00	0.21	0.73	1.05

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
Future Volume (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		5.0	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.86		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (prot)		1535	1425		1323		1637	3094		1637	3072	
Flt Permitted		0.76	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (perm)		1222	1425		1323		1637	3094		1637	3072	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	0	213	0	0	2	76	1712	2	0	1489	81
RTOR Reduction (vph)	0	0	161	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	238	52	0	0	0	76	1714	0	0	1567	0
Confl. Peds. (#/hr)	1		1	1		1	7			7		
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Effective Green, g (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.09	0.63			0.48	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6			6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0			5.0	
Lane Grp Cap (vph)		296	345		320		148	1936			1483	
v/s Ratio Prot					0.00		0.05	c0.55			c0.51	
v/s Ratio Perm		c0.19	0.04									
v/c Ratio		0.80	0.15		0.00		0.51	0.89			1.06	
Uniform Delay, d1		34.1	28.5		27.5		41.5	15.0			24.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		14.6	0.2		0.0		3.0	6.4			40.0	
Delay (s)		48.7	28.7		27.5		44.5	21.4			64.8	
Level of Service		D	C		C		D	C			E	
Approach Delay (s)		39.2			27.5			22.4			64.8	
Approach LOS		D			C			C			E	

Intersection Summary

HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	17.6
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

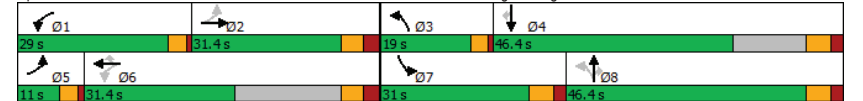
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
Future Volume (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0			0.0	205.0		0.0	175.0	190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99			0.98		0.98	1.00		0.99
Frt	0.879					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1576	2168	0	1492	1743	1219	1429	4848	1417	2749	3312	1229
Flt Permitted	0.613			0.661			0.088			0.950		
Satd. Flow (perm)	1010	2168	0	1031	1743	1196	132	4848	1393	2748	3312	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		116				138			169			122
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.6			324.8			266.0			278.1	
Travel Time (s)		13.1			23.4			19.2			20.0	
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
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 (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Adj. Flow (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	144	0	82	24	80	203	1582	194	82	1605	25
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	15.5	7.6		15.5	8.0	8.0	60.9	46.8	46.8	10.1	40.2	40.2
Actuated g/C Ratio	0.17	0.09		0.17	0.09	0.09	0.69	0.53	0.53	0.11	0.45	0.45
v/c Ratio	0.59	0.49		0.38	0.15	0.34	0.65	0.62	0.24	0.26	1.07	0.04
Control Delay	41.9	18.1		33.3	39.8	5.1	29.9	18.5	4.4	40.3	70.5	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	18.1		33.3	39.8	5.1	29.9	18.5	4.4	40.3	70.5	0.1
LOS	D	B		C	D	A	C	B	A	D	E	A
Approach Delay		29.5			22.0			18.3			68.0	
Approach LOS		C			C			B			E	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 88.7												
Natural Cycle: 150												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.07												
Intersection Signal Delay: 39.7								Intersection LOS: D				
Intersection Capacity Utilization 90.1%								ICU Level of Service E				
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	144	82	24	80	203	1582	194	82	1605	25
v/c Ratio	0.59	0.49	0.38	0.15	0.34	0.65	0.62	0.24	0.26	1.07	0.04
Control Delay	41.9	18.1	33.3	39.8	5.1	29.9	18.5	4.4	40.3	70.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	18.1	33.3	39.8	5.1	29.9	18.5	4.4	40.3	70.5	0.1
Queue Length 50th (m)	20.3	2.5	12.2	4.2	0.0	20.4	77.2	2.3	7.1	~172.7	0.0
Queue Length 95th (m)	36.6	12.1	24.6	11.7	2.6	#56.0	108.8	15.4	15.1	#240.9	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	222	697	426	849	653	310	2560	815	778	1952	764
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.21	0.19	0.03	0.12	0.65	0.62	0.24	0.11	0.82	0.03

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
Future Volume (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	4.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	2174		1487	1743	1199	1429	1484	1395	2749	3312	1213
Flt Permitted	0.61	1.00		0.66	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1015	2174		1034	1743	1199	132	4848	1395	2749	3312	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	132	28	116	82	24	80	203	1582	194	82	1605	25
RTOR Reduction (vph)	0	106	0	0	0	74	0	0	82	0	0	14
Lane Group Flow (vph)	132	38	0	82	24	6	203	1582	112	82	1605	11
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
Heavy Vehicles (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	15.3	8.1		12.5	6.7	6.7	60.6	46.8	46.8	7.8	41.5	41.5
Effective Green, g (s)	15.3	8.1		12.5	6.7	6.7	60.6	46.8	46.8	7.8	41.5	41.5
Actuated g/C Ratio	0.17	0.09		0.14	0.07	0.07	0.66	0.51	0.51	0.09	0.45	0.45
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	214	192		170	127	87	302	2485	715	234	1505	551
v/s Ratio Prot	c0.05	0.02		0.03	0.01		c0.11	0.33		0.03	c0.48	
v/s Ratio Perm	c0.05			0.04		0.00	0.33		0.08			0.01
v/c Ratio	0.62	0.20		0.48	0.19	0.07	0.67	0.64	0.16	0.35	1.07	0.02
Uniform Delay, d1	34.5	38.6		36.0	39.7	39.4	23.1	16.1	11.8	39.4	24.9	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.5		0.8	0.7	0.3	5.8	1.3	0.5	0.9	43.2	0.1
Delay (s)	39.7	39.1		36.8	40.5	39.7	28.9	17.4	12.3	40.3	68.1	13.8
Level of Service	D	D		D	D	C	B	B	B	D	E	B
Approach Delay (s)		39.4			38.5			18.0			66.0	
Approach LOS		D			D			B			E	

Intersection Summary

HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	22.8
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	↱	↰	↰	↱	↱
Traffic Volume (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Future Volume (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0			0.0	180.0		0.0	0.0	65.0
Storage Lanes	1		1	1			1	1		0	0	1
Taper Length (m)	25.0			7.5				100.0			7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1591	0	1458	1441	1776	1365	1561	3406	0	0	4803	1261
Flt Permitted	0.578			0.950			0.090					
Satd. Flow (perm)	968	0	1458	1441	1776	1365	148	3406	0	0	4803	1261
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			298						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Adj. Flow (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6						3.6			3.6	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.1		30.1	47.3	44.1		121.8	66.5			63.6	49.5
Actuated g/C Ratio	0.25		0.25	0.39	0.36		1.00	0.55			0.52	0.41
v/c Ratio	0.74		1.82	0.43	0.47		0.66	0.72			0.50	0.73
Control Delay	63.3		398.6	31.4	33.8		2.6	40.9			19.9	32.8
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	63.3		398.6	31.4	33.8		2.6	40.9			19.9	32.8
LOS	E		F	C	C		A	D			B	C
Approach Delay		346.2			13.8			22.8				31.8
Approach LOS		F			B			C				C
Intersection Summary												
Area Type: Other												
Cycle Length: 127.1												
Actuated Cycle Length: 121.8												
Natural Cycle: 150												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 1.82												
Intersection Signal Delay: 94.7												
Intersection LOS: F												
Intersection Capacity Utilization 120.7%												
ICU Level of Service H												
Analysis Period (min) 15												
Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp												

Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - AM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	176	952	239	299	907	142	897	1419	45
v/c Ratio	0.74	1.82	0.43	0.47	0.66	0.72	0.50	0.73	0.08
Control Delay	63.3	398.6	31.4	33.8	2.6	40.9	19.9	32.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	398.6	31.4	33.8	2.6	40.9	19.9	32.8	0.3
Queue Length 50th (m)	42.5	~330.6	45.6	59.8	0.0	17.1	74.2	108.3	0.0
Queue Length 95th (m)	#81.4	#420.5	72.2	90.0	0.0	#47.5	91.6	126.0	0.0
Internal Link Dist (m)			459.0			296.0	151.5		
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	238	524	559	643	1365	196	1934	2174	628
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	1.82	0.43	0.47	0.66	0.72	0.46	0.65	0.07

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↱	↱	↰	↱	→	↰	↱	↱
Traffic Volume (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Future Volume (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2	7.2	4.0	7.2	4.0	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95				0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00			1.00	1.00
Satd. Flow (prot)	1591	1458	1441	1776	1365	1561	3406				4803	1261
Flt Permitted	0.58	1.00	0.95	1.00	1.00	0.09	1.00	1.00			1.00	1.00
Satd. Flow (perm)	967	1458	1441	1776	1365	147	3406				4803	1261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	176	0	952	239	299	907	142	897	0	0	1419	45
RTOR Reduction (vph)	0	0	164	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	176	0	788	239	299	907	142	897	0	0	1419	18
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Turn Type	Perm	Perm	pm+pt	NA	Free	pm+pt	NA				NA	Perm
Protected Phases			1	6		3	8				4	
Permitted Phases	2	2	6		Free	8						4
Actuated Green, G (s)	30.1	30.1	44.1	44.1	121.8	63.6	63.6				49.6	49.6
Effective Green, g (s)	30.1	30.1	44.1	44.1	121.8	63.6	63.6				49.6	49.6
Actuated g/C Ratio	0.25	0.25	0.36	0.36	1.00	0.52	0.52				0.41	0.41
Clearance Time (s)	7.2	7.2	4.0	7.2		4.0	6.9				6.9	6.9
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0	5.0				5.0	5.0
Lane Grp Cap (vph)	238	360	521	643	1365	192	1778				1955	513
v/s Ratio Prot			0.04	0.17		0.06	0.26				0.30	
v/s Ratio Perm	0.18	c0.54	0.13		c0.66	c0.32						0.01
v/c Ratio	0.74	2.19	0.46	0.47	0.66	0.74	0.50				0.73	0.04
Uniform Delay, d1	42.2	45.9	29.7	29.8	0.0	20.9	18.9				30.4	21.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
Incremental Delay, d2	18.5	543.9	1.3	2.4	2.6	16.6	0.5				1.7	0.1
Delay (s)	60.8	589.7	31.1	32.2	2.6	37.5	19.4				32.1	21.8
Level of Service	E	F	C	C	A	D	B				C	C
Approach Delay (s)	507.2			13.4			21.8				31.7	
Approach LOS	F			B			C				C	

Intersection Summary

HCM 2000 Control Delay	130.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	121.8	Sum of lost time (s)	22.1
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2028 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	4	1177	400	19	64	8
Future Volume (vph)	4	1177	400	19	64	8
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.985	
Flt Protected					0.957	
Satd. Flow (prot)	0	1616	1530	0	1664	0
Flt Permitted					0.957	
Satd. Flow (perm)	0	1616	1530	0	1664	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	2%	7%	11%	0%	0%
Adj. Flow (vph)	4	1177	400	19	64	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1181	419	0	72	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 86.0%

ICU Level of Service E

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2028 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	4	1177	400	19	64	8
Future Volume (Veh/h)	4	1177	400	19	64	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	1177	400	19	64	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	419				1594	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419				1594	410
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				46	99
cM capacity (veh/h)	1027				118	646

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1181	419	72
Volume Left	4	0	64
Volume Right	0	19	8
cSH	1027	1700	130
Volume to Capacity	0.00	0.25	0.55
Queue Length 95th (m)	0.1	0.0	21.6
Control Delay (s)	0.1	0.0	62.4
Lane LOS	A		F
Approach Delay (s)	0.1	0.0	62.4
Approach LOS			F

Intersection Summary

Average Delay		2.8	
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)		15	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	65	907	353	100	345	132
Future Volume (vph)	65	907	353	100	345	132
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.963	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1637	1845	1528	1311	1615	0
Flt Permitted	0.402				0.965	
Satd. Flow (perm)	693	1845	1528	1311	1615	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				82	21	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Adj. Flow (vph)	65	907	353	100	345	132
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	907	353	100	477	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	41.0	38.5	29.7	29.7	25.1	
Actuated g/C Ratio	0.54	0.51	0.39	0.39	0.33	
v/c Ratio	0.14	0.97	0.59	0.18	0.87	
Control Delay	8.8	43.4	24.4	6.5	43.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.8	43.4	24.4	6.5	43.6	
LOS	A	D	C	A	D	
Approach Delay		41.1	20.5		43.6	
Approach LOS		D	C		D	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 76.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 36.8

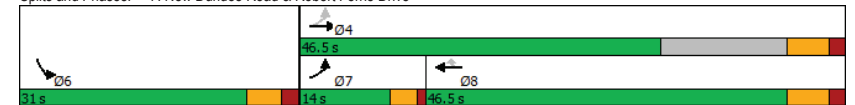
Intersection LOS: D

Intersection Capacity Utilization 87.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2028 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	65	907	353	100	477
v/c Ratio	0.14	0.97	0.59	0.18	0.87
Control Delay	8.8	43.4	24.4	6.5	43.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	43.4	24.4	6.5	43.6
Queue Length 50th (m)	4.4	125.1	43.3	1.7	66.5
Queue Length 95th (m)	9.8	#212.4	73.5	11.4	#135.6
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	497	1314	806	730	546
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.69	0.44	0.14	0.87

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2028 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	65	907	353	100	345	132
Future Volume (vph)	65	907	353	100	345	132
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1637	1845	1528	1311	1615	
Flt Permitted	0.40	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	693	1845	1528	1311	1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	907	353	100	345	132
RTOR Reduction (vph)	0	0	0	50	14	0
Lane Group Flow (vph)	65	907	353	50	463	0
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	39.4	39.4	29.7	29.7	25.1	
Effective Green, g (s)	39.4	39.4	29.7	29.7	25.1	
Actuated g/C Ratio	0.51	0.51	0.39	0.39	0.33	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	424	944	589	505	526	
v/s Ratio Prot	0.01	c0.49	0.23		c0.29	
v/s Ratio Perm	0.07			0.04		
v/c Ratio	0.15	0.96	0.60	0.10	0.88	
Uniform Delay, d1	10.1	18.1	18.9	15.1	24.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	20.3	1.6	0.1	18.6	
Delay (s)	10.3	38.4	20.5	15.2	43.2	
Level of Service	B	D	C	B	D	
Approach Delay (s)	36.5	19.4			43.2	
Approach LOS	D	B			D	
Intersection Summary						
HCM 2000 Control Delay		34.1		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.99				
Actuated Cycle Length (s)		77.0		Sum of lost time (s)		16.5
Intersection Capacity Utilization		87.4%		ICU Level of Service		E
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2028 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	508	82	13	325	10	45	23	24	12	41	12
Future Volume (vph)	11	508	82	13	325	10	45	23	24	12	41	12
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.996			0.965			0.975	
Flt Protected		0.999			0.998			0.976			0.991	
Satd. Flow (prot)	0	1430	0	0	1431	0	0	1332	0	0	1498	0
Flt Permitted		0.999			0.998			0.976			0.991	
Satd. Flow (perm)	0	1430	0	0	1431	0	0	1332	0	0	1498	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
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 (%)	18%	6%	7%	23%	7%	10%	0%	4%	33%	0%	0%	0%
Adj. Flow (vph)	11	508	82	13	325	10	45	23	24	12	41	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	601	0	0	348	0	0	92	0	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 63.8%	ICU Level of Service B											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2028 Total - AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	11	508	82	13	325	10	45	23	24	12	41	12	
Future Volume (Veh/h)	11	508	82	13	325	10	45	23	24	12	41	12	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	11	508	82	13	325	10	45	23	24	12	41	12	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type		None				None							
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	335			590				960	932	549	962	968	330
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	335			590				960	932	549	962	968	330
tC, single (s)	4.3			4.3				7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.4			2.4				3.5	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99				78	91	95	94	84	98
cM capacity (veh/h)	1140			890				201	258	480	206	250	716
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	601	348	92	65									
Volume Left	11	13	45	12									
Volume Right	82	10	24	12									
cSH	1140	890	254	272									
Volume to Capacity	0.01	0.01	0.36	0.24									
Queue Length 95th (m)	0.2	0.4	12.7	7.3									
Control Delay (s)	0.3	0.5	27.1	22.4									
Lane LOS	A	A	D	C									
Approach Delay (s)	0.3	0.5	27.1	22.4									
Approach LOS			D	C									
Intersection Summary													
Average Delay			3.9										
Intersection Capacity Utilization		63.8%				ICU Level of Service			B				
Analysis Period (min)		15											

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2028 Total - AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	221	56	41	366	183	147
Future Volume (vph)	221	56	41	366	183	147
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973				0.940	
Flt Protected	0.962			0.995		
Satd. Flow (prot)	1613	0	0	1585	1465	0
Flt Permitted	0.962			0.995		
Satd. Flow (perm)	1613	0	0	1585	1465	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	4%	9%	2%
Adj. Flow (vph)	221	56	41	366	183	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	407	330	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	73.1%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2028 Total - AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	221	56	41	366	183	147
Future Volume (vph)	221	56	41	366	183	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	221	56	41	366	183	147
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	277	407	330			
Volume Left (vph)	221	41	0			
Volume Right (vph)	56	0	147			
Hadj (s)	0.08	0.08	-0.17			
Departure Headway (s)	5.9	5.4	5.2			
Degree Utilization, x	0.45	0.61	0.48			
Capacity (veh/h)	569	645	657			
Control Delay (s)	13.6	16.2	12.9			
Approach Delay (s)	13.6	16.2	12.9			
Approach LOS	B	C	B			
Intersection Summary						
Delay	14.4					
Level of Service	B					
Intersection Capacity Utilization	73.1%			ICU Level of Service D		
Analysis Period (min)	15					

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2028 Total - AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	305	14	4	164	5
Future Volume (vph)	4	305	14	4	164	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867		0.970			
Flt Protected	0.999					0.954
Satd. Flow (prot)	1529	0	1442	0	0	1493
Flt Permitted	0.999					0.954
Satd. Flow (perm)	1529	0	1442	0	0	1493
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	7%	25%	5%	20%
Adj. Flow (vph)	4	305	14	4	164	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	309	0	18	0	0	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2028 Total - AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	305	14	4	164	5
Future Volume (Veh/h)	4	305	14	4	164	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	305	14	4	164	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349	16			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	16			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	71			90	
cM capacity (veh/h)	584	1069			1579	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	309	18	169			
Volume Left	4	0	164			
Volume Right	305	4	0			
cSH	1058	1700	1579			
Volume to Capacity	0.29	0.01	0.10			
Queue Length 95th (m)	9.8	0.0	2.8			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		44.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Future Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	0.99	
Frt	0.965					0.850		0.999			0.966	
Flt Protected	0.950				0.994		0.950			0.950		
Satd. Flow (prot)	1621	1498	0	0	1500	1365	1519	1616	0	1519	1458	0
Flt Permitted	0.728				0.974		0.523			0.416		
Satd. Flow (perm)	1224	1498	0	0	1467	1317	829	1616	0	664	1458	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		23				74		1			33	
Link Speed (k/h)		50				50		50			50	
Link Distance (m)		184.2				333.0		586.7			311.9	
Travel Time (s)		13.3				24.0		42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Adj. Flow (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	98	0	0	44	74	44	459	0	56	346	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0				0.0		0.0			0.0	
Crosswalk Width(m)		4.8				4.8		4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2			6		6
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.23	0.20			0.09	0.16	0.11	0.59		0.17	0.48	
Control Delay	17.3	13.5			15.4	5.4	9.7	15.3		10.8	12.4	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.3	13.5			15.4	5.4	9.7	15.3		10.8	12.4	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.3			9.1			14.8			12.2	
Approach LOS		B			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 62

Actuated Cycle Length: 62

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 13.5

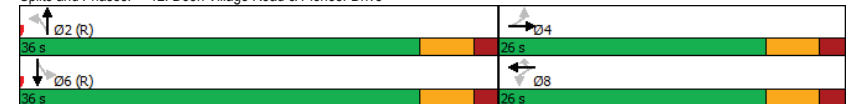
Intersection LOS: B

Intersection Capacity Utilization 76.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2028 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	98	44	74	44	459	56	346
v/c Ratio	0.23	0.20	0.09	0.16	0.11	0.59	0.17	0.48
Control Delay	17.3	13.5	15.4	5.4	9.7	15.3	10.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	13.5	15.4	5.4	9.7	15.3	10.8	12.4
Queue Length 50th (m)	7.7	6.3	3.6	0.0	2.7	37.0	3.5	23.2
Queue Length 95th (m)	17.5	16.1	9.9	7.7	7.6	63.6	9.8	43.2
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	394	498	473	474	401	782	321	722
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	0.23	0.20	0.09	0.16	0.11	0.59	0.17	0.48

