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Brechin Transportation Study

TRAFFIC OPERATIONS & NETWORK IMPROVEMENTS

Township of Ramara

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Issue	Date	Description
0	October 12, 2023	Draft report for Township review
1	November 9, 2023	Final Report
2	November 23, 2023	Minor revisions per Township review

Document Contents

1	Introduction	1
1.1	Study Area	1
1.2	Study Objectives.....	1
1.3	Report Format	2
2	Existing Conditions.....	3
2.1	Road Network.....	3
2.2	Traffic Volumes.....	6
2.3	Traffic Operations.....	8
3	Future Background Conditions.....	12
3.1	Road Network.....	12
3.2	Traffic Volumes.....	12
3.3	Traffic Operations.....	14
4	Future Development.....	19
4.1	Residential Developments.....	19
4.2	Commercial/Industrial Developments	21
4.3	Phasing.....	22
4.4	Trip Generation	22
4.5	Trip Distribution & Assignment	25
5	Future Total Conditions.....	26
5.1	Road Network.....	26
5.2	Traffic Volumes.....	26
5.3	Traffic Operations.....	26
5.4	Road Network Improvements	38
5.5	Pedestrian Crossing Review	42



6	Other Network Improvements	45
6.1	Railway Crossings.....	45
6.2	Highway 12 Access.....	50
6.3	On-Street Parking.....	53
7	Summary	58
7.1	Proposed Development.....	58
7.2	Traffic Operations.....	58
7.3	Other Road Improvements.....	60

Tables

Table 1:	Study Area Intersections.....	6
Table 2:	Highway 12 Daily Volumes	7
Table 3:	Intersection Operations – 2023.....	10
Table 4:	Road Operations – 2023.....	11
Table 5:	Historical Population Growth.....	12
Table 6:	Future Population Growth	13
Table 7:	Intersection Operations – 2033 Background.....	15
Table 8:	Intersection Operations – 2043 Background.....	16
Table 9:	Road Operations – 2033 Background.....	17
Table 10:	Road Operations – 2043 Background.....	18
Table 11:	Development Phasing	22
Table 12:	Trip Rates – Residential.....	23
Table 13:	Trip Rates – Commercial.....	23
Table 14:	Trip Rates – Industrial.....	24
Table 15:	Trip Generation – Future Developments	24
Table 16:	Intersection Operations – 2028 Total	27
Table 17:	Intersection Operations – 2033 Total	29
Table 18:	Intersection Operations – 2038 Total	31
Table 19:	Intersection Operations – 2043 Total	32
Table 20:	Road Operations – 2028 Total	34
Table 21:	Road Operations – 2033 Total	35
Table 22:	Road Operations – 2038 Total	36
Table 23:	Road Operations – 2043 Total	37



Figures

Figure 1: Study Area 64

Figure 2: Study Area Road Network 65

Figure 3: Study Area Intersections 66

Figure 4: Traffic Volumes – 2023 Counts..... 68

Figure 5: Traffic Volumes – 2023 Base 69

Figure 6: Traffic Volumes – 2033 Background 70

Figure 7: Traffic Volumes – 2043 Background 71

Figure 8: Future Development Map..... 72

Figure 9: Development Traffic – 2028 73

Figure 10: Development Traffic – 2033 74

Figure 11: Development Traffic – 2038 75

Figure 12: Development Traffic – 2043 76

Figure 13: Traffic Volumes – 2028 Total..... 77

Figure 14: Traffic Volumes – 2033 Total..... 78

Figure 15: Traffic Volumes – 2038 Total..... 79

Figure 16: Traffic Volumes – 2043 Total..... 80

Figure 17: Highway 12 Right-of-Way 81

Figure 18: Pedestrian Crossover Decision Support Tool 82

Figure 19: Pedestrian Crossover Selection Matrix 83

Figure 20: Warranted Pedestrian Crossover Facilities..... 84

Figure 21: Grade Separated Railway Crossing Locations..... 85

Figure 22: Highway 12 Access Road 86

Figure 23: O’Neill Lane Access Road..... 87

Figure 24: Parking Improvement Locations 88



Appendices

Appendix A: Traffic Counts

Appendix B: Level of Service Definitions

Appendix C: Existing Traffic Operations

Appendix D: Future Background Traffic Operations

Appendix E: Future Development Traffic Volumes

Appendix F: Future Total Traffic Operations

Appendix G: Traffic Signal Warrants

Appendix H: Ramara Road 47 Grade Separation

Appendix I: Concession Road 5 Grade Separation

Appendix J: Highway 12 Access Road

Appendix K: O'Neill Street Access Road

Appendix L: Ramara Road 47 Parking

Appendix M: Concession Road 4 & Mary Street Parking

Appendix N: Preliminary Cost Estimates



1 Introduction

Tatham Engineering Limited has been retained by the Township of Ramara to prepare a Transportation Study for the Brechin area. The purpose of the Transportation Study is to provide a framework for future development by identifying where and when transportation-related improvements are required, aiding in future development applications and providing background for future Official Plan updates and Development Charge studies.

1.1 STUDY AREA

This study focuses on the community of Brechin and surrounding area, located in the Township of Ramara, as illustrated in Figure 1.

1.2 STUDY OBJECTIVES

Study objectives have been established in consideration of traffic operations and other road network improvements.