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2028 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Future Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1498			1498	1317	1505	1616		1515	1459	
Flt Permitted	0.73	1.00			0.97	1.00	0.52	1.00		0.42	1.00	
Satd. Flow (perm)	1225	1498			1466	1317	829	1616		664	1459	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	75	23	5	39	74	44	456	3	56	268	78
RTOR Reduction (vph)	0	16	0	0	0	50	0	1	0	0	17	0
Lane Group Flow (vph)	89	82	0	0	44	24	44	458	0	56	329	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	395	483			472	424	401	781		321	705	
v/s Ratio Prot		0.06						c0.28			0.23	
v/s Ratio Perm	c0.07				0.03	0.02	0.05			0.08		
v/c Ratio	0.23	0.17			0.09	0.06	0.11	0.59		0.17	0.47	
Uniform Delay, d1	15.3	15.1			14.7	14.5	8.7	11.5		9.0	10.7	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.8			0.4	0.3	0.6	3.2		1.2	2.2	
Delay (s)	16.7	15.8			15.1	14.7	9.3	14.8		10.2	12.9	
Level of Service	B	B			B	B	A	B		B	B	
Approach Delay (s)	16.2				14.9			14.3			12.5	
Approach LOS	B				B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:44:08 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FT 2028							
Leg North	0.55	1.02	3.75	0.35	A	4.01	A
Leg West	1.43	1.03	4.83	0.58	A		
Leg East	0.35	~1	2.54	0.25	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:44:07 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2028, AM	FT 2028	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				4.01	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	477.00	100.000
West	ONE HOUR	✓	972.00	100.000
East	ONE HOUR	✓	453.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.000	132.000	345.000
West	65.000	0.000	907.000
East	100.000	353.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.00	0.28	0.72
West	0.07	0.00	0.93
East	0.22	0.78	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	East

From	North	1.000	1.030	1.010
	West	1.030	1.000	1.030
	East	1.070	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.0	3.0	1.0
West	3.0	0.0	3.0
East	7.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.35	3.75	0.55	1.02	A	437.70	656.56	36.98	3.38	0.41	36.98	3.38
West	0.58	4.83	1.43	1.03	A	891.92	1337.89	87.99	3.95	0.98	87.99	3.95
East	0.25	2.54	0.35	~1	A	415.68	623.52	25.03	2.41	0.28	25.03	2.41

Main Results for each time segment**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	359.11	89.78	357.91	123.86	265.08	0.00	1568.05	856.58	0.229	0.00	0.30	3.018	A
West	731.77	182.94	729.23	364.13	258.87	0.00	1911.82	1690.18	0.383	0.00	0.64	3.129	A
East	341.04	85.26	340.18	939.33	48.77	0.00	2040.93	2001.44	0.167	0.00	0.22	2.280	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	428.81	107.20	428.45	148.22	317.17	0.00	1539.43	856.59	0.279	0.30	0.39	3.290	A
West	873.81	218.45	872.80	435.74	309.89	0.00	1880.46	1690.18	0.465	0.64	0.89	3.676	A
East	407.24	101.81	407.02	1124.32	58.37	0.00	2035.03	2001.44	0.200	0.22	0.27	2.383	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	525.19	131.30	524.57	181.45	388.41	0.00	1500.28	856.59	0.350	0.39	0.54	3.745	A
West	1070.19	267.55	1068.07	533.57	379.41	0.00	1837.74	1690.18	0.582	0.89	1.42	4.804	A
East	498.76	124.69	498.44	1376.05	71.42	0.00	2027.00	2001.44	0.246	0.27	0.35	2.538	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	525.19	131.30	525.18	181.67	388.66	0.00	1500.14	856.59	0.350	0.54	0.55	3.748	A
West	1070.19	267.55	1070.16	533.99	379.85	0.00	1837.47	1690.18	0.582	1.42	1.43	4.832	A
East	498.76	124.69	498.76	1378.44	71.56	0.00	2026.92	2001.44	0.246	0.35	0.35	2.538	A

Main results: (09:00-09:15)

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Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:43:52 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FT 2028							
Leg North	0.36	~1	4.46	0.26	A	5.24	A
Leg West	0.63	1.03	3.05	0.38	A		
Leg East	2.57	4.07	6.52	0.72	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:43:51 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2028, PM	FT 2028	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				5.24	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	262.00	100.000
West	ONE HOUR	✓	678.00	100.000
East	ONE HOUR	✓	1305.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To		
	North	West	East
From North	0.000	93.000	169.000
From West	108.000	0.000	570.000
From East	309.000	996.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To		
	North	West	East
From North	0.00	0.35	0.65
From West	0.16	0.00	0.84
From East	0.24	0.76	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	East

From	North	1.000	1.020	1.020
	West	1.010	1.000	1.030
	East	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

	To		
	North	West	East
From North	0.0	2.0	2.0
From West	1.0	0.0	3.0
From East	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.26	4.46	0.36	~1	A	240.42	360.62	23.33	3.88	0.26	23.33	3.88
West	0.38	3.05	0.63	1.03	A	622.14	933.22	43.08	2.77	0.48	43.09	2.77
East	0.72	6.52	2.57	4.07	A	1197.49	1796.24	146.36	4.89	1.63	146.38	4.89

Main Results for each time segment**Main results: (16:00-16:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	197.25	49.31	196.52	312.81	746.92	0.00	1303.24	915.21	0.151	0.00	0.18	3.316	A
West	510.43	127.61	509.03	816.68	126.76	0.00	1993.00	1708.12	0.256	0.00	0.35	2.488	A
East	982.47	245.62	978.65	554.71	81.08	0.00	2021.07	1903.69	0.486	0.00	0.96	3.501	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.53	58.88	235.29	374.38	894.00	0.00	1222.41	915.22	0.193	0.18	0.24	3.719	A
West	609.51	152.38	609.09	977.52	151.77	0.00	1977.63	1708.12	0.308	0.35	0.46	2.701	A
East	1173.17	293.29	1171.36	663.84	97.02	0.00	2011.27	1903.69	0.583	0.96	1.41	4.351	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	288.47	72.12	288.02	457.94	1093.15	0.00	1112.95	915.22	0.259	0.24	0.35	4.449	A
West	746.49	186.62	745.79	1195.39	185.78	0.00	1956.73	1708.12	0.382	0.46	0.63	3.051	A
East	1436.83	359.21	1432.29	812.78	118.80	0.00	1997.89	1903.69	0.719	1.41	2.54	6.426	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	288.47	72.12	288.46	459.10	1096.52	0.00	1111.10	915.22	0.260	0.35	0.36	4.463	A
West	746.49	186.62	746.48	1198.91	186.07	0.00	1956.55	1708.12	0.382	0.63	0.63	3.053	A
East	1436.83	359.21	1436.71	813.64	118.91	0.00	1997.82	1903.69	0.719	2.54	2.57	6.524	A

Main results: (17:00-17:15)

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Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
Future Volume (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.97	1.00		0.98	0.99	1.00		1.00		0.97
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	3471	1488	1686	3438	1417	1670	3308	0	3146	1863	1458
Flt Permitted	0.089			0.116			0.149			0.950		
Satd. Flow (perm)	156	3471	1447	206	3438	1387	259	3308	0	3131	1863	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			479			433		4				296
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Adj. Flow (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
Shared Lane Traffic (%)												
Lane Group Flow (vph)	421	1204	685	41	1189	600	341	353	0	728	438	444
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

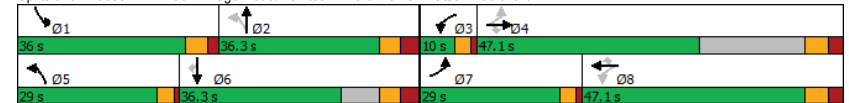
Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	61.0	61.0	49.0	40.0	40.0	56.1	29.0		30.0	37.2	37.2
Actuated g/C Ratio	0.49	0.41	0.41	0.33	0.27	0.27	0.38	0.20		0.20	0.25	0.25
v/c Ratio	1.28	0.84	0.78	0.33	1.28	0.87	1.05	0.54		1.15	0.94	0.77
Control Delay	183.1	46.6	18.2	29.6	179.3	28.3	106.0	56.7		134.9	83.5	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	183.1	46.6	18.2	29.6	179.3	28.3	106.0	56.7		134.9	83.5	27.0
LOS	F	D	B	C	F	C	F	E		F	F	C
Approach Delay		63.1			126.4			80.9			91.2	
Approach LOS		E			F			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length:	148.4											
Actuated Cycle Length:	148.4											
Natural Cycle:	145											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.28											
Intersection Signal Delay:	90.0				Intersection LOS: F							
Intersection Capacity Utilization	124.7%				ICU Level of Service H							
Analysis Period (min)	15											

Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard



Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	421	1204	685	41	1189	600	341	353	728	438	444
v/c Ratio	1.28	0.84	0.78	0.33	1.28	0.87	1.05	0.54	1.15	0.94	0.77
Control Delay	183.1	46.6	18.2	29.6	179.3	28.3	106.0	56.7	134.9	83.5	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	183.1	46.6	18.2	29.6	179.3	28.3	106.0	56.7	134.9	83.5	27.0
Queue Length 50th (m)	~148.5	179.7	60.5	6.6	~245.2	57.0	~89.8	51.8	~135.6	135.4	45.4
Queue Length 95th (m)	#218.2	212.2	123.2	13.8	#289.7	#135.4	#157.7	69.3	#176.7	#206.1	93.9
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	330	1426	876	127	926	690	337	649	635	466	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.84	0.78	0.32	1.28	0.87	1.01	0.54	1.15	0.94	0.77

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
Future Volume (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1670	3471	1447	1686	3438	1387	1668	3307		3146	1863	1410
Flt Permitted	0.09	1.00	1.00	0.12	1.00	1.00	0.15	1.00		0.95	1.00	1.00
Satd. Flow (perm)	157	3471	1447	205	3438	1387	261	3307		3146	1863	1410
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	421	1204	685	41	1189	600	341	331	22	728	438	444
RTOR Reduction (vph)	0	0	283	0	0	315	0	3	0	0	0	222
Lane Group Flow (vph)	421	1204	402	41	1189	285	341	350	0	728	438	222
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	69.8	61.0	61.0	45.6	40.8	40.8	52.8	29.0		30.0	37.2	37.2
Effective Green, g (s)	69.8	61.0	61.0	45.6	40.8	40.8	52.8	29.0		30.0	37.2	37.2
Actuated g/C Ratio	0.47	0.41	0.41	0.31	0.27	0.27	0.35	0.19		0.20	0.25	0.25
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	326	1419	591	110	940	379	316	642		632	464	351
v/s Ratio Prot	c0.22	0.35		0.01	0.35		0.17	0.11		c0.23	0.24	
v/s Ratio Perm	c0.39		0.28	0.10		0.21	c0.21					0.16
v/c Ratio	1.29	0.85	0.68	0.37	1.26	0.75	1.08	0.54		1.15	0.94	0.63
Uniform Delay, d1	48.5	39.9	36.1	38.4	54.2	49.6	44.6	54.2		59.6	55.0	49.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	152.2	4.9	3.1	2.1	127.7	8.2	73.3	3.3		85.6	29.9	8.4
Delay (s)	200.7	44.8	39.2	40.6	181.9	57.8	117.9	57.5		145.2	84.9	58.3
Level of Service	F	D	D	D	F	E	F	E		F	F	E
Approach Delay (s)		71.6			138.1			87.2			104.8	
Approach LOS		E			F			F			F	

Intersection Summary

HCM 2000 Control Delay	100.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	24.4
Intersection Capacity Utilization	124.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
Future Volume (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99										
Frt			0.850								0.985	
Flt Protected		0.953			0.979		0.950			0.950		
Satd. Flow (prot)	0	1493	1417	0	1517	0	1670	3182	0	1686	3173	0
Flt Permitted		0.726			0.896		0.950			0.088		
Satd. Flow (perm)	0	1131	1417	0	1389	0	1670	3182	0	156	3173	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125								12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	4					4						
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 (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Adj. Flow (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	125	0	7	0	127	1895	0	2	1818	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		17.2			17.2			12.9		63.4		45.4
Actuated g/C Ratio		0.18			0.18			0.14		0.68		0.49
v/c Ratio		0.69			0.35			0.55		0.88		0.03
Control Delay		53.5			8.9			48.1		19.2		18.0
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.5			8.9			48.1		19.2		18.0
LOS		D			A			C		D		B
Approach Delay		32.8			31.1			21.0				109.9
Approach LOS		C			C			C				F
Intersection Summary												
Area Type:		Other										
Cycle Length:		117.6										
Actuated Cycle Length:		93.3										
Natural Cycle:		110										
Control Type:		Semi Act-Uncoord										
Maximum v/c Ratio:		1.17										
Intersection Signal Delay:		61.1						Intersection LOS: E				
Intersection Capacity Utilization		104.6%						ICU Level of Service G				
Analysis Period (min)		15										

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	125	7	127	1895	2	1818
v/c Ratio	0.69	0.35	0.03	0.55	0.88	0.03	1.17
Control Delay	53.5	8.9	31.1	48.1	19.2	18.0	110.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	8.9	31.1	48.1	19.2	18.0	110.0
Queue Length 50th (m)	25.3	0.0	1.1	22.5	129.1	0.2	~213.6
Queue Length 95th (m)	48.8	14.7	5.0	44.9	#260.4	2.0	#327.9
Internal Link Dist (m)	295.9		64.4		538.4		2438.2
Turn Bay Length (m)				110.0		35.0	
Base Capacity (vph)	428	614	525	361	2410	75	1550
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.01	0.35	0.79	0.03	1.17

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
Future Volume (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1487	1417		1517		1670	3181		1686	3172	
Flt Permitted		0.73	1.00		0.90		0.95	1.00		0.09	1.00	
Satd. Flow (perm)		1132	1417		1389		1670	3181		156	3172	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	3	125	3	4	0	127	1889	6	2	1631	187
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	144	23	0	7	0	127	1895	0	2	1812	0
Confl. Peds. (#/hr)		4					4					
Heavy Vehicles (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Actuated Green, G (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Effective Green, g (s)		17.2	17.2		17.2		12.9	63.4		45.5	45.5	
Actuated g/C Ratio		0.18	0.18		0.18		0.14	0.68		0.49	0.49	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		208	261		256		231	2163		76	1548	
v/s Ratio Prot							0.08	c0.60			c0.57	
v/s Ratio Perm		c0.13	0.02		0.01					0.01		
v/c Ratio		0.69	0.09		0.03		0.55	0.88		0.03	1.17	
Uniform Delay, d1		35.5	31.5		31.1		37.4	11.8		12.4	23.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.5	0.1		0.0		2.7	5.4		0.6	84.0	
Delay (s)		45.1	31.6		31.2		40.1	17.2		13.0	107.8	
Level of Service		D	C		C		D	B		B	F	
Approach Delay (s)		38.8			31.2			18.6			107.7	
Approach LOS		D			C			B			F	

Intersection Summary

HCM 2000 Control Delay	59.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	17.6
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

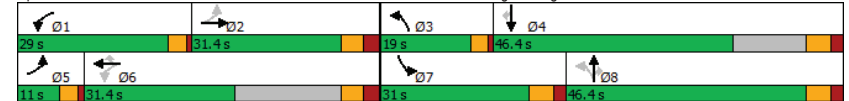
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
Future Volume (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.97			0.99	1.00		0.98
Frt	0.871					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1621	2500	0	1576	1827	1340	1547	4940	1377	2870	3471	1458
Flt Permitted	0.722			0.471			0.097			0.950		
Satd. Flow (perm)	1217	2500	0	773	1827	1306	158	4940	1359	2869	3471	1425
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		175				138			169			122
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.6			324.8			266.0			278.1	
Travel Time (s)		13.1			23.4			19.2			20.0	
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
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 (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Adj. Flow (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	204	0	143	53	112	189	1688	89	101	1608	57
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	17.1	7.7		21.5	10.2	10.2	56.5	41.4	41.4	10.3	40.9	40.9
Actuated g/C Ratio	0.19	0.08		0.23	0.11	0.11	0.62	0.45	0.45	0.11	0.45	0.45
v/c Ratio	0.88	0.55		0.54	0.26	0.42	0.65	0.76	0.13	0.32	1.04	0.08
Control Delay	67.6	15.9		35.7	40.1	8.9	27.7	24.3	0.4	41.9	61.0	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	15.9		35.7	40.1	8.9	27.7	24.3	0.4	41.9	61.0	0.2
LOS	E	B		D	D	A	C	C	A	D	E	A
Approach Delay		43.2			26.7			23.6			57.9	
Approach LOS		D			C			C			E	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 91.7												
Natural Cycle: 130												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.04												
Intersection Signal Delay: 39.3					Intersection LOS: D							
Intersection Capacity Utilization 98.1%					ICU Level of Service F							
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	228	204	143	53	112	189	1688	89	101	1608	57
v/c Ratio	0.88	0.55	0.54	0.26	0.42	0.65	0.76	0.13	0.32	1.04	0.08
Control Delay	67.6	15.9	35.7	40.1	8.9	27.7	24.3	0.4	41.9	61.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	15.9	35.7	40.1	8.9	27.7	24.3	0.4	41.9	61.0	0.2
Queue Length 50th (m)	36.6	2.6	21.7	9.2	0.0	16.4	89.7	0.0	8.9	~170.6	0.0
Queue Length 95th (m)	#77.9	14.1	38.9	20.6	10.0	44.5	130.7	0.0	18.2	#251.2	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	258	810	441	859	687	329	2227	705	784	1974	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.25	0.32	0.06	0.16	0.57	0.76	0.13	0.13	0.81	0.07

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
Future Volume (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2512		1571	1827	1312	1547	4940	1359	2870	3471	1430
Flt Permitted	0.72	1.00		0.47	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1226	2512		778	1827	1312	157	4940	1359	2870	3471	1430
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	228	29	175	143	53	112	189	1688	89	101	1608	57
RTOR Reduction (vph)	0	160	0	0	0	100	0	0	49	0	0	32
Lane Group Flow (vph)	228	44	0	143	53	12	189	1688	40	101	1608	25
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
Heavy Vehicles (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	14.7	7.7		19.7	10.2	10.2	54.1	41.4	41.4	10.3	41.0	41.0
Effective Green, g (s)	14.7	7.7		19.7	10.2	10.2	54.1	41.4	41.4	10.3	41.0	41.0
Actuated g/C Ratio	0.16	0.08		0.21	0.11	0.11	0.59	0.45	0.45	0.11	0.45	0.45
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	226	210		249	203	145	285	2230	613	322	1551	639
v/s Ratio Prot	c0.08	0.02		c0.06	0.03		c0.09	0.34		0.04	c0.46	
v/s Ratio Perm	c0.08			0.06		0.01	0.30		0.03			0.02
v/c Ratio	1.01	0.21		0.57	0.26	0.09	0.66	0.76	0.07	0.31	1.04	0.04
Uniform Delay, d1	38.0	39.2		31.1	37.3	36.6	20.7	21.0	14.2	37.4	25.4	14.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.2	0.5		2.0	0.7	0.3	5.7	2.5	0.2	0.6	33.0	0.1
Delay (s)	100.2	39.7		33.1	38.0	36.8	26.4	23.4	14.4	38.0	58.3	14.4
Level of Service	F	D		C	D	D	C	C	B	D	E	B
Approach Delay (s)		71.6			35.3			23.3			55.7	
Approach LOS		E			D			C			E	

Intersection Summary

HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	22.8
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Future Volume (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1621	0	1458	1637	1881	1390	1637	3438	0	0	5036	1458
Flt Permitted	0.132			0.950			0.115					
Satd. Flow (perm)	225	0	1458	1637	1881	1390	198	3438	0	0	5036	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			222			364						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)							2	2				
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 (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Adj. Flow (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.2		30.2	47.4	44.2		116.0	60.5			43.5	43.5
Actuated g/C Ratio	0.26		0.26	0.41	0.38		1.00	0.52			0.38	0.38
v/c Ratio	1.97		1.03	0.38	1.23		0.75	1.75			0.66	0.22
Control Delay	513.9		72.1	27.6	148.7		3.7	379.5			31.6	7.5
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	513.9		72.1	27.6	148.7		3.7	379.5			31.6	7.5
LOS	F		E	C	F		A	F			C	A
Approach Delay		147.1			65.4			138.3				29.3
Approach LOS		F			E			F				C
Intersection Summary												
Area Type: Other												
Cycle Length: 127.1												
Actuated Cycle Length: 116												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 1.97												
Intersection Signal Delay: 82.6												
Intersection Capacity Utilization 119.4%												
Analysis Period (min) 15												
Intersection LOS: F												
ICU Level of Service H												
Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp												

Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - PM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	114	557	251	882	1036	400	816	1248	133
v/c Ratio	1.97	1.03	0.38	1.23	0.75	1.75	0.48	0.66	0.22
Control Delay	513.9	72.1	27.6	148.7	3.7	379.5	20.0	31.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	513.9	72.1	27.6	148.7	3.7	379.5	20.0	31.6	7.5
Queue Length 50th (m)	~42.3	~100.4	41.4	~262.0	0.0	~121.7	65.1	89.3	4.2
Queue Length 95th (m)	#87.3	#189.6	73.5	#384.5	0.0	#197.2	81.0	104.3	16.8
Internal Link Dist (m)			459.0			296.0	151.5		
Turn Bay Length (m)	75.0				180.0			65.0	
Base Capacity (vph)	58	543	669	717	1390	228	2055	2400	749
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.97	1.03	0.38	1.23	0.75	1.75	0.40	0.52	0.18

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Future Volume (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1621		1458	1637	1881	1390	1637	3438			5036	1458
Flt Permitted	0.13		1.00	0.95	1.00	1.00	0.12	1.00			1.00	1.00
Satd. Flow (perm)	226		1458	1637	1881	1390	198	3438			5036	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	0	557	251	882	1036	400	816	0	0	1248	133
RTOR Reduction (vph)	0	0	164	0	0	0	0	0	0	0	0	66
Lane Group Flow (vph)	114	0	393	251	882	1036	400	816	0	0	1248	67
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.2		30.2	44.2	44.2	115.9	57.6	57.6			43.6	43.6
Effective Green, g (s)	30.2		30.2	44.2	44.2	115.9	57.6	57.6			43.6	43.6
Actuated g/C Ratio	0.26		0.26	0.38	0.38	1.00	0.50	0.50			0.38	0.38
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	58		379	624	717	1390	222	1708			1894	548
v/s Ratio Prot				0.03	c0.47		c0.16	0.24			0.25	
v/s Ratio Perm	c0.50		0.27	0.12		0.75	c0.74					0.05
v/c Ratio	1.97		1.04	0.40	1.23	0.75	1.80	0.48			0.66	0.12
Uniform Delay, d1	42.9		42.9	26.2	35.9	0.0	25.0	19.2			30.0	23.6
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	490.5		56.0	0.9	115.6	3.7	378.2	0.4			1.1	0.2
Delay (s)	533.3		98.8	27.1	151.4	3.7	403.1	19.7			31.1	23.9
Level of Service	F		F	C	F	A	F	B			C	C
Approach Delay (s)		172.7			66.5			145.8			30.4	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay		88.2										
HCM 2000 Volume to Capacity ratio		1.85										
Actuated Cycle Length (s)		115.9						22.1				
Intersection Capacity Utilization		119.4%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2028 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	11	830	1388	97	52	12
Future Volume (vph)	11	830	1388	97	52	12
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.975	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1601	1604	0	1654	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1601	1604	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	1%	0%	0%
Adj. Flow (vph)	11	830	1388	97	52	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	841	1485	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	101.4%
Analysis Period (min)	15
ICU Level of Service	G

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2028 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	11	830	1388	97	52	12
Future Volume (Veh/h)	11	830	1388	97	52	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	830	1388	97	52	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1485				2288	1436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1485				2288	1436
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				0	93
cM capacity (veh/h)	459				43	165

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	841	1485	64
Volume Left	11	0	52
Volume Right	0	97	12
cSH	459	1700	50
Volume to Capacity	0.02	0.87	1.29
Queue Length 95th (m)	0.6	0.0	47.0
Control Delay (s)	0.8	0.0	356.5
Lane LOS	A		F
Approach Delay (s)	0.8	0.0	356.5
Approach LOS			F

Intersection Summary

Average Delay		9.8	
Intersection Capacity Utilization	101.4%		ICU Level of Service
Analysis Period (min)		15	
			G

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	108	570	996	309	169	93
Future Volume (vph)	108	570	996	309	169	93
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.952	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1670	1845	1618	1389	1596	0
Flt Permitted	0.090				0.969	
Satd. Flow (perm)	158	1845	1618	1389	1596	0
Right Turn on Red				Yes	Yes	
Satd. Flow (RTOR)				89	30	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Adj. Flow (vph)	108	570	996	309	169	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	570	996	309	262	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	53.2	50.7	40.2	40.2	25.1	
Actuated g/C Ratio	0.60	0.57	0.45	0.45	0.28	
v/c Ratio	0.44	0.54	1.36	0.46	0.55	
Control Delay	15.0	13.7	193.5	14.8	29.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	13.7	193.5	14.8	29.8	
LOS	B	B	F	B	C	
Approach Delay		13.9	151.2		29.8	
Approach LOS		B	F		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 88.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 95.6

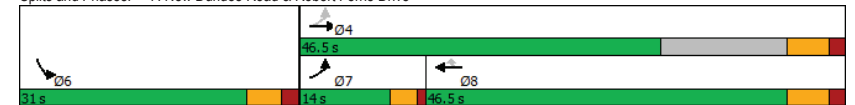
Intersection LOS: F

Intersection Capacity Utilization 96.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2028 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	108	570	996	309	262
v/c Ratio	0.44	0.54	1.36	0.46	0.55
Control Delay	15.0	13.7	193.5	14.8	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	13.7	193.5	14.8	29.8
Queue Length 50th (m)	7.5	57.8	~249.1	27.0	36.7
Queue Length 95th (m)	18.4	85.4	#325.4	50.4	62.6
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	266	1132	735	679	474
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.50	1.36	0.46	0.55

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2028 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	108	570	996	309	169	93
Future Volume (vph)	108	570	996	309	169	93
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1670	1845	1618	1389	1596	
Flt Permitted	0.09	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	159	1845	1618	1389	1596	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	570	996	309	169	93
RTOR Reduction (vph)	0	0	0	49	22	0
Lane Group Flow (vph)	108	570	996	260	240	0
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	51.6	51.6	40.2	40.2	25.1	
Effective Green, g (s)	51.6	51.6	40.2	40.2	25.1	
Actuated g/C Ratio	0.58	0.58	0.45	0.45	0.28	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	217	1067	729	625	449	
v/s Ratio Prot	0.04	c0.31	c0.62		c0.15	
v/s Ratio Perm	0.25			0.19		
v/c Ratio	0.50	0.53	1.37	0.42	0.54	
Uniform Delay, d1	18.1	11.5	24.5	16.6	27.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.5	173.6	0.5	4.5	
Delay (s)	19.9	12.0	198.1	17.0	31.6	
Level of Service	B	B	F	B	C	
Approach Delay (s)		13.2	155.2		31.6	
Approach LOS		B	F		C	

Intersection Summary

HCM 2000 Control Delay	97.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
8: New Dundee Road

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	26	593	89	20	629	18	68	75	19	4	34	19
Future Volume (vph)	26	593	89	20	629	18	68	75	19	4	34	19
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.996			0.984			0.955	
Flt Protected		0.998			0.999			0.979			0.997	
Satd. Flow (prot)	0	1504	0	0	1495	0	0	1475	0	0	1450	0
Flt Permitted		0.998			0.999			0.979			0.997	
Satd. Flow (perm)	0	1504	0	0	1495	0	0	1475	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	2%	10%	3%	0%	3%	0%	0%	0%	3%	0%
Adj. Flow (vph)	26	593	89	20	629	18	68	75	19	4	34	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	708	0	0	667	0	0	162	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 83.2%

ICU Level of Service E

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	26	593	89	20	629	18	68	75	19	4	34	19
Future Volume (Veh/h)	26	593	89	20	629	18	68	75	19	4	34	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	593	89	20	629	18	68	75	19	4	34	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	647			682			1404	1376	638	1424	1412	638
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	647			682			1404	1376	638	1424	1412	638
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			21	46	96	93	74	96
cM capacity (veh/h)	948			874			86	139	481	61	131	480
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	708	667	162	57								
Volume Left	26	20	68	4								
Volume Right	89	18	19	19								
cSH	948	874	118	156								
Volume to Capacity	0.03	0.02	1.37	0.37								
Queue Length 95th (m)	0.7	0.6	87.8	12.3								
Control Delay (s)	0.7	0.6	277.9	40.8								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.7	0.6	277.9	40.8								
Approach LOS		F	E									

Intersection Summary

Average Delay 30.3

Intersection Capacity Utilization 83.2% ICU Level of Service E

Analysis Period (min) 15

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2028 Total - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	215	30	50	270	490	291
Future Volume (vph)	215	30	50	270	490	291
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983			0.950		
Flt Protected	0.958			0.992		
Satd. Flow (prot)	1662	0	0	1605	1542	0
Flt Permitted	0.958			0.992		
Satd. Flow (perm)	1662	0	0	1605	1542	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%
Adj. Flow (vph)	215	30	50	270	490	291
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	320	781	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 86.9% ICU Level of Service E

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2028 Total - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	215	30	50	270	490	291
Future Volume (vph)	215	30	50	270	490	291
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	30	50	270	490	291
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	245	320	781			
Volume Left (vph)	215	50	0			
Volume Right (vph)	30	0	291			
Hadj (s)	0.10	0.07	-0.20			
Departure Headway (s)	6.5	5.8	5.1			
Degree Utilization, x	0.44	0.51	1.11			
Capacity (veh/h)	539	610	699			
Control Delay (s)	14.6	14.7	87.4			
Approach Delay (s)	14.6	14.7	87.4			
Approach LOS	B	B	F			
Intersection Summary						
Delay		56.9				
Level of Service		F				
Intersection Capacity Utilization		86.9%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2028 Total - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (vph)	7	269	14	2	208	13
Future Volume (vph)	7	269	14	2	208	13
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.983			
Flt Protected	0.999					0.955
Satd. Flow (prot)	1530	0	1622	0	0	1505
Flt Permitted	0.999					0.955
Satd. Flow (perm)	1530	0	1622	0	0	1505
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Confl. Peds. (#/hr)	49			7	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	7	269	14	2	208	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	16	0	0	221
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2028 Total - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	7	269	14	2	208	13
Future Volume (Veh/h)	7	269	14	2	208	13
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	269	14	2	208	13
Pedestrians	7		49			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	1		4			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500	22			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	22			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	74			87	
cM capacity (veh/h)	441	1055			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	16	221
Volume Left	7	0	208
Volume Right	269	2	0
cSH	1019	1700	1564
Volume to Capacity	0.27	0.01	0.13
Queue Length 95th (m)	8.8	0.0	3.7
Control Delay (s)	9.8	0.0	7.3
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	7.3
Approach LOS	A		

Intersection Summary

Average Delay 8.4

Intersection Capacity Utilization 45.7%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Future Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	1.00	
Frt	0.976					0.850		0.995			0.985	
Flt Protected	0.950				0.990		0.950			0.950		
Satd. Flow (prot)	1653	1587	0	0	1621	1430	1686	1579	0	1621	1585	0
Flt Permitted	0.678				0.935		0.220			0.487		
Satd. Flow (perm)	1164	1587	0	0	1526	1380	388	1579	0	829	1585	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				101		4			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		184.2			333.0			586.7			311.9	
Travel Time (s)		13.3			24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Adj. Flow (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	86	0	0	123	101	13	384	0	135	686	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2028 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.17			0.25	0.20	0.07	0.50		0.34	0.89	
Control Delay	16.6	14.1			17.2	5.0	9.8	13.6		12.9	31.0	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.6	14.1			17.2	5.0	9.8	13.6		12.9	31.0	
LOS	B	B			B	A	A	B		B	C	
Approach Delay		15.1			11.7			13.5			28.0	
Approach LOS		B			B			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 62

Actuated Cycle Length: 62

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 20.9

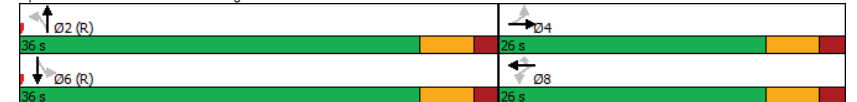
Intersection LOS: C

Intersection Capacity Utilization 78.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2028 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	86	123	101	13	384	135	686
v/c Ratio	0.17	0.17	0.25	0.20	0.07	0.50	0.34	0.89
Control Delay	16.6	14.1	17.2	5.0	9.8	13.6	12.9	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	14.1	17.2	5.0	9.8	13.6	12.9	31.0
Queue Length 50th (m)	5.3	6.1	10.7	0.0	0.8	29.0	9.3	68.4
Queue Length 95th (m)	13.4	15.0	22.3	8.9	3.5	50.8	21.1	#136.1
Internal Link Dist (m)		160.2	309.0			562.7		287.9
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	375	521	492	513	187	766	401	773
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	0.17	0.17	0.25	0.20	0.07	0.50	0.34	0.89

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2028 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Future Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1632	1587			1616	1380	1678	1580		1617	1584	
Flt Permitted	0.68	1.00			0.93	1.00	0.22	1.00		0.49	1.00	
Satd. Flow (perm)	1164	1587			1526	1380	388	1580		828	1584	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	72	14	25	98	101	13	372	12	135	617	69
RTOR Reduction (vph)	0	9	0	0	0	68	0	2	0	0	7	0
Lane Group Flow (vph)	63	77	0	0	123	33	13	382	0	135	679	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	375	511			492	445	187	764		400	766	
v/s Ratio Prot		0.05						0.24			c0.43	
v/s Ratio Perm	0.05				c0.08	0.02	0.03			0.16		
v/c Ratio	0.17	0.15			0.25	0.07	0.07	0.50		0.34	0.89	
Uniform Delay, d1	15.0	14.9			15.5	14.6	8.5	10.9		9.9	14.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6			1.2	0.3	0.7	2.3		2.3	14.4	
Delay (s)	16.0	15.6			16.7	14.9	9.3	13.2		12.1	28.8	
Level of Service	B	B			B	B	A	B		B	C	
Approach Delay (s)		15.8			15.9			13.1			26.1	
Approach LOS		B			B			B			C	

Intersection Summary

HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:47:39 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FT 2028							
Leg North	0.09	~1	2.60	0.07	A	3.37	A
Leg West	0.71	1.06	3.11	0.40	A		
Leg South	0.85	1.02	4.16	0.46	A		
Leg East	0.34	~1	2.76	0.23	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:47:38 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2028, AM	FT 2028	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.37	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	113.00	100.000
West	ONE HOUR	✓	752.00	100.000
South	ONE HOUR	✓	668.00	100.000
East	ONE HOUR	✓	409.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	67.000	18.000	28.000
	West	200.000	0.000	54.000	498.000
	South	55.000	74.000	0.000	539.000
	East	66.000	214.000	129.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.59	0.16	0.25
	West	0.27	0.00	0.07	0.66
	South	0.08	0.11	0.00	0.81

East	0.16	0.52	0.32	0.00
------	------	------	------	------

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.190	1.350	1.370
	West	1.050	1.000	1.210	1.050
	South	1.150	1.040	1.000	1.000
	East	1.250	1.130	1.090	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	19.0	35.0	37.0
	West	5.0	0.0	21.0	5.0
	South	15.0	4.0	0.0	0.0
	East	25.0	13.0	9.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.07	2.60	0.09	~1	A	103.69	155.54	6.48	2.50	0.07	6.48	2.50
West	0.40	3.11	0.71	1.06	A	690.05	1035.07	48.27	2.80	0.54	48.28	2.80
South	0.46	4.16	0.85	1.02	A	612.97	919.45	53.15	3.47	0.59	53.15	3.47
East	0.23	2.76	0.34	~1	A	375.31	562.96	24.15	2.57	0.27	24.15	2.57

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	85.07	21.27	84.85	240.99	313.08	0.00	1966.37	1040.86	0.043	0.00	0.06	2.400	A
West	566.15	141.54	564.58	266.53	131.40	0.00	2097.72	1483.63	0.270	0.00	0.39	2.487	A
South	502.91	125.73	501.34	150.92	545.07	0.00	1798.66	1010.69	0.280	0.00	0.39	2.813	A
East	307.92	76.98	307.10	799.43	246.97	0.00	2014.16	1766.34	0.153	0.00	0.20	2.391	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	101.58	25.40	101.53	288.36	374.63	0.00	1921.87	1040.86	0.053	0.06	0.07	2.480	A
West	676.03	169.01	675.56	318.93	157.23	0.00	2079.04	1483.63	0.325	0.39	0.51	2.719	A
South	600.52	150.13	599.92	180.58	652.21	0.00	1721.20	1010.69	0.349	0.39	0.54	3.257	A
East	367.68	91.92	367.47	956.61	295.52	0.00	1979.06	1766.34	0.186	0.20	0.26	2.533	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	124.42	31.10	124.34	353.06	458.71	0.00	1861.09	1040.86	0.067	0.07	0.09	2.600	A
West	827.97	206.99	827.15	390.50	192.54	0.00	2053.51	1483.63	0.403	0.51	0.71	3.110	A
South	735.48	183.87	734.28	221.13	798.57	0.00	1615.39	1010.69	0.455	0.54	0.84	4.141	A
East	450.32	112.58	449.97	1171.06	361.79	0.00	1931.16	1766.34	0.233	0.26	0.34	2.757	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	124.42	31.10	124.41	353.42	459.12	0.00	1860.79	1040.86	0.067	0.09	0.09	2.600	A
West	827.97	206.99	827.96	390.86	192.68	0.00	2053.41	1483.63	0.403	0.71	0.71	3.113	A
South	735.48	183.87	735.47	221.30	799.33	0.00	1614.83	1010.69	0.455	0.84	0.85	4.155	A
East	450.32	112.58	450.31	1172.57	362.23	0.00	1930.84	1766.34	0.233	0.34	0.34	2.757	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	101.58	25.40	101.66	288.94	375.29	0.00	1921.39	1040.86	0.053	0.09	0.07	2.481	A
West	676.03	169.01	676.84	319.49	157.46	0.00	2078.87	1483.63	0.325	0.71	0.51	2.725	A
South	600.52	150.13	601.71	180.87	653.42	0.00	1720.32	1010.69	0.349	0.85	0.55	3.272	A
East	367.68	91.92	368.02	958.93	296.21	0.00	1978.57	1766.34	0.186	0.34	0.26	2.535	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	85.07	21.27	85.13	241.88	314.19	0.00	1965.57	1040.86	0.043	0.07	0.06	2.403	A
West	566.15	141.54	566.62	267.48	131.84	0.00	2097.40	1483.63	0.270	0.51	0.39	2.495	A
South	502.91	125.73	503.51	151.43	547.03	0.00	1797.24	1010.69	0.280	0.55	0.40	2.827	A
East	307.92	76.98	308.13	802.61	247.93	0.00	2013.47	1766.34	0.153	0.26	0.21	2.396	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.84	0.06	2.400	A	A
West	5.76	0.38	2.487	A	A
South	5.77	0.38	2.813	A	A
East	3.02	0.20	2.391	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.04	0.07	2.480	A	A
West	7.53	0.50	2.719	A	A
South	7.98	0.53	3.257	A	A
East	3.83	0.26	2.533	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.33	0.09	2.600	A	A
West	10.50	0.70	3.110	A	A
South	12.32	0.82	4.141	A	A
East	5.09	0.34	2.757	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	1.35	0.09	2.600	A	A
West	10.70	0.71	3.113	A	A
South	12.66	0.84	4.155	A	A
East	5.16	0.34	2.757	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.06	0.07	2.481	A	A
West	7.82	0.52	2.725	A	A
South	8.37	0.56	3.272	A	A
East	3.95	0.26	2.535	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.86	0.06	2.403	A	A
West	5.98	0.40	2.495	A	A
South	6.03	0.40	2.827	A	A
East	3.12	0.21	2.396	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.84	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.71	0.00	0.00	0.00	1.06			N/A	N/A
South	0.85	0.00	0.00	0.00	1.02			N/A	N/A
East	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.40	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2023
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:47:08 PM

Summary of intersection performance

	PM					Intersection Delay (s)	Intersection LOS
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS		
A1 - FT 2028							
Leg North	0.45	~1	4.58	0.30	A	4.61	A
Leg West	0.75	1.02	3.80	0.42	A		
Leg South	0.44	~1	2.99	0.31	A		
Leg East	2.09	3.05	5.70	0.67	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:47:07 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2028, PM	FT 2028	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				4.61	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	324.00	100.000
West	ONE HOUR	✓	648.00	100.000
South	ONE HOUR	✓	482.00	100.000
East	ONE HOUR	✓	1208.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	218.000	68.000	38.000
	West	119.000	0.000	116.000	413.000
	South	57.000	100.000	0.000	325.000
	East	26.000	643.000	539.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.67	0.21	0.12
	West	0.18	0.00	0.18	0.64
	South	0.12	0.21	0.00	0.67
	East				

	East	0.02	0.53	0.45	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	1.000	1.020	1.020	1.190
	West	1.040	1.000	1.000	1.020
	South	1.000	1.020	1.000	1.000
	East	1.520	1.020	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.0	2.0	2.0	19.0
	West	4.0	0.0	0.0	2.0
	South	0.0	2.0	0.0	0.0
	East	52.0	2.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.30	4.58	0.45	~1	A	297.31	445.96	27.91	3.76	0.31	27.92	3.76
West	0.42	3.80	0.75	1.02	A	594.62	891.92	48.20	3.24	0.54	48.21	3.24
South	0.31	2.99	0.44	~1	A	442.29	663.44	29.66	2.68	0.33	29.66	2.68
East	0.67	5.70	2.09	3.05	A	1108.48	1662.72	121.21	4.37	1.35	121.22	4.37

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	243.92	60.98	243.12	151.62	961.78	0.00	1497.39	799.14	0.163	0.00	0.20	2.976	A
West	487.85	121.96	486.39	721.02	483.88	0.00	1842.89	1454.52	0.265	0.00	0.37	2.704	A
South	362.87	90.72	361.92	542.43	427.83	0.00	1883.41	1261.65	0.193	0.00	0.24	2.374	A
East	909.45	227.36	906.20	582.54	207.21	0.00	2042.91	1702.51	0.445	0.00	0.81	3.215	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	291.27	72.82	290.95	181.43	1150.99	0.00	1360.61	799.14	0.214	0.20	0.28	3.491	A
West	582.54	145.63	582.02	862.86	579.08	0.00	1774.07	1454.52	0.328	0.37	0.50	3.078	A
South	433.31	108.33	433.02	649.14	511.95	0.00	1822.59	1261.65	0.238	0.24	0.31	2.601	A
East	1085.97	271.49	1084.49	697.04	247.93	0.00	2013.47	1702.51	0.539	0.81	1.18	3.939	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	356.73	89.18	356.06	222.09	1407.94	0.00	1174.84	799.14	0.304	0.28	0.45	4.557	A
West	713.46	178.37	712.46	1055.64	708.36	0.00	1680.60	1454.52	0.425	0.50	0.75	3.789	A
South	530.69	132.67	530.19	794.14	626.68	0.00	1739.65	1261.65	0.305	0.31	0.44	2.986	A
East	1330.03	332.51	1326.49	853.33	303.53	0.00	1973.27	1702.51	0.674	1.18	2.07	5.635	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	356.73	89.18	356.72	222.40	1411.43	0.00	1172.32	799.14	0.304	0.45	0.45	4.578	A
West	713.46	178.37	713.45	1058.03	710.12	0.00	1679.33	1454.52	0.425	0.75	0.75	3.800	A
South	530.69	132.67	530.69	796.00	627.57	0.00	1739.01	1261.65	0.305	0.44	0.44	2.990	A
East	1330.03	332.51	1329.95	854.38	303.88	0.00	1973.02	1702.51	0.674	2.07	2.09	5.697	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	291.27	72.82	291.94	181.91	1156.05	0.00	1356.95	799.14	0.215	0.45	0.28	3.510	A
West	582.54	145.63	583.53	866.35	581.63	0.00	1772.22	1454.52	0.329	0.75	0.50	3.090	A
South	433.31	108.33	433.81	651.85	513.31	0.00	1821.61	1261.65	0.238	0.44	0.31	2.605	A
East	1085.97	271.49	1089.50	698.66	248.46	0.00	2013.08	1702.51	0.539	2.09	1.20	3.984	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	243.92	60.98	244.25	152.24	966.71	0.00	1493.83	799.14	0.163	0.28	0.20	2.988	A
West	487.85	121.96	488.38	724.58	486.38	0.00	1841.08	1454.52	0.265	0.50	0.37	2.714	A
South	362.87	90.72	363.17	545.16	429.60	0.00	1882.13	1261.65	0.193	0.31	0.24	2.381	A
East	909.45	227.36	910.97	584.79	207.98	0.00	2042.35	1702.51	0.445	1.20	0.82	3.245	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.96	0.20	2.976	A	A
West	5.39	0.36	2.704	A	A
South	3.53	0.24	2.374	A	A
East	11.87	0.79	3.215	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.15	0.28	3.491	A	A
West	7.33	0.49	3.078	A	A
South	4.62	0.31	2.601	A	A
East	17.28	1.15	3.939	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.59	0.44	4.557	A	A
West	10.97	0.73	3.789	A	A
South	6.48	0.43	2.986	A	A
East	29.68	1.98	5.635	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
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North	6.76	0.45	4.578	A	A
West	11.24	0.75	3.800	A	A
South	6.59	0.44	2.990	A	A
East	31.17	2.08	5.697	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.35	0.29	3.510	A	A
West	7.67	0.51	3.090	A	A
South	4.78	0.32	2.605	A	A
East	18.61	1.24	3.984	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.09	0.21	2.988	A	A
West	5.62	0.37	2.714	A	A
South	3.65	0.24	2.381	A	A
East	12.60	0.84	3.245	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.18	0.00	0.00	2.04	3.05			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.07	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.75	0.00	0.00	0.00	1.02			N/A	N/A
South	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.09	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.20	0.00	0.00	1.02	2.04			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.82	0.00	0.00	1.02	1.02			N/A	N/A

Appendix G

2033 Total Traffic Operations Reports



Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
Future Volume (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1900	1750	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.96	1.00		0.98	0.99	1.00		0.98		0.98
Frt			0.850			0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	3374	1390	1561	3438	1390	1653	3254	0	2895	1759	1417
Flt Permitted	0.086			0.181			0.579			0.950		
Satd. Flow (perm)	140	3374	1337	297	3438	1361	1001	3254	0	2838	1759	1389
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193			416		2				152
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		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 (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Adj. Flow (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	1158	266	14	1222	621	408	380	0	314	156	152
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	65.1	65.1	48.9	40.0	40.0	58.4	30.5		22.4	30.4	30.4
Actuated g/C Ratio	0.51	0.46	0.46	0.34	0.28	0.28	0.41	0.21		0.16	0.21	0.21
v/c Ratio	1.43	0.75	0.37	0.09	1.27	0.91	0.78	0.54		0.69	0.42	0.37
Control Delay	243.9	36.9	9.5	21.6	169.4	35.0	43.2	53.5		64.8	52.2	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	243.9	36.9	9.5	21.6	169.4	35.0	43.2	53.5		64.8	52.2	9.1
LOS	F	D	A	C	F	D	D	D		E	D	A
Approach Delay		83.1			123.4			48.2			48.1	
Approach LOS		F			F			D			D	
Intersection Summary												
Area Type:		Other										
Cycle Length: 148.4												
Actuated Cycle Length: 142.3												
Natural Cycle: 145												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.43												
Intersection Signal Delay: 88.0						Intersection LOS: F						
Intersection Capacity Utilization 127.7%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	454	1158	266	14	1222	621	408	380	314	156	152
v/c Ratio	1.43	0.75	0.37	0.09	1.27	0.91	0.78	0.54	0.69	0.42	0.37
Control Delay	243.9	36.9	9.5	21.6	169.4	35.0	43.2	53.5	64.8	52.2	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	243.9	36.9	9.5	21.6	169.4	35.0	43.2	53.5	64.8	52.2	9.1
Queue Length 50th (m)	~166.1	137.0	11.4	2.0	~236.5	69.7	89.3	52.8	45.6	40.5	0.0
Queue Length 95th (m)	#248.2	200.1	37.7	6.3	#296.3	#159.0	#129.7	74.1	61.8	63.2	18.8
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	318	1543	716	155	966	681	525	699	610	444	464
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.43	0.75	0.37	0.09	1.27	0.91	0.78	0.54	0.51	0.35	0.33

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
Future Volume (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1547	3374	1338	1561	3438	1362	1648	3255		2895	1759	1389
Flt Permitted	0.09	1.00	1.00	0.18	1.00	1.00	0.58	1.00		0.95	1.00	1.00
Satd. Flow (perm)	140	3374	1338	297	3438	1362	1005	3255		2895	1759	1389
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	454	1158	266	14	1222	621	408	365	15	314	156	152
RTOR Reduction (vph)	0	0	106	0	0	294	0	2	0	0	0	120
Lane Group Flow (vph)	454	1158	160	14	1222	327	408	378	0	314	156	32
Confl. Peds. (#/hr)	8		10	10		8	5		13	13		5
Heavy Vehicles (%)	9%	7%	7%	8%	5%	7%	2%	3%	0%	13%	8%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	71.5	65.1	65.1	44.9	42.5	42.5	55.0	30.5		22.4	30.4	30.4
Effective Green, g (s)	71.5	65.1	65.1	44.9	42.5	42.5	55.0	30.5		22.4	30.4	30.4
Actuated g/C Ratio	0.49	0.45	0.45	0.31	0.29	0.29	0.38	0.21		0.15	0.21	0.21
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	312	1516	601	113	1009	399	490	685		447	369	291
v/s Ratio Prot	c0.25	0.34		0.00	0.36		c0.14	0.12		0.11	0.09	
v/s Ratio Perm	c0.47		0.12	0.04		0.24	c0.18					0.02
Uniform Delay, d1	47.2	33.4	24.9	35.2	51.2	47.6	37.9	51.1		58.0	49.6	46.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	221.8	2.3	0.2	0.5	104.3	12.4	11.5	3.2		6.2	3.5	0.8
Delay (s)	269.1	35.8	25.1	35.7	155.5	60.0	49.4	54.2		64.2	53.1	47.0
Level of Service	F	D	C	D	F	E	D	D		E	D	D
Approach Delay (s)		90.7			122.6			51.7			57.2	
Approach LOS		F			F			D			E	

Intersection Summary

HCM 2000 Control Delay	92.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	144.8	Sum of lost time (s)	24.4
Intersection Capacity Utilization	127.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
Future Volume (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		0.99		1.00				1.00	
Frt			0.850		0.865						0.993	
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1537	1444	0	1323	0	1637	3094	0	1775	3073	0
Flt Permitted		0.757					0.950					
Satd. Flow (perm)	0	1223	1425	0	1323	0	1633	3094	0	1775	3073	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213		80						5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	1		1	1		1	7					7
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 (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Adj. Flow (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	213	0	2	0	76	1794	0	0	1640	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm		NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		23.2	23.2		23.2		11.4	58.6			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.12	0.62			0.49	
v/c Ratio		0.80	0.42		0.01		0.39	0.94			1.09	
Control Delay		53.8	6.7		0.0		48.8	28.9			80.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		53.8	6.7		0.0		48.8	28.9			80.6	
LOS		D	A		A		D	C			F	
Approach Delay		31.5						29.7			80.6	
Approach LOS		C						C			F	
Intersection Summary												
Area Type:		Other										
Cycle Length: 117.6												
Actuated Cycle Length: 94.8												
Natural Cycle: 100												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.09												
Intersection Signal Delay: 51.0						Intersection LOS: D						
Intersection Capacity Utilization 100.0%						ICU Level of Service F						
Analysis Period (min) 15												
Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park												
 Ø2		 Ø3				 Ø4						
41 s		25 s				51.6 s						
 Ø6		 Ø8										
41 s		51.6 s										

Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	→	↘	←	↙	↑	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	238	213	2	76	1794	1640
v/c Ratio	0.80	0.42	0.01	0.39	0.94	1.09
Control Delay	53.8	6.7	0.0	48.8	28.9	80.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.7	0.0	48.8	28.9	80.6
Queue Length 50th (m)	43.8	0.0	0.0	14.2	151.3	~199.5
Queue Length 95th (m)	75.9	17.2	0.0	31.4	#273.1	#305.8
Internal Link Dist (m)	295.9		64.4		538.4	2438.2
Turn Bay Length (m)				110.0		
Base Capacity (vph)	463	672	550	354	2343	1499
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	0.51	0.32	0.00	0.21	0.77	1.09

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park AM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
Future Volume (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)		6.0	6.0		6.0		5.0	6.6		5.0	6.6	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.86		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (prot)		1535	1425		1323		1637	3094		1637	3073	
Flt Permitted		0.76	1.00		1.00		0.95	1.00		1.00	1.00	
Satd. Flow (perm)		1222	1425		1323		1637	3094		1637	3073	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	0	213	0	0	2	76	1792	2	0	1559	81
RTOR Reduction (vph)	0	0	161	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	238	52	0	0	0	76	1794	0	0	1637	0
Confl. Peds. (#/hr)	1		1	1		1	7			7		
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	3%	9%	0%	0%	9%	4%
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Effective Green, g (s)		23.2	23.2		23.2		8.7	59.9			46.2	
Actuated g/C Ratio		0.24	0.24		0.24		0.09	0.63			0.48	
Clearance Time (s)		6.0	6.0		6.0		5.0	6.6			6.6	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	5.0			5.0	
Lane Grp Cap (vph)		296	345		320		148	1936			1483	
v/s Ratio Prot					0.00		0.05	c0.58			c0.53	
v/s Ratio Perm		c0.19	0.04									
v/c Ratio		0.80	0.15		0.00		0.51	0.93			1.10	
Uniform Delay, d1		34.1	28.5		27.5		41.5	15.9			24.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		14.6	0.2		0.0		3.0	9.2			57.4	
Delay (s)		48.7	28.7		27.5		44.5	25.1			82.1	
Level of Service		D	C		C		D	C			F	
Approach Delay (s)		39.2			27.5			25.9			82.1	
Approach LOS		D			C			C			F	

Intersection Summary

HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	95.7	Sum of lost time (s)	17.6
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

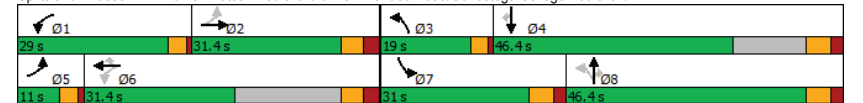
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
Future Volume (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.98			0.98	1.00		0.99
Frt	0.880					0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1576	2174	0	1492	1743	1219	1429	4848	1417	2749	3312	1229
Flt Permitted	0.624			0.658			0.088			0.950		
Satd. Flow (perm)	1028	2174	0	1026	1743	1196	132	4848	1393	2748	3312	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		119				138			169			122
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		181.6			324.8		266.0			278.1		
Travel Time (s)		13.1			23.4		19.2			20.0		
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
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 (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Adj. Flow (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	149	0	86	25	84	213	1655	204	86	1681	27
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2		7.2		
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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		

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	15.5	7.6		15.8	8.1	8.1	60.9	46.8	46.8	10.2	40.2	40.2
Actuated g/C Ratio	0.17	0.09		0.18	0.09	0.09	0.69	0.53	0.53	0.11	0.45	0.45
v/c Ratio	0.62	0.51		0.39	0.16	0.36	0.69	0.65	0.25	0.27	1.12	0.04
Control Delay	43.5	18.5		33.5	39.8	5.8	32.4	19.2	4.8	40.5	90.3	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	18.5		33.5	39.8	5.8	32.4	19.2	4.8	40.5	90.3	0.1
LOS	D	B		C	D	A	C	B	A	D	F	A
Approach Delay		30.5			22.4			19.2			86.6	
Approach LOS		C			C			B			F	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 88.9												
Natural Cycle: 150												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.12												
Intersection Signal Delay: 47.9												
Intersection LOS: D												
Intersection Capacity Utilization 93.2%												
ICU Level of Service F												
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	139	149	86	25	84	213	1655	204	86	1681	27
v/c Ratio	0.62	0.51	0.39	0.16	0.36	0.69	0.65	0.25	0.27	1.12	0.04
Control Delay	43.5	18.5	33.5	39.8	5.8	32.4	19.2	4.8	40.5	90.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	18.5	33.5	39.8	5.8	32.4	19.2	4.8	40.5	90.3	0.1
Queue Length 50th (m)	21.5	2.7	12.9	4.3	0.0	22.5	82.9	3.2	7.4	~188.3	0.0
Queue Length 95th (m)	38.2	12.5	25.4	12.1	3.5	#62.2	117.7	17.2	15.6	#259.2	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	223	700	426	848	652	310	2554	814	777	1948	763
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.21	0.20	0.03	0.13	0.69	0.65	0.25	0.11	0.86	0.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
Future Volume (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	2180		1487	1743	1199	1429	4848	1395	2749	3312	1213
Flt Permitted	0.62	1.00		0.66	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1031	2180		1029	1743	1199	132	4848	1395	2749	3312	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	139	30	119	86	25	84	213	1655	204	86	1681	27
RTOR Reduction (vph)	0	108	0	0	0	78	0	0	83	0	0	15
Lane Group Flow (vph)	139	41	0	86	25	6	213	1655	121	86	1681	12
Confl. Peds. (#/hr)	6		8	8		6	1		3	3		1
Heavy Vehicles (%)	7%	11%	40%	13%	9%	22%	18%	7%	5%	19%	9%	21%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	15.4	8.2		12.8	6.9	6.9	60.6	46.8	46.8	7.8	41.5	41.5
Effective Green, g (s)	15.4	8.2		12.8	6.9	6.9	60.6	46.8	46.8	7.8	41.5	41.5
Actuated g/C Ratio	0.17	0.09		0.14	0.08	0.08	0.66	0.51	0.51	0.09	0.45	0.45
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	216	195		173	131	90	301	2479	713	234	1502	550
v/s Ratio Prot	c0.05	0.02		0.03	0.01		c0.12	0.34		0.03	c0.51	
v/s Ratio Perm	c0.06			0.04		0.01	0.35		0.09			0.01
v/c Ratio	0.64	0.21		0.50	0.19	0.07	0.71	0.67	0.17	0.37	1.12	0.02
Uniform Delay, d1	34.8	38.6		35.9	39.7	39.3	24.0	16.6	12.0	39.5	25.0	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.5		0.8	0.7	0.3	7.4	1.4	0.5	1.0	63.2	0.1
Delay (s)	41.2	39.2		36.7	40.4	39.7	31.4	18.0	12.5	40.5	88.2	13.9
Level of Service	D	D		D	D	D	C	B	B	D	F	B
Approach Delay (s)		40.1			38.5			18.8			84.8	
Approach LOS		D			D			B			F	

Intersection Summary

HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	91.5	Sum of lost time (s)	22.8
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Future Volume (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1591	0	1458	1441	1776	1365	1561	3406	0	0	4803	1261
Flt Permitted	0.572			0.950			0.080					
Satd. Flow (perm)	958	0	1458	1441	1776	1365	131	3406	0	0	4803	1261
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213			288						105
Link Speed (k/h)		50			50			50				50
Link Distance (m)		1202.5			483.0			320.0				175.5
Travel Time (s)		86.6			34.8			23.0				12.6
Confl. Peds. (#/hr)								2	2			
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 (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Adj. Flow (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.1		30.1	47.3	44.1	123.4	68.1	65.2			51.2	51.2
Actuated g/C Ratio	0.24		0.24	0.38	0.36	1.00	0.55	0.53			0.41	0.41
v/c Ratio	0.77		1.90	0.45	0.49	0.70	0.78	0.52			0.75	0.08
Control Delay	66.9		435.9	32.6	34.9	3.0	50.1	20.1			33.2	0.3
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	66.9		435.9	32.6	34.9	3.0	50.1	20.1			33.2	0.3
LOS	E		F	C	C	A	D	C			C	A
Approach Delay		379.0			14.4			24.1				32.2
Approach LOS		F			B			C				C
Intersection Summary												
Area Type: Other												
Cycle Length: 127.1												
Actuated Cycle Length: 123.4												
Natural Cycle: 150												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 1.90												
Intersection Signal Delay: 101.4 Intersection LOS: F												
Intersection Capacity Utilization 124.6% ICU Level of Service H												
Analysis Period (min) 15												
Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp												
Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø13
14 s	37.2 s	14 s	61.9 s									
37.2 s		61.9 s										

Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - AM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	981	251	310	952	146	942	1486	47
v/c Ratio	0.77	1.90	0.45	0.49	0.70	0.78	0.52	0.75	0.08
Control Delay	66.9	435.9	32.6	34.9	3.0	50.1	20.1	33.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	435.9	32.6	34.9	3.0	50.1	20.1	33.2	0.3
Queue Length 50th (m)	44.6	~356.4	50.0	64.4	0.0	19.9	79.3	115.8	0.0
Queue Length 95th (m)	#83.7	#439.3	76.3	93.7	0.0	#55.5	97.7	134.1	0.0
Internal Link Dist (m)			459.0				296.0	151.5	
Turn Bay Length (m)	75.0					180.0			65.0
Base Capacity (vph)	233	516	552	634	1365	188	1908	2145	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	1.90	0.45	0.49	0.70	0.78	0.49	0.69	0.08

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	↰	↱	↰	↰	↰	↰	↱	↱
Traffic Volume (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Future Volume (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	0.85	1.00	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1591		1458	1441	1776	1365	1561	3406			4803	1261
Flt Permitted	0.57		1.00	0.95	1.00	1.00	0.08	1.00			1.00	1.00
Satd. Flow (perm)	957		1458	1441	1776	1365	131	3406			4803	1261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	0	981	251	310	952	146	942	0	0	1486	47
RTOR Reduction (vph)	0	0	161	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	179	0	820	251	310	952	146	942	0	0	1486	20
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	6%	0%	2%	17%	7%	9%	8%	6%	0%	0%	8%	18%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.1		30.1	44.1	44.1	123.4	65.2	65.2			51.2	51.2
Effective Green, g (s)	30.1		30.1	44.1	44.1	123.4	65.2	65.2			51.2	51.2
Actuated g/C Ratio	0.24		0.24	0.36	0.36	1.00	0.53	0.53			0.41	0.41
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	233		355	514	634	1365	185	1799			1992	523
v/s Ratio Prot				0.04	0.17		0.06	0.28			0.31	
v/s Ratio Perm	0.19		c0.56	0.13		c0.70	c0.35					0.02
v/c Ratio	0.77		2.31	0.49	0.49	0.70	0.79	0.52			0.75	0.04
Uniform Delay, d1	43.4		46.6	30.9	30.9	0.0	25.0	19.0			30.6	21.5
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	21.3		598.2	1.5	2.7	3.0	22.4	0.5			1.9	0.1
Delay (s)	64.7		644.8	32.4	33.6	3.0	47.4	19.5			32.5	21.5
Level of Service	E		F	C	C	A	D	B			C	C
Approach Delay (s)		555.3			14.1			23.2			32.1	
Approach LOS		F			B			C			C	

Intersection Summary

HCM 2000 Control Delay	139.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	123.4	Sum of lost time (s)	22.1
Intersection Capacity Utilization	124.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2033 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	4	1209	412	19	64	8
Future Volume (vph)	4	1209	412	19	64	8
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.985	
Flt Protected					0.957	
Satd. Flow (prot)	0	1616	1530	0	1664	0
Flt Permitted					0.957	
Satd. Flow (perm)	0	1616	1530	0	1664	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	2%	7%	11%	0%	0%
Adj. Flow (vph)	4	1209	412	19	64	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1213	431	0	72	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 87.9%	ICU Level of Service E					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2033 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	4	1209	412	19	64	8
Future Volume (Veh/h)	4	1209	412	19	64	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	1209	412	19	64	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	431				1638	422
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431				1638	422
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				42	99
cM capacity (veh/h)	1016				111	636
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	1213	431	72			
Volume Left	4	0	64			
Volume Right	0	19	8			
cSH	1016	1700	123			
Volume to Capacity	0.00	0.25	0.59			
Queue Length 95th (m)	0.1	0.0	23.4			
Control Delay (s)	0.1	0.0	69.6			
Lane LOS	A		F			
Approach Delay (s)	0.1	0.0	69.6			
Approach LOS			F			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		87.9%		ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	65	925	363	100	345	132
Future Volume (vph)	65	925	363	100	345	132
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.963	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1637	1845	1528	1311	1615	0
Flt Permitted	0.395				0.965	
Satd. Flow (perm)	681	1845	1528	1311	1615	0
Right Turn on Red				Yes	Yes	
Satd. Flow (RTOR)				79	21	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Adj. Flow (vph)	65	925	363	100	345	132
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	925	363	100	477	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	41.9	39.4	30.5	30.5	25.1	
Actuated g/C Ratio	0.54	0.51	0.40	0.40	0.33	
v/c Ratio	0.14	0.98	0.60	0.18	0.88	
Control Delay	8.8	45.0	24.5	6.8	45.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.8	45.0	24.5	6.8	45.1	
LOS	A	D	C	A	D	
Approach Delay		42.7	20.6		45.1	
Approach LOS		D	C		D	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 77

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 38.0

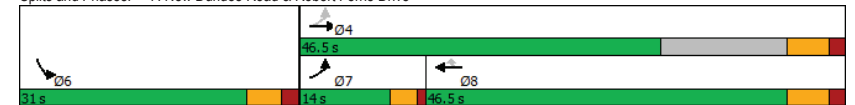
Intersection LOS: D

Intersection Capacity Utilization 88.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2033 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	65	925	363	100	477
v/c Ratio	0.14	0.98	0.60	0.18	0.88
Control Delay	8.8	45.0	24.5	6.8	45.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	45.0	24.5	6.8	45.1
Queue Length 50th (m)	4.4	130.0	44.9	2.0	66.5
Queue Length 95th (m)	9.6	#219.3	76.2	11.7	#138.0
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	494	1298	796	721	540
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.71	0.46	0.14	0.88

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2033 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	65	925	363	100	345	132
Future Volume (vph)	65	925	363	100	345	132
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1637	1845	1528	1311	1615	
Flt Permitted	0.40	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	681	1845	1528	1311	1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	925	363	100	345	132
RTOR Reduction (vph)	0	0	0	48	14	0
Lane Group Flow (vph)	65	925	363	52	463	0
Heavy Vehicles (%)	3%	3%	8%	7%	1%	3%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	40.3	40.3	30.5	30.5	25.1	
Effective Green, g (s)	40.3	40.3	30.5	30.5	25.1	
Actuated g/C Ratio	0.52	0.52	0.39	0.39	0.32	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	423	954	598	513	520	
v/s Ratio Prot	0.01	c0.50	0.24		c0.29	
v/s Ratio Perm	0.07			0.04		
v/c Ratio	0.15	0.97	0.61	0.10	0.89	
Uniform Delay, d1	10.1	18.2	18.9	15.0	25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	21.7	1.7	0.1	20.0	
Delay (s)	10.2	40.0	20.7	15.1	45.0	
Level of Service	B	D	C	B	D	
Approach Delay (s)		38.0	19.5		45.0	
Approach LOS		D	B		D	
Intersection Summary						
HCM 2000 Control Delay			35.3		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			77.9		Sum of lost time (s)	16.5
Intersection Capacity Utilization			88.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
8: New Dundee Road

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	524	82	13	336	10	45	23	24	12	41	12
Future Volume (vph)	11	524	82	13	336	10	45	23	24	12	41	12
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.996			0.965			0.975	
Flt Protected		0.999			0.998			0.976			0.991	
Satd. Flow (prot)	0	1430	0	0	1431	0	0	1332	0	0	1498	0
Flt Permitted		0.999			0.998			0.976			0.991	
Satd. Flow (perm)	0	1430	0	0	1431	0	0	1332	0	0	1498	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
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 (%)	18%	6%	7%	23%	7%	10%	0%	4%	33%	0%	0%	0%
Adj. Flow (vph)	11	524	82	13	336	10	45	23	24	12	41	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	617	0	0	359	0	0	92	0	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 64.9%

ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	11	524	82	13	336	10	45	23	24	12	41	12
Future Volume (Veh/h)	11	524	82	13	336	10	45	23	24	12	41	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	11	524	82	13	336	10	45	23	24	12	41	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	346			606			986	959	565	990	995	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346			606			986	959	565	990	995	341
tC, single (s)	4.3			4.3			7.1	6.5	6.5	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.5	4.0	3.6	3.5	4.0	3.3
p0 queue free %	99			99			77	91	95	94	83	98
cM capacity (veh/h)	1129			878			192	249	470	197	241	706
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	617	359	92	65								
Volume Left	11	13	45	12								
Volume Right	82	10	24	12								
cSH	1129	878	243	262								
Volume to Capacity	0.01	0.01	0.38	0.25								
Queue Length 95th (m)	0.2	0.4	13.4	7.6								
Control Delay (s)	0.3	0.5	28.5	23.2								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.3	0.5	28.5	23.2								
Approach LOS			D	C								

Intersection Summary

Average Delay 4.0

Intersection Capacity Utilization 64.9% ICU Level of Service C

Analysis Period (min) 15

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2033 Total - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	221	56	41	366	183	147
Future Volume (vph)	221	56	41	366	183	147
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973				0.940	
Flt Protected	0.962			0.995		
Satd. Flow (prot)	1613	0	0	1585	1465	0
Flt Permitted	0.962			0.995		
Satd. Flow (perm)	1613	0	0	1585	1465	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	4%	9%	2%
Adj. Flow (vph)	221	56	41	366	183	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	407	330	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 73.1% ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2033 Total - AM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	221	56	41	366	183	147
Future Volume (vph)	221	56	41	366	183	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	221	56	41	366	183	147
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	277	407	330			
Volume Left (vph)	221	41	0			
Volume Right (vph)	56	0	147			
Hadj (s)	0.08	0.08	-0.17			
Departure Headway (s)	5.9	5.4	5.2			
Degree Utilization, x	0.45	0.61	0.48			
Capacity (veh/h)	569	645	657			
Control Delay (s)	13.6	16.2	12.9			
Approach Delay (s)	13.6	16.2	12.9			
Approach LOS	B	C	B			
Intersection Summary						
Delay		14.4				
Level of Service		B				
Intersection Capacity Utilization		73.1%		ICU Level of Service	D	
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2033 Total - AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	305	14	4	164	5
Future Volume (vph)	4	305	14	4	164	5
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867		0.970			
Flt Protected	0.999					0.954
Satd. Flow (prot)	1529	0	1442	0	0	1493
Flt Permitted	0.999					0.954
Satd. Flow (perm)	1529	0	1442	0	0	1493
Link Speed (k/h)	50		50			50
Link Distance (m)	263.9		234.9			249.5
Travel Time (s)	19.0		16.9			18.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	7%	25%	5%	20%
Adj. Flow (vph)	4	305	14	4	164	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	309	0	18	0	0	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2033 Total - AM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	305	14	4	164	5
Future Volume (Veh/h)	4	305	14	4	164	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	305	14	4	164	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349	16			18	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	16			18	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	71			90	
cM capacity (veh/h)	584	1069			1579	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	309	18	169			
Volume Left	4	0	164			
Volume Right	305	4	0			
cSH	1058	1700	1579			
Volume to Capacity	0.29	0.01	0.10			
Queue Length 95th (m)	9.8	0.0	2.8			
Control Delay (s)	9.8	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		44.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Future Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	0.99	
Frt	0.965					0.850		0.999			0.966	
Flt Protected	0.950				0.994		0.950			0.950		
Satd. Flow (prot)	1621	1498	0	0	1500	1365	1519	1616	0	1519	1458	0
Flt Permitted	0.728				0.974		0.523			0.416		
Satd. Flow (perm)	1224	1498	0	0	1467	1317	829	1616	0	664	1458	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		23				74		1			33	
Link Speed (k/h)		50				50		50			50	
Link Distance (m)		184.2				333.0		586.7			311.9	
Travel Time (s)		13.3				24.0		42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Adj. Flow (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	98	0	0	44	74	44	459	0	56	346	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6		3.6			3.6	
Link Offset(m)		0.0				0.0		0.0			0.0	
Crosswalk Width(m)		4.8				4.8		4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2			6		6
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Total - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.23	0.20			0.09	0.16	0.11	0.59		0.17	0.48	
Control Delay	17.3	13.5			15.4	5.4	9.7	15.3		10.8	12.4	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.3	13.5			15.4	5.4	9.7	15.3		10.8	12.4	
LOS	B	B			B	A	A	B		B	B	
Approach Delay		15.3			9.1			14.8			12.2	
Approach LOS		B			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 62

Actuated Cycle Length: 62

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 13.5

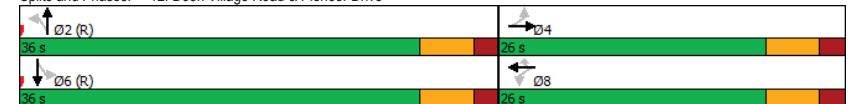
Intersection LOS: B

Intersection Capacity Utilization 76.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2033 Total - AM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	98	44	74	44	459	56	346
v/c Ratio	0.23	0.20	0.09	0.16	0.11	0.59	0.17	0.48
Control Delay	17.3	13.5	15.4	5.4	9.7	15.3	10.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	13.5	15.4	5.4	9.7	15.3	10.8	12.4
Queue Length 50th (m)	7.7	6.3	3.6	0.0	2.7	37.0	3.5	23.2
Queue Length 95th (m)	17.5	16.1	9.9	7.7	7.6	63.6	9.8	43.2
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	394	498	473	474	401	782	321	722
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	0.23	0.20	0.09	0.16	0.11	0.59	0.17	0.48

Intersection Summary

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2033 Total - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Future Volume (vph)	89	75	23	5	39	74	44	456	3	56	268	78
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1498			1498	1317	1505	1616		1515	1459	
Flt Permitted	0.73	1.00			0.97	1.00	0.52	1.00		0.42	1.00	
Satd. Flow (perm)	1225	1498			1466	1317	829	1616		664	1459	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	75	23	5	39	74	44	456	3	56	268	78
RTOR Reduction (vph)	0	16	0	0	0	50	0	1	0	0	17	0
Lane Group Flow (vph)	89	82	0	0	44	24	44	458	0	56	329	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	4%	3%	13%	20%	8%	9%	11%	2%	0%	11%	10%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	395	483			472	424	401	781		321	705	
v/s Ratio Prot		0.06						c0.28			0.23	
v/s Ratio Perm	c0.07				0.03	0.02	0.05			0.08		
v/c Ratio	0.23	0.17			0.09	0.06	0.11	0.59		0.17	0.47	
Uniform Delay, d1	15.3	15.1			14.7	14.5	8.7	11.5		9.0	10.7	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.8			0.4	0.3	0.6	3.2		1.2	2.2	
Delay (s)	16.7	15.8			15.1	14.7	9.3	14.8		10.2	12.9	
Level of Service	B	B			B	B	A	B		B	B	
Approach Delay (s)	16.2				14.9			14.3			12.5	
Approach LOS	B				B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:42:34 PM

Summary of intersection performance

AM							
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FT 2033							
Leg North	0.55	1.02	3.77	0.35	A	4.09	A
Leg West	1.49	1.03	4.96	0.59	A		
Leg East	0.36	~1	2.56	0.25	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM " model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:42:34 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2033, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2033, AM	FT 2033	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				4.09	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	477.00	100.000
West	ONE HOUR	✓	990.00	100.000
East	ONE HOUR	✓	463.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To			
	North	West	East	
North	0.000	132.000	345.000	
West	65.000	0.000	925.000	
East	100.000	363.000	0.000	

Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To			
	North	West	East	
North	0.00	0.28	0.72	
West	0.07	0.00	0.93	
East	0.22	0.78	0.00	

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To			
	North	West	East	

From	North	1.000	1.030	1.010
	West	1.030	1.000	1.030
	East	1.070	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To			
	North	West	East	
	0.0	3.0	1.0	
North	3.0	0.0	3.0	
West	7.0	8.0	0.0	

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.35	3.77	0.55	1.02	A	437.70	656.56	37.16	3.40	0.41	37.16	3.40
West	0.59	4.96	1.49	1.03	A	908.44	1362.66	91.37	4.02	1.02	91.38	4.02
East	0.25	2.56	0.36	~1	A	424.86	637.29	25.73	2.42	0.29	25.73	2.42

Main Results for each time segment**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	359.11	89.78	357.91	123.86	272.59	0.00	1563.93	850.84	0.230	0.00	0.30	3.028	A
West	745.32	186.33	742.71	371.63	258.86	0.00	1911.82	1692.73	0.390	0.00	0.65	3.165	A
East	348.57	87.14	347.69	952.81	48.76	0.00	2040.93	2002.60	0.171	0.00	0.22	2.290	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	428.81	107.20	428.45	148.21	326.16	0.00	1534.49	850.84	0.279	0.30	0.39	3.305	A
West	889.99	222.50	888.93	444.72	309.89	0.00	1880.47	1692.73	0.473	0.65	0.92	3.796	A
East	416.23	104.06	416.01	1140.46	58.36	0.00	2035.03	2002.60	0.205	0.22	0.28	2.396	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	525.19	131.30	524.57	181.45	399.41	0.00	1494.23	850.84	0.351	0.39	0.55	3.768	A
West	1090.01	272.50	1087.76	544.57	379.40	0.00	1837.75	1692.73	0.593	0.92	1.48	4.929	A
East	509.77	127.44	509.43	1395.74	71.42	0.00	2027.01	2002.60	0.251	0.28	0.36	2.556	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	525.19	131.30	525.18	181.67	399.67	0.00	1494.09	850.84	0.352	0.55	0.55	3.772	A
West	1090.01	272.50	1089.97	545.00	379.85	0.00	1837.47	1692.73	0.593	1.48	1.49	4.960	A
East	509.77	127.44	509.77	1398.25	71.56	0.00	2026.92	2002.60	0.252	0.36	0.36	2.557	A

Main results: (09:00-09:15)

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Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	428.81	107.20	429.42	148.55	326.59	0.00	1534.25	850.84	0.279	0.55	0.40	3.312	A
West	889.99	222.50	892.22	445.43	310.59	0.00	1880.03	1692.73	0.473	1.49	0.93	3.764	A
East	416.23	104.06	416.56	1144.23	58.58	0.00	2034.90	2002.60	0.205	0.36	0.28	2.397	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	v/c Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	359.11	89.78	359.48	124.34	273.46	0.00	1563.45	850.84	0.230	0.40	0.30	3.038	A
West	745.32	186.33	746.41	372.94	260.00	0.00	1911.12	1692.73	0.390	0.93	0.66	3.185	A
East	348.57	87.14	348.79	957.40	49.01	0.00	2040.78	2002.60	0.171	0.28	0.22	2.294	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.43	0.30	3.028	A	A
West	9.59	0.64	3.165	A	A
East	3.27	0.22	2.290	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.79	0.39	3.305	A	A
West	13.49	0.90	3.736	A	A
East	4.10	0.27	2.396	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.05	0.54	3.768	A	A
West	21.50	1.43	4.929	A	A
East	5.35	0.36	2.556	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.22	0.55	3.772	A	A
West	22.32	1.49	4.960	A	A
East	5.42	0.36	2.557	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.04	0.40	3.312	A	A
West	14.36	0.96	3.764	A	A
East	4.22	0.28	2.397	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.63	0.31	3.038	A	A
West	10.12	0.67	3.185	A	A
East	3.38	0.23	2.294	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

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Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.92	0.00	0.00	1.03	1.03			N/A	N/A
East	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.48	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	0.00	0.00	0.00	1.02			N/A	N/A
West	1.49	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.40	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.93	0.00	0.00	0.00	1.03			N/A	N/A
East	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Robert Ferrie and New Dundee.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:41:54 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - FT 2033							
Leg North	0.36	~1	4.54	0.26	A	5.45	A
Leg West	0.65	1.03	3.08	0.39	A		
Leg East	2.75	4.07	6.85	0.73	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D2 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:41:53 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2033, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2033, PM	FT 2033	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,East				5.45	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Leg	Leg	Name	Description
North	North	Robert Ferrie Drive	
West	West	New Dundee Road	
East	East	New Dundee Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.647	2016.168
West		(calculated)	(calculated)	0.723	2436.345
East		(calculated)	(calculated)	0.723	2436.345

The slope and intercept shown above include any corrections and adjustments.

Leg Capacity Adjustments

Leg	Type	Reason	Direct Capacity Adjustment (PCE/hr)	Percentage Capacity Adjustment (%)
North	Percentage			85.00
West	Percentage			85.00
East	Percentage			85.00

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	262.00	100.000
West	ONE HOUR	✓	689.00	100.000
East	ONE HOUR	✓	1329.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To			
	North	West	East	
	0.000	93.000	169.000	
	108.000	0.000	581.000	
East	309.000	1020.000	0.000	

Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To			
	North	West	East	
	0.00	0.35	0.65	
	0.16	0.00	0.84	
East	0.23	0.77	0.00	

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To			
	North	West	East	

From	North	1.000	1.020	1.020
	West	1.010	1.000	1.030
	East	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To			
	North	West	East	
	0.0	2.0	2.0	
	1.0	0.0	3.0	
East	1.0	2.0	0.0	

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.26	4.54	0.36	~1	A	240.42	360.62	23.65	3.93	0.26	23.65	3.93
West	0.39	3.08	0.65	1.03	A	632.24	948.36	44.14	2.79	0.49	44.14	2.79
East	0.73	6.85	2.75	4.07	A	1219.51	1829.27	154.21	5.06	1.71	154.22	5.06

Main Results for each time segment**Main results: (16:00-16:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	197.25	49.31	196.52	312.79	764.87	0.00	1293.38	909.70	0.153	0.00	0.18	3.346	A
West	518.72	129.68	517.28	834.63	126.76	0.00	1993.00	1710.30	0.260	0.00	0.36	2.502	A
East	1000.54	250.14	996.58	562.95	81.08	0.00	2021.07	1906.15	0.495	0.00	0.99	3.563	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.53	58.88	235.28	374.36	915.48	0.00	1210.60	909.71	0.195	0.18	0.25	3.764	A
West	619.40	154.85	618.97	999.00	151.77	0.00	1977.63	1710.30	0.313	0.36	0.47	2.721	A
East	1194.74	298.69	1192.82	673.72	97.02	0.00	2011.27	1906.15	0.594	0.99	1.47	4.465	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	288.47	72.12	288.00	457.86	1119.24	0.00	1098.62	909.70	0.263	0.25	0.36	4.528	A
West	758.60	189.65	757.88	1221.47	185.77	0.00	1956.73	1710.30	0.388	0.47	0.65	3.082	A
East	1463.26	365.81	1458.30	824.86	118.80	0.00	1997.89	1906.15	0.732	1.47	2.71	6.728	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	288.47	72.12	288.46	459.09	1122.93	0.00	1096.59	909.70	0.263	0.36	0.36	4.543	A
West	758.60	189.65	758.60	1225.32	186.07	0.00	1956.55	1710.30	0.388	0.65	0.65	3.085	A
East	1463.26	365.81	1463.11	825.75	118.91	0.00	1997.82	1906.15	0.732	2.71	2.75	6.847	A

Main results: (17:00-17:15)

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Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

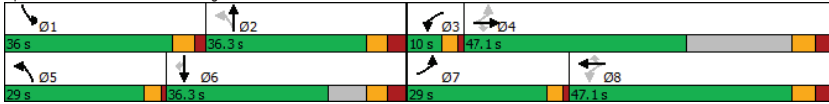
2033 Total - PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
Future Volume (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Storage Length (m)	275.0		80.0	120.0		200.0	25.0		0.0	105.0		65.0
Storage Lanes	1		1	1		1	1		0	2		1
Taper Length (m)	80.0			90.0			20.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor			0.97	1.00		0.98	0.99	1.00		1.00		0.97
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	3471	1488	1686	3438	1417	1670	3308	0	3146	1863	1458
Flt Permitted	0.089			0.098			0.138			0.950		
Satd. Flow (perm)	156	3471	1447	174	3438	1387	241	3308	0	3131	1863	1410
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)			477			433		4				300
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.7			2462.2			122.0			383.8	
Travel Time (s)		32.4			177.3			8.8			27.6	
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Adj. Flow (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
Shared Lane Traffic (%)												
Lane Group Flow (vph)	421	1261	715	43	1243	600	341	353	0	764	438	458
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.09	1.09	1.09	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.0	47.1	47.1	9.0	47.1	47.1	9.0	36.3		11.0	36.3	36.3
Total Split (s)	29.0	47.1	47.1	10.0	47.1	47.1	29.0	36.3		36.0	36.3	36.3
Total Split (%)	19.5%	31.7%	31.7%	6.7%	31.7%	31.7%	19.5%	24.5%		24.3%	24.5%	24.5%
Maximum Green (s)	25.0	40.0	40.0	6.0	40.0	40.0	25.0	29.0		30.0	29.0	29.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.7		4.0	3.7	3.7
All-Red Time (s)	1.0	2.9	2.9	1.0	2.9	2.9	1.0	3.6		2.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		22.0	22.0		22.0	22.0		10.0			10.0	10.0
Flash Dont Walk (s)		18.0	18.0		18.0	18.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.1	61.0	61.0	49.0	40.0	40.0	57.3	29.0		30.0	36.0	36.0
Actuated g/C Ratio	0.49	0.41	0.41	0.33	0.27	0.27	0.39	0.20		0.20	0.24	0.24
v/c Ratio	1.28	0.88	0.82	0.37	1.34	0.87	1.02	0.54		1.20	0.97	0.80
Control Delay	183.1	49.5	21.2	31.9	202.8	28.3	98.6	56.7		155.1	90.9	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	183.1	49.5	21.2	31.9	202.8	28.3	98.6	56.7		155.1	90.9	29.6
LOS	F	D	C	C	F	C	F	E		F	F	C
Approach Delay		64.6			143.4			77.3			103.5	
Approach LOS		E			F			E			F	
Intersection Summary												
Area Type: Other												
Cycle Length: 148.4												
Actuated Cycle Length: 148.4												
Natural Cycle: 145												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.34												
Intersection Signal Delay: 98.0						Intersection LOS: F						
Intersection Capacity Utilization 127.2%						ICU Level of Service H						
Analysis Period (min) 15												
Splits and Phases: 2: Doon Village Road/Manitou Drive & Homer Watson Boulevard												
												

Queues

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	421	1261	715	43	1243	600	341	353	764	438	458
v/c Ratio	1.28	0.88	0.82	0.37	1.34	0.87	1.02	0.54	1.20	0.97	0.80
Control Delay	183.1	49.5	21.2	31.9	202.8	28.3	98.6	56.7	155.1	90.9	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	183.1	49.5	21.2	31.9	202.8	28.3	98.6	56.7	155.1	90.9	29.6
Queue Length 50th (m)	~148.5	193.2	74.7	6.9	~263.4	57.0	~94.6	51.8	~147.5	135.4	49.4
Queue Length 95th (m)	#218.2	#231.3	144.7	14.2	#308.3	#135.4	#160.3	69.3	#188.9	#206.1	99.4
Internal Link Dist (m)		425.7			2438.2			98.0		359.8	
Turn Bay Length (m)	275.0		80.0	120.0		200.0	25.0		105.0		65.0
Base Capacity (vph)	330	1426	875	118	926	690	333	649	635	451	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.88	0.82	0.36	1.34	0.87	1.02	0.54	1.20	0.97	0.80

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

2: Doon Village Road/Manitou Drive & Homer Watson Boulevard

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
Future Volume (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1775	1775	1775	1900	1750
Total Lost time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1670	3471	1447	1686	3438	1387	1668	3307		3146	1863	1410
Flt Permitted	0.09	1.00	1.00	0.10	1.00	1.00	0.14	1.00		0.95	1.00	1.00
Satd. Flow (perm)	157	3471	1447	174	3438	1387	242	3307		3146	1863	1410
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	421	1261	715	43	1243	600	341	331	22	764	438	458
RTOR Reduction (vph)	0	0	282	0	0	315	0	3	0	0	0	228
Lane Group Flow (vph)	421	1261	433	43	1243	285	341	350	0	764	438	230
Confl. Peds. (#/hr)	8		4	4		8	14		3	3		14
Heavy Vehicles (%)	1%	4%	0%	0%	5%	5%	1%	1%	0%	4%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					6
Actuated Green, G (s)	69.8	61.0	61.0	45.6	40.8	40.8	54.0	29.0		30.0	36.0	36.0
Effective Green, g (s)	69.8	61.0	61.0	45.6	40.8	40.8	54.0	29.0		30.0	36.0	36.0
Actuated g/C Ratio	0.47	0.41	0.41	0.31	0.27	0.27	0.36	0.19		0.20	0.24	0.24
Clearance Time (s)	4.0	7.1	7.1	4.0	7.1	7.1	4.0	7.3		6.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		5.0	3.0	3.0
Lane Grp Cap (vph)	326	1419	591	101	940	379	326	642		632	449	340
v/s Ratio Prot	c0.22	0.36		0.01	0.36		0.17	0.11		c0.24	c0.24	
v/s Ratio Perm	c0.39		0.30	0.12		0.21	0.20					0.16
v/c Ratio	1.29	0.89	0.73	0.43	1.32	0.75	1.05	0.54		1.21	0.98	0.68
Uniform Delay, d1	48.5	40.9	37.2	39.1	54.2	49.6	46.0	54.2		59.6	56.2	51.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	152.2	7.2	4.7	2.9	152.5	8.2	62.4	3.3		108.3	36.8	10.4
Delay (s)	200.7	48.1	41.9	42.0	206.7	57.8	108.4	57.5		167.9	93.0	61.7
Level of Service	F	D	D	D	F	E	F	E		F	F	E
Approach Delay (s)		73.1			155.6			82.5			118.8	
Approach LOS		E			F			F			F	

Intersection Summary

HCM 2000 Control Delay	108.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	24.4
Intersection Capacity Utilization	127.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↖		↖		↖	↖		↖	↖	
Traffic Volume (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
Future Volume (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		0.0	35.0		0.0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			70.0			55.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99										
Frt			0.850								0.985	
Flt Protected		0.953			0.979		0.950			0.950		
Satd. Flow (prot)	0	1493	1417	0	1517	0	1670	3182	0	1686	3173	0
Flt Permitted		0.726			0.896		0.950			0.088		
Satd. Flow (perm)	0	1131	1417	0	1389	0	1670	3182	0	156	3173	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)			125								11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		319.9			88.4			562.4			2462.2	
Travel Time (s)		23.0			6.4			40.5			177.3	
Confl. Peds. (#/hr)	4					4						
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 (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Adj. Flow (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	125	0	7	0	127	1981	0	2	1894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.20	1.20	1.11	1.29	1.29	1.29	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		10.0	20.0		20.0	20.0	
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		15.0	26.6		26.6	26.6	
Total Split (s)	41.0	41.0	41.0	41.0	41.0		25.0	51.6		51.6	51.6	
Total Split (%)	34.9%	34.9%	34.9%	34.9%	34.9%		21.3%	43.9%		43.9%	43.9%	
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0		20.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		5.0	6.6		6.6	6.6	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	
Walk Time (s)	8.0	8.0	8.0	8.0	8.0			7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0			13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)		17.2			17.2			12.9		63.4		45.4
Actuated g/C Ratio		0.18			0.18			0.14		0.68		0.49
v/c Ratio		0.69			0.35			0.55		0.92		0.03
Control Delay		53.5			8.9			48.1		22.3		18.0
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		53.5			8.9			48.1		22.3		18.0
LOS		D			A			C		D		F
Approach Delay		32.8			31.1			23.9				130.7
Approach LOS		C			C			C				F
Intersection Summary												
Area Type:		Other										
Cycle Length:		117.6										
Actuated Cycle Length:		93.3										
Natural Cycle:		120										
Control Type:		Semi Act-Uncoord										
Maximum v/c Ratio:		1.22										
Intersection Signal Delay:		71.8						Intersection LOS: E				
Intersection Capacity Utilization		107.2%						ICU Level of Service G				
Analysis Period (min)		15										

Splits and Phases: 3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park



Queues

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	144	125	7	127	1981	2	1894
v/c Ratio	0.69	0.35	0.03	0.55	0.92	0.03	1.22
Control Delay	53.5	8.9	31.1	48.1	22.3	18.0	130.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	8.9	31.1	48.1	22.3	18.0	130.8
Queue Length 50th (m)	25.3	0.0	1.1	22.5	144.4	0.2	~229.7
Queue Length 95th (m)	48.8	14.7	5.0	44.9	#281.5	2.0	#346.7
Internal Link Dist (m)	295.9		64.4		538.4		2438.2
Turn Bay Length (m)				110.0		35.0	
Base Capacity (vph)	428	614	525	361	2410	75	1550
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.01	0.35	0.82	0.03	1.22

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

3: Homer Watson Boulevard & Doon South Drive/Walter Bean Grand River Trail Park PM Peak Hour

	↘	→	↙	↗	←	↖	↘	↑	↗	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↘	↗		↘		↘	↗		↘	↗	
Traffic Volume (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
Future Volume (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
Ideal Flow (vphpl)	1650	1650	1750	1550	1550	1550	1775	1775	1775	1775	1775	1775
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.98	0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1487	1417		1517	1670		1670	3181		1686	3173	
Flt Permitted	0.73	1.00		0.90	0.95		0.95	1.00		0.09	1.00	
Satd. Flow (perm)	1132	1417		1389	1670		1670	3181		156	3173	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	3	125	3	4	0	127	1975	6	2	1707	187
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	144	23	0	7	0	127	1981	0	2	1888	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	4%	67%	5%	0%	0%	0%	1%	6%	0%	0%	5%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6						4		
Actuated Green, G (s)	17.2	17.2		17.2	12.9		63.4	45.5		45.5	45.5	
Effective Green, g (s)	17.2	17.2		17.2	12.9		63.4	45.5		45.5	45.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.14		0.68	0.49		0.49	0.49	
Clearance Time (s)	6.0	6.0		6.0	5.0		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	208	261		256	231		2163	76		1549		
v/s Ratio Prot					0.08		c0.62			c0.60		
v/s Ratio Perm	c0.13	0.02		0.01				0.01				
v/c Ratio	0.69	0.09		0.03	0.55		0.92	0.03		1.22		
Uniform Delay, d1	35.5	31.5		31.1	37.4		12.6	12.4		23.9		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		
Incremental Delay, d2	9.5	0.1		0.0	2.7		7.6	0.6		104.7		
Delay (s)	45.1	31.6		31.2	40.1		20.2	13.0		128.5		
Level of Service	D	C		C	D		C	B		F		
Approach Delay (s)	38.8			31.2			21.4			128.4		
Approach LOS	D			C			C			F		

Intersection Summary

HCM 2000 Control Delay	69.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	17.6
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

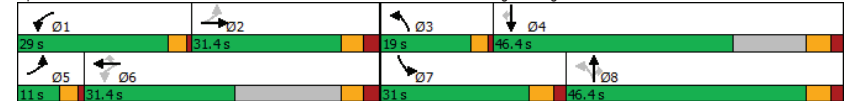
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Traffic Volume (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
Future Volume (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Storage Length (m)	50.0		0.0	50.0		0.0	205.0		0.0	175.0		190.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	75.0			50.0			100.0			75.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99	0.98		0.99		0.97			0.99	1.00		0.98
Frt		0.872				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1621	2504	0	1576	1827	1340	1547	4940	1377	2870	3471	1458
Flt Permitted	0.721			0.450			0.096			0.950		
Satd. Flow (perm)	1215	2504	0	738	1827	1306	156	4940	1359	2869	3471	1425
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		180				138			169			122
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.6			324.8			266.0			278.1	
Travel Time (s)		13.1			23.4			19.2			20.0	
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
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 (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Adj. Flow (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	240	211	0	150	55	118	199	1764	94	106	1683	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
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	1.09	1.09	1.09	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.11
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	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	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	2.0
Detector 1 Type	Cl+Ex	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	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	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	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	

Lanes, Volumes, Timings

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0
Minimum Split (s)	9.0	40.4		9.0	40.4	40.4	9.0	32.6	32.6	16.0	32.6	32.6
Total Split (s)	11.0	31.4		29.0	31.4	31.4	19.0	46.4	46.4	31.0	46.4	46.4
Total Split (%)	8.0%	22.8%		21.0%	22.8%	22.8%	13.8%	33.7%	33.7%	22.5%	33.7%	33.7%
Maximum Green (s)	7.0	25.0		25.0	25.0	25.0	15.0	40.0	40.0	25.0	40.0	40.0
Yellow Time (s)	3.0	3.7		3.0	3.7	3.7	3.0	4.2	4.2	4.0	4.2	4.2
All-Red Time (s)	1.0	2.7		1.0	2.7	2.7	1.0	2.2	2.2	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		10.0			10.0	10.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		24.0			24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	17.1	7.7		22.1	10.6	10.6	57.9	41.8	41.8	10.3	40.4	40.4
Actuated g/C Ratio	0.18	0.08		0.24	0.11	0.11	0.63	0.45	0.45	0.11	0.44	0.44
v/c Ratio	0.94	0.57		0.57	0.26	0.44	0.66	0.79	0.13	0.33	1.11	0.09
Control Delay	79.0	16.3		36.7	40.1	9.8	28.5	25.7	0.4	42.5	87.6	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	16.3		36.7	40.1	9.8	28.5	25.7	0.4	42.5	87.6	0.2
LOS	E	B		D	A	C	C	A	A	D	F	A
Approach Delay		49.7			27.5			24.8			82.2	
Approach LOS		D			C			C			F	
Intersection Summary												
Area Type:		Other										
Cycle Length: 137.8												
Actuated Cycle Length: 92.6												
Natural Cycle: 140												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 1.11												
Intersection Signal Delay: 50.1								Intersection LOS: D				
Intersection Capacity Utilization 101.5%								ICU Level of Service G				
Analysis Period (min) 15												

Splits and Phases: 4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard



Queues

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	240	211	150	55	118	199	1764	94	106	1683	60
v/c Ratio	0.94	0.57	0.57	0.26	0.44	0.66	0.79	0.13	0.33	1.11	0.09
Control Delay	79.0	16.3	36.7	40.1	9.8	28.5	25.7	0.4	42.5	87.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.0	16.3	36.7	40.1	9.8	28.5	25.7	0.4	42.5	87.6	0.2
Queue Length 50th (m)	39.7	2.9	23.4	9.7	0.0	18.2	97.1	0.0	9.6	~193.1	0.0
Queue Length 95th (m)	#85.0	14.5	40.5	20.9	11.7	#51.6	141.7	0.1	19.0	#270.9	0.0
Internal Link Dist (m)		157.6		300.8			242.0			254.1	
Turn Bay Length (m)	50.0		50.0			205.0			175.0		190.0
Base Capacity (vph)	255	810	439	851	682	325	2229	705	778	1957	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.26	0.34	0.06	0.17	0.61	0.79	0.13	0.14	0.86	0.07

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

4: Homer Watson Boulevard & New Dundee Road/Conestoga College Boulevard - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
Future Volume (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
Ideal Flow (vphpl)	1775	1775	1775	1775	1900	1750	1775	1900	1750	1775	1900	1750
Total Lost time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2516		1571	1827	1312	1547	4940	1359	2870	3471	1430
Flt Permitted	0.72	1.00		0.45	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1224	2516		744	1827	1312	156	4940	1359	2870	3471	1430
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	31	180	150	55	118	199	1764	94	106	1683	60
RTOR Reduction (vph)	0	165	0	0	0	104	0	0	52	0	0	34
Lane Group Flow (vph)	240	46	0	150	55	14	199	1764	42	106	1683	26
Confl. Peds. (#/hr)	11		13	13		11	7		1	1		7
Heavy Vehicles (%)	4%	7%	16%	7%	4%	11%	9%	5%	8%	14%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	14.7	7.7		20.5	10.6	10.6	55.5	41.8	41.8	10.3	40.4	40.4
Effective Green, g (s)	14.7	7.7		20.5	10.6	10.6	55.5	41.8	41.8	10.3	40.4	40.4
Actuated g/C Ratio	0.16	0.08		0.22	0.11	0.11	0.60	0.45	0.45	0.11	0.44	0.44
Clearance Time (s)	4.0	6.4		4.0	6.4	6.4	4.0	6.4	6.4	6.0	6.4	6.4
Vehicle Extension (s)	3.0	3.0		0.2	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	223	209		253	209	150	299	2232	614	319	1515	624
v/s Ratio Prot	c0.08	0.02		c0.06	0.03		c0.10	0.36		0.04	c0.48	
v/s Ratio Perm	c0.09			0.07		0.01	0.30		0.03			0.02
v/c Ratio	1.08	0.22		0.59	0.26	0.09	0.67	0.79	0.07	0.33	1.11	0.04
Uniform Delay, d1	38.4	39.6		31.0	37.4	36.6	21.5	21.6	14.3	37.9	26.1	14.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	82.0	0.5		2.5	0.7	0.3	5.5	2.9	0.2	0.6	59.8	0.1
Delay (s)	120.4	40.1		33.5	38.1	36.9	27.0	24.6	14.6	38.5	85.9	15.1
Level of Service	F	D		C	D	D	C	C	B	D	F	B
Approach Delay (s)		82.8			35.5			24.3			80.9	
Approach LOS		F			D			C			F	

Intersection Summary

HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	22.8
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	→	↱	↰	→	↱
Traffic Volume (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Future Volume (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Storage Length (m)	75.0		0.0	0.0		0.0	180.0		0.0	0.0		65.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			7.5			100.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1621	0	1458	1637	1881	1390	1637	3438	0	0	5036	1458
Flt Permitted	0.132			0.950			0.106					
Satd. Flow (perm)	225	0	1458	1637	1881	1390	183	3438	0	0	5036	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			216			352						105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1202.5			483.0			320.0			175.5	
Travel Time (s)		86.6			34.8			23.0			12.6	
Confl. Peds. (#/hr)								2	2			
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 (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Adj. Flow (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.11	1.09	1.00	1.11	1.09	1.00	1.00	1.00	1.00	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (m)	2.0		2.0	2.0	10.0	2.0	2.0	10.0			10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Size(m)	2.0		2.0	2.0	0.6	2.0	2.0	0.6			0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(m)					9.4			9.4			9.4	
Detector 2 Size(m)					0.6			0.6			0.6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	

Lanes, Volumes, Timings

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Detector Phase	2		2	1	6		3	8			4	4
Switch Phase												
Minimum Initial (s)	10.0		10.0	5.0	10.0		5.0	20.0			20.0	20.0
Minimum Split (s)	33.2		33.2	9.0	33.2		9.0	26.9			26.9	26.9
Total Split (s)	37.2		37.2	14.0	37.2		14.0	61.9			61.9	61.9
Total Split (%)	29.3%		29.3%	11.0%	29.3%		11.0%	48.7%			48.7%	48.7%
Maximum Green (s)	30.0		30.0	10.0	30.0		10.0	55.0			55.0	55.0
Yellow Time (s)	3.7		3.7	3.0	3.7		3.0	4.2			4.2	4.2
All-Red Time (s)	3.5		3.5	1.0	3.5		1.0	2.7			2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Lead/Lag	Lag		Lag	Lead			Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Recall Mode	Max		Max	None	Max		None	None			None	None
Walk Time (s)	7.0		7.0		7.0			15.0			15.0	15.0
Flash Dont Walk (s)	19.0		19.0		19.0			5.0			5.0	5.0
Pedestrian Calls (#/hr)	0		0		0			0			0	0
Act Effct Green (s)	30.1		30.1	47.4	44.2		118.2	62.8			59.9	45.8
Actuated g/C Ratio	0.25		0.25	0.40	0.37		1.00	0.53			0.51	0.39
v/c Ratio	2.05		1.08	0.40	1.30		0.78	1.87			0.49	0.67
Control Delay	557.7		89.8	29.1	177.0		4.4	429.9			20.0	31.5
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	557.7		89.8	29.1	177.0		4.4	429.9			20.0	31.5
LOS	F		F	C	F		A	F			C	A
Approach Delay		168.9			76.9			153.2				29.3
Approach LOS		F			E			F				C

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 118.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 2.05

Intersection Signal Delay: 93.1

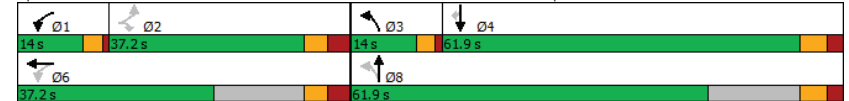
Intersection LOS: F

Intersection Capacity Utilization 123.1%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp



Queues

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - PM Peak Hour

	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	117	575	264	912	1085	412	856	1309	135
v/c Ratio	2.05	1.08	0.40	1.30	0.78	1.87	0.49	0.67	0.21
Control Delay	557.7	89.8	29.1	177.0	4.4	429.9	20.0	31.5	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	557.7	89.8	29.1	177.0	4.4	429.9	20.0	31.5	7.5
Queue Length 50th (m)	~45.2	~116.1	45.9	~287.7	0.0	~134.0	69.4	95.2	4.5
Queue Length 95th (m)	#90.0	#202.8	77.2	#400.9	0.0	#208.6	86.1	111.0	17.1
Internal Link Dist (m)			459.0				296.0	151.5	
Turn Bay Length (m)	75.0					180.0			65.0
Base Capacity (vph)	57	532	656	703	1390	220	2015	2353	737
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.05	1.08	0.40	1.30	0.78	1.87	0.42	0.56	0.18

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Homer Watson Boulevard & New Dundee Road/WB 401 Off-Ramp

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱	↰	↰	↰	↰	↰			↰	↰
Traffic Volume (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Future Volume (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
Ideal Flow (vphpl)	1775	1900	1750	1775	1900	1750	1775	1900	1900	1900	1900	1750
Total Lost time (s)	7.2		7.2	4.0	7.2	4.0	4.0	6.9			6.9	6.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00	1.00	0.95			0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1621		1458	1637	1881	1390	1637	3438			5036	1458
Flt Permitted	0.13		1.00	0.95	1.00	1.00	0.11	1.00			1.00	1.00
Satd. Flow (perm)	226		1458	1637	1881	1390	182	3438			5036	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	117	0	575	264	912	1085	412	856	0	0	1309	135
RTOR Reduction (vph)	0	0	161	0	0	0	0	0	0	0	0	64
Lane Group Flow (vph)	117	0	414	264	912	1085	412	856	0	0	1309	71
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	4%	0%	2%	3%	1%	7%	3%	5%	0%	0%	3%	2%
Turn Type	Perm		Perm	pm+pt	NA	Free	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases	2		2	6		Free	8					4
Actuated Green, G (s)	30.2		30.2	44.2	44.2	118.2	59.9	59.9			45.9	45.9
Effective Green, g (s)	30.2		30.2	44.2	44.2	118.2	59.9	59.9			45.9	45.9
Actuated g/C Ratio	0.26		0.26	0.37	0.37	1.00	0.51	0.51			0.39	0.39
Clearance Time (s)	7.2		7.2	4.0	7.2		4.0	6.9			6.9	6.9
Vehicle Extension (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	57		372	612	703	1390	215	1742			1955	566
v/s Ratio Prot				0.04	c0.48		c0.16	0.25			0.26	
v/s Ratio Perm	c0.52		0.28	0.12		0.78	c0.81					0.05
v/c Ratio	2.05		1.11	0.43	1.30	0.78	1.92	0.49			0.67	0.13
Uniform Delay, d1	44.0		44.0	27.6	37.0	0.0	26.7	19.1			29.9	23.2
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	528.8		81.0	1.0	144.2	4.4	429.1	0.5			1.2	0.2
Delay (s)	572.8		125.0	28.6	181.2	4.4	455.9	19.6			31.1	23.4
Level of Service	F		F	C	F	A	F	B			C	C
Approach Delay (s)		200.7			78.5			161.4			30.3	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay	99.7			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	1.96											
Actuated Cycle Length (s)	118.2			Sum of lost time (s)					22.1			
Intersection Capacity Utilization	123.1%			ICU Level of Service					H			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

6: New Dundee Road & Pinnacle Drive

2033 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations						
Traffic Volume (vph)	11	855	1432	97	52	12
Future Volume (vph)	11	855	1432	97	52	12
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.975	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1601	1604	0	1654	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1601	1604	0	1654	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		800.9	1202.5		173.1	
Travel Time (s)		57.7	86.6		12.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	2%	1%	0%	0%
Adj. Flow (vph)	11	855	1432	97	52	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	866	1529	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.20	1.20	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 104.1%

ICU Level of Service G

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

6: New Dundee Road & Pinnacle Drive

2033 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	11	855	1432	97	52	12
Future Volume (Veh/h)	11	855	1432	97	52	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	855	1432	97	52	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1529				2358	1480
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1529				2358	1480
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				0	92
cM capacity (veh/h)	441				39	156

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	866	1529	64
Volume Left	11	0	52
Volume Right	0	97	12
cSH	441	1700	45
Volume to Capacity	0.02	0.90	1.42
Queue Length 95th (m)	0.6	0.0	49.8
Control Delay (s)	0.8	0.0	424.8
Lane LOS	A		F
Approach Delay (s)	0.8	0.0	424.8
Approach LOS			F

Intersection Summary

Average Delay 11.4

Intersection Capacity Utilization 104.1%

ICU Level of Service

G

Analysis Period (min) 15

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	108	581	1020	309	169	93
Future Volume (vph)	108	581	1020	309	169	93
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Storage Length (m)	30.0			25.0	0.0	0.0
Storage Lanes	1			1	1	0
Taper Length (m)	60.0				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.952	
Flt Protected	0.950				0.969	
Satd. Flow (prot)	1670	1845	1618	1389	1596	0
Flt Permitted	0.090				0.969	
Satd. Flow (perm)	158	1845	1618	1389	1596	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				87	30	
Link Speed (k/h)		50	50		50	
Link Distance (m)		2839.6	800.9		225.4	
Travel Time (s)		204.5	57.7		16.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Adj. Flow (vph)	108	581	1020	309	169	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	581	1020	309	262	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.00	1.20	1.20	1.10	1.10
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	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		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	

Lanes, Volumes, Timings

7: New Dundee Road & Robert Ferrie Drive

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8		
Detector Phase	7	4	8	8	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	8.0	
Minimum Split (s)	9.0	46.5	46.5	46.5	20.0	
Total Split (s)	14.0	46.5	46.5	46.5	31.0	
Total Split (%)	15.3%	50.8%	50.8%	50.8%	33.9%	
Maximum Green (s)	10.0	40.0	40.0	40.0	25.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.0	
All-Red Time (s)	1.0	1.9	1.9	1.9	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	Max	
Walk Time (s)		31.0	31.0	31.0	7.0	
Flash Dont Walk (s)		9.0	9.0	9.0	7.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Act Effct Green (s)	53.2	50.7	40.2	40.2	25.1	
Actuated g/C Ratio	0.60	0.57	0.45	0.45	0.28	
v/c Ratio	0.44	0.55	1.39	0.46	0.55	
Control Delay	15.0	13.9	207.5	15.0	29.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	13.9	207.5	15.0	29.8	
LOS	B	B	F	B	C	
Approach Delay		14.1	162.7		29.8	
Approach LOS		B	F		C	

Intersection Summary

Area Type: Other

Cycle Length: 91.5

Actuated Cycle Length: 88.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.39

Intersection Signal Delay: 102.5

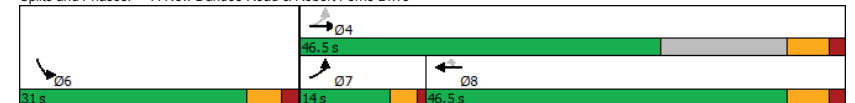
Intersection LOS: F

Intersection Capacity Utilization 98.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 7: New Dundee Road & Robert Ferrie Drive



Queues

7: New Dundee Road & Robert Ferrie Drive

2033 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	108	581	1020	309	262
v/c Ratio	0.44	0.55	1.39	0.46	0.55
Control Delay	15.0	13.9	207.5	15.0	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	13.9	207.5	15.0	29.8
Queue Length 50th (m)	7.5	59.5	~258.4	27.3	36.7
Queue Length 95th (m)	18.4	88.1	#335.2	50.8	62.6
Internal Link Dist (m)		2815.6	776.9		201.4
Turn Bay Length (m)	30.0			25.0	
Base Capacity (vph)	266	1132	735	679	474
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.51	1.39	0.46	0.55

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

7: New Dundee Road & Robert Ferrie Drive

2033 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	108	581	1020	309	169	93
Future Volume (vph)	108	581	1020	309	169	93
Ideal Flow (vphpl)	1775	1900	1650	1650	1765	1765
Total Lost time (s)	4.0	6.5	6.5	6.5	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1670	1845	1618	1389	1596	
Flt Permitted	0.09	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	159	1845	1618	1389	1596	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	581	1020	309	169	93
RTOR Reduction (vph)	0	0	0	48	22	0
Lane Group Flow (vph)	108	581	1020	261	240	0
Heavy Vehicles (%)	1%	3%	2%	1%	2%	2%
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	51.6	51.6	40.2	40.2	25.1	
Effective Green, g (s)	51.6	51.6	40.2	40.2	25.1	
Actuated g/C Ratio	0.58	0.58	0.45	0.45	0.28	
Clearance Time (s)	4.0	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	217	1067	729	625	449	
v/s Ratio Prot	0.04	c0.31	c0.63		c0.15	
v/s Ratio Perm	0.25			0.19		
v/c Ratio	0.50	0.54	1.40	0.42	0.54	
Uniform Delay, d1	18.1	11.6	24.5	16.6	27.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.6	187.9	0.5	4.5	
Delay (s)	19.9	12.1	212.4	17.0	31.6	
Level of Service	B	B	F	B	C	
Approach Delay (s)		13.4	167.0		31.6	
Approach LOS		B	F		C	

Intersection Summary

HCM 2000 Control Delay	105.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
8: New Dundee Road

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	26	611	89	20	649	18	68	75	19	4	34	19
Future Volume (vph)	26	611	89	20	649	18	68	75	19	4	34	19
Ideal Flow (vphpl)	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.996			0.984			0.955	
Flt Protected		0.998			0.999			0.979			0.997	
Satd. Flow (prot)	0	1504	0	0	1496	0	0	1475	0	0	1450	0
Flt Permitted		0.998			0.999			0.979			0.997	
Satd. Flow (perm)	0	1504	0	0	1496	0	0	1475	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		734.0			2839.6			383.9			563.5	
Travel Time (s)		52.8			204.5			27.6			40.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	2%	10%	3%	0%	3%	0%	0%	0%	3%	0%
Adj. Flow (vph)	26	611	89	20	649	18	68	75	19	4	34	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	726	0	0	687	0	0	162	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 84.5% ICU Level of Service E

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
8: New Dundee Road

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	26	611	89	20	649	18	68	75	19	4	34	19
Future Volume (Veh/h)	26	611	89	20	649	18	68	75	19	4	34	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	611	89	20	649	18	68	75	19	4	34	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	667			700			1442	1414	656	1462	1450	658
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	667			700			1442	1414	656	1462	1450	658
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			15	43	96	93	73	96
cM capacity (veh/h)	932			861			80	132	469	55	124	468
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	726	687	162	57								
Volume Left	26	20	68	4								
Volume Right	89	18	19	19								
cSH	932	861	111	147								
Volume to Capacity	0.03	0.02	1.46	0.39								
Queue Length 95th (m)	0.7	0.6	93.0	13.3								
Control Delay (s)	0.7	0.6	320.4	44.3								
Lane LOS	A	A	F	E								
Approach Delay (s)	0.7	0.6	320.4	44.3								
Approach LOS		F	E									

Intersection Summary

Average Delay 33.9

Intersection Capacity Utilization 84.5% ICU Level of Service E

Analysis Period (min) 15

Lanes, Volumes, Timings

10: Doon Mills Road & Apple Ridge Drive

2033 Total - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (vph)	215	30	50	270	490	291
Future Volume (vph)	215	30	50	270	490	291
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983			0.950		
Flt Protected	0.958			0.992		
Satd. Flow (prot)	1662	0	0	1605	1542	0
Flt Permitted	0.958			0.992		
Satd. Flow (perm)	1662	0	0	1605	1542	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	204.8			367.3	715.4	
Travel Time (s)	14.7			26.4	51.5	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%
Adj. Flow (vph)	215	30	50	270	490	291
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	320	781	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 86.9% ICU Level of Service E

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

10: Doon Mills Road & Apple Ridge Drive

2033 Total - PM Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	215	30	50	270	490	291
Future Volume (vph)	215	30	50	270	490	291
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	215	30	50	270	490	291
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	245	320	781			
Volume Left (vph)	215	50	0			
Volume Right (vph)	30	0	291			
Hadj (s)	0.10	0.07	-0.20			
Departure Headway (s)	6.5	5.8	5.1			
Degree Utilization, x	0.44	0.51	1.11			
Capacity (veh/h)	539	610	699			
Control Delay (s)	14.6	14.7	87.4			
Approach Delay (s)	14.6	14.7	87.4			
Approach LOS	B	B	F			
Intersection Summary						
Delay		56.9				
Level of Service		F				
Intersection Capacity Utilization		86.9%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings

11: Biehn Drive & Carnydale Drive

2033 Total - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (vph)	7	269	14	2	208	13
Future Volume (vph)	7	269	14	2	208	13
Ideal Flow (vphpl)	1765	1765	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.983			
Flt Protected	0.999				0.955	
Satd. Flow (prot)	1530	0	1622	0	0	1505
Flt Permitted	0.999				0.955	
Satd. Flow (perm)	1530	0	1622	0	0	1505
Link Speed (k/h)	50		50		50	
Link Distance (m)	263.9		234.9		249.5	
Travel Time (s)	19.0		16.9		18.0	
Confl. Peds. (#/hr)	49			7	7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	7	269	14	2	208	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	16	0	0	221
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.20	1.20	1.20	1.20
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

11: Biehn Drive & Carnydale Drive

2033 Total - PM Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	7	269	14	2	208	13
Future Volume (Veh/h)	7	269	14	2	208	13
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	269	14	2	208	13
Pedestrians	7		49			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	1		4			
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500	22			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500	22			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	74			87	
cM capacity (veh/h)	441	1055			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	16	221
Volume Left	7	0	208
Volume Right	269	2	0
cSH	1019	1700	1564
Volume to Capacity	0.27	0.01	0.13
Queue Length 95th (m)	8.8	0.0	3.7
Control Delay (s)	9.8	0.0	7.3
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	7.3
Approach LOS	A		

Intersection Summary

Average Delay 8.4

Intersection Capacity Utilization 45.7%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Traffic Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Future Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Storage Length (m)	20.0		0.0	0.0		30.0	20.0		0.0	30.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	15.0			7.5			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99			1.00	0.96	0.99	1.00		1.00	1.00	
Frt	0.976					0.850		0.995			0.985	
Flt Protected	0.950				0.990		0.950			0.950		
Satd. Flow (prot)	1653	1587	0	0	1621	1430	1686	1579	0	1621	1585	0
Flt Permitted	0.678				0.935		0.220			0.487		
Satd. Flow (perm)	1164	1587	0	0	1526	1380	388	1579	0	829	1585	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		14				101		4			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		184.2			333.0			586.7			311.9	
Travel Time (s)		13.3			24.0			42.2			22.5	
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
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 (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Adj. Flow (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	86	0	0	123	101	13	384	0	135	686	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	Right	Left	Left	Right	
Median Width(m)		3.6				3.6				3.6		
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.20	1.20	1.20	1.20	1.11	1.09	1.20	1.20	1.09	1.20	1.20
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	36.0	36.0		36.0	36.0	
Total Split (%)	41.9%	41.9%		41.9%	41.9%	41.9%	58.1%	58.1%		58.1%	58.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

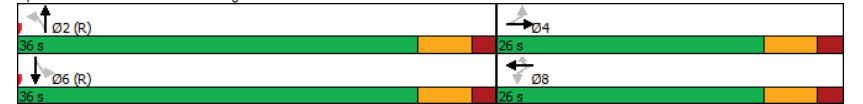
Lanes, Volumes, Timings

12: Doon Village Road & Pioneer Drive

2033 Total - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
v/c Ratio	0.17	0.17			0.25	0.20	0.07	0.50		0.34	0.89	
Control Delay	16.6	14.1			17.2	5.0	9.8	13.6		12.9	31.0	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.6	14.1			17.2	5.0	9.8	13.6		12.9	31.0	
LOS	B	B			B	A	A	B		B	C	
Approach Delay		15.1			11.7			13.5			28.0	
Approach LOS		B			B			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	62											
Actuated Cycle Length:	62											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	65											
Control Type:	Pre timed											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	20.9											
Intersection Capacity Utilization	78.2%											
ICU Level of Service	D											
Analysis Period (min)	15											

Splits and Phases: 12: Doon Village Road & Pioneer Drive



Queues

12: Doon Village Road & Pioneer Drive

2033 Total - PM Peak Hour

	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	86	123	101	13	384	135	686
v/c Ratio	0.17	0.17	0.25	0.20	0.07	0.50	0.34	0.89
Control Delay	16.6	14.1	17.2	5.0	9.8	13.6	12.9	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	14.1	17.2	5.0	9.8	13.6	12.9	31.0
Queue Length 50th (m)	5.3	6.1	10.7	0.0	0.8	29.0	9.3	68.4
Queue Length 95th (m)	13.4	15.0	22.3	8.9	3.5	50.8	21.1	#136.1
Internal Link Dist (m)	160.2	309.0			562.7		287.9	
Turn Bay Length (m)	20.0			30.0	20.0		30.0	
Base Capacity (vph)	375	521	492	513	187	766	401	773
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	0.17	0.17	0.25	0.20	0.07	0.50	0.34	0.89

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

12: Doon Village Road & Pioneer Drive

2033 Total - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Future Volume (vph)	63	72	14	25	98	101	13	372	12	135	617	69
Ideal Flow (vphpl)	1775	1650	1650	1650	1650	1750	1775	1650	1650	1775	1650	1650
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1632	1587			1616	1380	1678	1580		1617	1584	
Flt Permitted	0.68	1.00			0.93	1.00	0.22	1.00		0.49	1.00	
Satd. Flow (perm)	1164	1587			1526	1380	388	1580		828	1584	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	72	14	25	98	101	13	372	12	135	617	69
RTOR Reduction (vph)	0	9	0	0	0	68	0	2	0	0	7	0
Lane Group Flow (vph)	63	77	0	0	123	33	13	382	0	135	679	0
Confl. Peds. (#/hr)	10		11	11		10	15		5	5		15
Heavy Vehicles (%)	2%	1%	0%	0%	1%	4%	0%	4%	0%	4%	2%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	375	511			492	445	187	764		400	766	
v/s Ratio Prot		0.05						0.24			c0.43	
v/s Ratio Perm	0.05				c0.08	0.02	0.03			0.16		
v/c Ratio	0.17	0.15			0.25	0.07	0.07	0.50		0.34	0.89	
Uniform Delay, d1	15.0	14.9			15.5	14.6	8.5	10.9		9.9	14.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.6			1.2	0.3	0.7	2.3		2.3	14.4	
Delay (s)	16.0	15.6			16.7	14.9	9.3	13.2		12.1	28.8	
Level of Service	B	B			B	B	A	B		B	C	
Approach Delay (s)		15.8			15.9			13.1			26.1	
Approach LOS		B			B			B			C	

Intersection Summary

HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2023
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:38:04 PM

Summary of intersection performance

AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	
A1 - FT 2033						
Leg North	0.10	~1	2.63	0.07	A	3.49
Leg West	0.78	1.06	3.23	0.42	A	
Leg South	0.90	1.02	4.36	0.47	A	
Leg East	0.37	~1	2.82	0.24	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:38:03 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2033, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2033, AM	FT 2033	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.49	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	120.00	100.000
West	ONE HOUR	✓	789.00	100.000
South	ONE HOUR	✓	678.00	100.000
East	ONE HOUR	✓	425.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	71.000	19.000	30.000
	West	210.000	0.000	56.000	523.000
	South	57.000	77.000	0.000	544.000
	East	70.000	225.000	130.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.59	0.16	0.25
	West	0.27	0.00	0.07	0.66
	South	0.08	0.11	0.00	0.80

East	0.16	0.53	0.31	0.00
------	------	------	------	------

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.190	1.350	1.370
	West	1.050	1.000	1.210	1.050
	South	1.150	1.040	1.000	1.000
	East	1.250	1.130	1.090	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	19.0	35.0	37.0
	West	5.0	0.0	21.0	5.0
	South	15.0	4.0	0.0	0.0
	East	25.0	13.0	9.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.07	2.63	0.10	~1	A	110.11	165.17	6.94	2.52	0.08	6.94	2.52
West	0.42	3.23	0.78	1.06	A	724.00	1086.00	52.12	2.88	0.58	52.12	2.88
South	0.47	4.36	0.90	1.02	A	622.14	933.22	55.92	3.60	0.62	55.92	3.60
East	0.24	2.82	0.37	~1	A	389.99	584.98	25.53	2.62	0.28	25.53	2.62

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	90.34	22.59	90.10	252.99	324.33	0.00	1958.24	1046.38	0.046	0.00	0.06	2.417	A
West	594.00	148.50	592.33	280.03	134.40	0.00	2095.55	1494.10	0.283	0.00	0.42	2.536	A
South	510.43	127.61	508.81	153.92	572.81	0.00	1778.59	1000.09	0.287	0.00	0.41	2.875	A
East	319.96	79.99	319.10	823.41	258.21	0.00	2006.03	1762.32	0.160	0.00	0.21	2.421	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	107.88	26.97	107.82	302.73	388.09	0.00	1912.14	1046.38	0.056	0.06	0.07	2.503	A
West	709.29	177.32	708.78	335.09	160.82	0.00	2076.44	1494.10	0.342	0.42	0.55	2.790	A
South	609.51	152.38	608.87	184.17	685.43	0.00	1697.18	1000.09	0.359	0.41	0.57	3.357	A
East	382.07	95.52	381.84	985.31	308.99	0.00	1969.33	1762.32	0.194	0.21	0.27	2.574	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (PCE/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	132.12	33.03	132.04	370.63	475.18	0.00	1849.18	1046.38	0.071	0.07	0.10	2.630	A
West	868.71	217.18	867.80	410.29	196.93	0.00	2050.34	1494.10	0.424	0.55	0.77	3.225	A
South	746.49	186.62	745.18	225.52	839.21	0.00	1586.00	1000.10	0.471	0.57	0.90	4.341	A
East	467.93	116.98	467.56	1206.14	378.25	0.00	1919.26	1762.32	0.244	0.27	0.36	2.815	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	132.12	33.03	132.12	371.04	475.64	0.00	1848.85	1046.38	0.071	0.10	0.10	2.630 A	A
West	868.71	217.18	868.70	410.68	197.08	0.00	2050.23	1494.10	0.424	0.77	0.78	3.228 A	A
South	746.49	186.62	746.47	225.71	840.07	0.00	1585.38	1000.10	0.471	0.90	0.90	4.357 A	A
East	467.93	116.98	467.93	1207.80	378.74	0.00	1918.90	1762.32	0.244	0.36	0.37	2.815 A	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	107.88	26.97	107.96	303.36	388.81	0.00	1911.62	1046.38	0.056	0.10	0.08	2.506 A	A
West	709.29	177.32	710.19	335.71	161.06	0.00	2076.27	1494.10	0.342	0.78	0.55	2.794 A	A
South	609.51	152.38	610.81	184.48	686.78	0.00	1696.21	1000.09	0.359	0.90	0.57	3.371 A	A
East	382.07	95.52	382.43	987.84	309.75	0.00	1968.78	1762.32	0.194	0.37	0.27	2.576 A	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	90.34	22.59	90.40	253.94	325.50	0.00	1957.39	1046.38	0.046	0.08	0.06	2.419 A	A
West	594.00	148.50	594.53	281.04	134.86	0.00	2095.22	1494.10	0.284	0.55	0.42	2.543 A	A
South	510.43	127.61	511.08	154.45	574.93	0.00	1777.07	1000.09	0.287	0.57	0.41	2.891 A	A
East	319.96	79.99	320.19	826.76	259.25	0.00	2005.29	1762.32	0.160	0.27	0.22	2.427 A	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.90	0.06	2.417	A	A
West	6.16	0.41	2.536	A	A
South	5.99	0.40	2.875	A	A
East	3.17	0.21	2.421	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.11	0.07	2.503	A	A
West	8.10	0.54	2.790	A	A
South	8.34	0.56	3.357	A	A
East	4.04	0.27	2.574	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.43	0.10	2.630	A	A
West	11.41	0.76	3.225	A	A
South	13.09	0.87	4.341	A	A
East	5.40	0.36	2.815	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	1.45	0.10	2.630	A	A
West	11.64	0.78	3.228	A	A
South	13.47	0.90	4.357	A	A
East	5.48	0.37	2.815	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.14	0.08	2.506	A	A
West	8.42	0.56	2.794	A	A
South	8.77	0.58	3.371	A	A
East	4.17	0.28	2.576	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.92	0.06	2.419	A	A
West	6.40	0.43	2.543	A	A
South	6.26	0.42	2.891	A	A
East	3.28	0.22	2.427	A	A

Queue Variation Results for each time segment**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.42	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.90	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.78	0.00	0.00	0.00	1.06			N/A	N/A
South	0.90	0.00	0.00	0.00	1.02			N/A	N/A
East	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.42	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821.26/11/2015]
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Filename: Strasburg and Huron.arc8
Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Projects\230376 - Arcady
Report generation date: 2023-12-13 2:37:29 PM

Summary of intersection performance

	PM						Intersection Delay (s)	Intersection LOS
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS			
A1 - FT 2033								
Leg North	0.51	1.04	4.88	0.33	A	4.93	A	
Leg West	0.82	1.02	3.96	0.45	A			
Leg South	0.46	1.00	3.08	0.32	A			
Leg East	2.34	3.06	6.21	0.70	A			

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - FB 2028, AM" model duration: 8:00 AM - 9:30 AM
"D4 - FB 2028, PM" model duration: 4:00 PM - 5:30 PM
"D5 - FB 2033, AM" model duration: 8:00 AM - 9:30 AM
"D6 - FB 2033, PM" model duration: 4:00 PM - 5:30 PM
"D7 - FT 2028, AM" model duration: 8:00 AM - 9:30 AM
"D8 - FT 2028, PM" model duration: 4:00 PM - 5:30 PM
"D9 - FT 2033, AM" model duration: 8:00 AM - 9:30 AM
"D10 - FT 2033, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2023-12-13 2:37:28 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2023-12-13
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - FT 2033, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
FT 2033, PM	FT 2033	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				4.93	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Strasburg Road	
West	West	Huron Road	
South	South	Strasburg Road	
East	East	Huron Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	
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Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	ROW Standard		90.00
West	Percentage	ROW Standard		90.00
South	Percentage	ROW Standard		90.00
East	Percentage	ROW Standard		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	341.00	100.000
West	ONE HOUR	✓	677.00	100.000
South	ONE HOUR	✓	492.00	100.000
East	ONE HOUR	✓	1247.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	229.000	72.000	40.000
	West	125.000	0.000	118.000	434.000
	South	60.000	103.000	0.000	329.000
	East	28.000	676.000	543.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.00	0.67	0.21	0.12
	West	0.18	0.00	0.17	0.64
	South	0.12	0.21	0.00	0.67

	East	0.02	0.54	0.44	0.00
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Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	1.000	1.020	1.020	1.190
	West	1.040	1.000	1.000	1.020
	South	1.000	1.020	1.000	1.000
	East	1.520	1.020	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.0	2.0	2.0	19.0
	West	4.0	0.0	0.0	2.0
	South	0.0	2.0	0.0	0.0
	East	52.0	2.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.33	4.88	0.51	1.04	A	312.91	469.36	30.82	3.94	0.34	30.82	3.94
West	0.45	3.96	0.82	1.02	A	621.23	931.84	52.01	3.35	0.58	52.02	3.35
South	0.32	3.08	0.46	1.00	A	451.47	677.20	30.97	2.74	0.34	30.97	2.74
East	0.70	6.21	2.34	3.06	A	1144.27	1716.40	133.04	4.65	1.48	133.05	4.65

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	256.72	64.18	255.85	159.87	991.68	0.00	1475.78	803.89	0.174	0.00	0.22	3.060	A
West	509.68	127.42	508.12	756.21	491.33	0.00	1837.51	1467.36	0.277	0.00	0.39	2.760	A
South	370.40	92.60	369.41	549.88	449.57	0.00	1867.69	1248.61	0.198	0.00	0.25	2.411	A
East	938.81	234.70	935.35	602.78	216.21	0.00	2036.40	1697.78	0.461	0.00	0.87	3.321	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	306.55	76.64	306.19	191.30	1186.77	0.00	1334.73	803.89	0.230	0.22	0.31	3.631	A
West	608.61	152.15	608.04	904.97	587.99	0.00	1767.62	1467.36	0.344	0.39	0.53	3.165	A
South	442.30	110.57	441.99	658.06	537.97	0.00	1803.78	1248.61	0.245	0.25	0.32	2.654	A
East	1121.03	280.26	1119.38	721.26	258.70	0.00	2005.68	1697.78	0.559	0.87	1.28	4.130	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	
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Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	375.45	93.86	374.67	234.15	1451.38	0.00	1143.44	803.89	0.328	0.31	0.50	4.852	A
West	745.39	186.35	744.27	1106.94	719.10	0.00	1672.83	1467.37	0.446	0.53	0.81	3.949	A
South	541.70	135.43	541.16	804.88	658.49	0.00	1716.65	1248.61	0.316	0.32	0.46	3.073	A
East	1372.97	343.24	1368.82	882.95	316.71	0.00	1963.75	1697.78	0.699	1.28	2.32	6.121	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	375.45	93.86	375.43	234.51	1455.45	0.00	1140.49	803.89	0.329	0.50	0.51	4.881	A
West	745.39	186.35	745.37	1109.76	721.12	0.00	1671.38	1467.37	0.446	0.81	0.82	3.965	A
South	541.70	135.43	541.70	807.00	659.50	0.00	1715.93	1248.61	0.316	0.46	0.46	3.077	A
East	1372.97	343.24	1372.87	884.10	317.09	0.00	1963.47	1697.78	0.699	2.32	2.34	6.207	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	306.55	76.64	307.33	191.85	1192.62	0.00	1330.51	803.89	0.230	0.51	0.31	3.651	A
West	608.61	152.15	609.72	909.05	590.89	0.00	1765.52	1467.36	0.345	0.82	0.54	3.179	A
South	442.30	110.57	442.84	661.12	539.50	0.00	1802.68	1248.61	0.245	0.46	0.33	2.658	A
East	1121.03	280.26	1125.18	723.04	259.29	0.00	2005.26	1697.78	0.559	2.34	1.30	4.187	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	256.72	64.18	257.09	160.54	997.01	0.00	1471.92	803.89	0.174	0.31	0.22	3.076	A
West	509.68	127.42	510.26	760.11	493.98	0.00	1835.59	1467.36	0.278	0.54	0.39	2.771	A
South	370.40	92.60	370.72	552.76	451.48	0.00	1866.31	1248.61	0.198	0.33	0.25	2.417	A
East	938.81	234.70	940.52	605.17	217.03	0.00	2035.61	1697.78	0.461	1.30	0.88	3.355	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.20	0.21	3.060	A	A
West	5.74	0.38	2.760	A	A
South	3.66	0.24	2.411	A	A
East	12.64	0.84	3.321	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.54	0.30	3.631	A	A
West	7.87	0.52	3.165	A	A
South	4.81	0.32	2.654	A	A
East	18.66	1.24	4.130	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.37	0.49	4.852	A	A
West	11.93	0.80	3.949	A	A
South	6.80	0.45	3.073	A	A
East	33.08	2.21	6.121	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
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North	7.58	0.51	4.881	A	A
West	12.24	0.82	3.965	A	A
South	6.92	0.46	3.077	A	A
East	34.98	2.33	6.207	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.78	0.32	3.651	A	A
West	8.25	0.55	3.179	A	A
South	4.99	0.33	2.658	A	A
East	20.22	1.35	4.187	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.35	0.22	3.076	A	A
West	5.99	0.40	2.771	A	A
South	3.79	0.25	2.417	A	A
East	13.46	0.90	3.355	A	A

Queue Variation Results for each time segment**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.87	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.28	0.00	0.00	2.04	3.06			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.32	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.51	0.00	0.00	0.00	1.04			N/A	N/A
West	0.82	0.00	0.00	0.00	1.02			N/A	N/A
South	0.46	0.00	0.00	0.00	1.00			N/A	N/A
East	2.34	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.30	0.00	0.00	2.04	2.04			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.88	0.00	0.00	1.02	2.04			N/A	N/A

Appendix H

OTM Traffic Control Signal Warrants



Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2033 Total
Region/City/Township: Kitchener

Major Street: New Dundee Road
Minor Street: Pinnacle Road

North/South?: N

Number of Approach Lanes: 1
Tee Intersection?: Y
Flow Conditions: Free
PM Forecast Only? N

Warrant Results			
150% Satisfied	No	Justification for new intersections with forecast traffic	
120% Satisfied	No	Justification for existing intersections with forecast traffic	

Time Period	Major Street						Minor Street						Peds Crossing
	New Dundee Road						Pinnacle Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	4	1209	0	0	412	19	0	0	0	64	0	8	
PM Peak Hour	11	855	0	0	1432	97	0	0	0	52	0	12	
Average Hourly Volume	4	516	0	0	461	29	0	0	0	29	0	5	0

Warrant	AHV
1A - All	1044
1B - Minor	34
2A - Major	1010
2B - Cross	29

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	All Approaches	480	720	600	900	1044
% Fulfilled						217.4%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Minor Street Approaches	180	255	180	255	34
% Fulfilled						18.9%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Major Street Approaches	480	720	600	900	1010
% Fulfilled						210.4%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
	Traffic Crossing Major Street	50	75	50	75	29
% Fulfilled						58.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2033 Total
Region/City/Township: Kitchener

Major Street: New Dundee Road
Minor Street: Reidel Road

North/South?: N

Number of Approach Lanes: 1
Tee Intersection?: N
Flow Conditions: Free
PM Forecast Only? N

Warrant Results			
150% Satisfied	No	Justification for new intersections with forecast traffic	
120% Satisfied	No	Justification for existing intersections with forecast traffic	

Time Period	Major Street						Minor Street						Peds Crossing
	New Dundee Road						Reidel Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	11	524	82	13	336	10	45	23	24	12	41	12	
PM Peak Hour	26	611	89	20	649	18	68	75	19	4	34	19	
Average Hourly Volume	9	284	43	8	246	7	28	25	11	4	19	8	0

Warrant	AHV
1A - All	691
1B - Minor	94
2A - Major	597
2B - Cross	57

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	X					
	All Approaches	480	720	600	900	691
% Fulfilled						144.0%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	X					
	Minor Street Approaches	120	170	120	170	94
% Fulfilled						78.3%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	X					
	Major Street Approaches	480	720	600	900	597
% Fulfilled						124.4%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	X					
	Traffic Crossing Major Street	50	75	50	75	57
% Fulfilled						113.5%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2033 Total
Region/City/Township: Kitchener

Major Street: Doon Mills Road
Minor Street: Apple Ridge Drive

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection?: Y
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

Time Period	Major Street						Minor Street						Peds Crossing
	Doon Mills Road						Apple Ridge Drive						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	41	366	0	0	183	147	221	0	56	0	0	0	
PM Peak Hour	50	270	0	0	490	291	215	0	30	0	0	0	
Average Hourly Volume	23	159	0	0	168	110	109	0	22	0	0	0	0

Warrant	AHV
1A - All	590
1B - Minor	131
2A - Major	460
2B - Cross	109

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	590
% Fulfilled						81.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	180	255	180	255	131
% Fulfilled						51.2%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	460
% Fulfilled						63.8%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	109
% Fulfilled						145.3%