1.2.1 Traffic Operations

The objectives of the Traffic Operations review are:

1. Identify and inventory the existing road system and their respective intersections. The inventory addresses jurisdiction, number of lanes, cross-sections, speed limits, intersection configurations, intersection control, etc.
2. Compile traffic data from the appropriate road jurisdictions for the subject road sections and intersections. Additional traffic counts will be conducted to address data gaps and ensure current traffic volumes are appropriately represented.
3. Complete an assessment of the existing study area road system traffic operations to establish an operational baseline and determine if any system improvements are required under existing conditions.
4. Establish background growth rates for the area based on historical and projected future growth within the Township and adjacent municipalities. These rates will be applied to the existing traffic volumes to determine long-term growth expected on the road network independent of any growth in the Brechin area.
5. Complete an assessment of the study area road system traffic operations under future horizon periods (2033 and 2043) considering only the background growth (referred to as the *future background conditions*) to establish any future system needs exclusive of



development within the Brechin area. This may include provision of new turn lanes, protected turning phases, traffic signals, road widenings, etc.

6. Identify planned and potential development parcels within the Brechin area (through consultation with Township staff) to estimate the future trip generation potential of each. This estimated generation will be distributed and assigned to the road system based on anticipated build-out levels at each future horizon.
7. Complete a final assessment of the study area road system traffic operations under future horizon periods considering both the background growth and additional volumes generated by the noted planned/potential developments (referred to as the *future total conditions*) to establish any future system needs due to development within the Brechin area.
8. Review the need for and impact of other identified traffic operational improvements (controlled pedestrian crossing across Highway 12 at Gladstone Street and a channelized northbound right turn on Highway 12 at County Road 47).
9. Provide a suggested timeline and cost estimate for implementation of the recommended improvements. As required to establish the time of need, 5 and 15 year planning horizons will be considered in addition to the 10 and 20 year planning horizons noted above.

1.2.2 Other Network Improvements

Further to road system improvements realized through the traffic operations review, a number of additional network improvements were identified by the Township. Conceptual plans and cost estimates have been developed along with commentary provided further in the report. The areas of investigation include:

- grade separated CN rail crossings on Ramara Rd 47 and Concession Road 5;
- Highway 12 alternative access points; and
- formalization of parking at various locations.

1.3 REPORT FORMAT

In context of the study objectives, the report has been organized as follows:

- Traffic Operations (Chapters 2 to 5).
- Other Network Improvements (Chapter 6); and
- Summary (Chapter 7).



2 Existing Conditions

This chapter will discuss the existing conditions within the study area, namely the current road network, traffic volumes, and traffic operations.

2.1 ROAD NETWORK

The existing road network to be addressed by this study consists of the following road sections and their respective intersections:

- Highway 12
- County Road 47
- Ramara Road 47
- Concession Road 3
- Concession Road 4
- Church Street
- Gladstone Street
- Simcoe Street

2.1.1 Road Sections

Aerial imagery of the road system is provided in Figure 2 with further details provided below.

Highway 12

- Class 2B Arterial under the jurisdiction of the Ministry of Transportation of Ontario (MTO), as per MTO's *Highway Corridor Management Manual*
- oriented north-south through the study area
- urban cross-section (curb & gutter, sidewalks, etc.) within the built-up area of Brechin (approximately 500 metres north of Ramara Road 47 to 200 metres south of Gladstone Street), rural cross-section (open ditches, unpaved shoulders, etc.) outside of this area
- 1 travel lane per direction, with a continuous two-way left turn lane between Ramara Road 47 and 200 metres south of Gladstone Street
- on-street parking available on both sides of Highway 12 north of Ramara Road 47 until the end of the urbanized section
- posted speed limit of 50 km/h through most of the study area, increasing to 80 km/h south of County Road 47 (the change is posted approximately 75 metres north of County Road 47)
- assumed planning capacity of 1,000 vehicles per hour per lane (vphpl), reflective of the road's highway designation



County Road 47

- classified as a Secondary Arterial under the jurisdiction of the County of Simcoe as per the County's *Official Plan*¹
- generally oriented east-west through the study area (alignment shifts from that of Concession Road 4 to one approximately 800 metres further south by means of a large S-bend where it intersects Highway 12)
- rural cross-section with posted speed limit of 60 km/h throughout study area
- assumed planning capacity of 700 vphpl, reflective of its classification as a lower-order arterial road

Ramara Road 47

- classified as a collector under the jurisdiction of the Township of Ramara (as per *Schedule B* of the Township's *Official Plan*²)
- oriented east-west between Highway 12 and Simcoe Road, changing to a northeast-southwest alignment at Simcoe Road before changing again to a north-south alignment approximately 730 metres north of Concession Road 3
- rural cross-section with a posted speed limit of 50 km/h throughout much of the study area (decreases to 40 km/h near Brechin Public School and increases to 60 km/h south of Simcoe Road)
- assumed planning capacity of 600 vphpl, reflective of the collector classification and characteristics of the road

Concession Road 3

- classified as a local road under the jurisdiction of the Township of Ramara
- oriented east-west through the study area
- rural cross-section with a gravel driving surface (a small portion is paved from Highway 12 to 400 metres east of Highway 12)
- no posted speed limit on either side of Highway 12 (and thus assumed 50 km/h)
- assumed planning capacity of 400 vphpl given road characteristics and local classification

¹ *County of Simcoe Official Plan*. County of Simcoe Planning Department. Consolidated February 2023.

² *Township of Ramara Official Plan Schedule B - Roads Plan*. Township of Ramara. January 2016.



Concession Road 4

- classified as a collector road under the jurisdiction of the Township of Ramara
- oriented east-west through the study area
- semi-urban cross-section within urban area of Brechin with a posted speed limit of 40 km/h
- transitions to a rural cross-section approximately 350 metres east of Highway 12 with a posted speed limit of 50 km/h
- assumed planning capacity of 600 vphpl

Church Street & Gladstone Street

- each is classified as a local road under the jurisdiction of the Township of Ramara
- Church Street oriented north-south, Gladstone Street oriented east-west
- rural cross-section and posted speed limit of 40 km/h on each road
- assumed planning capacity of 400 vphpl on each road

Simcoe Road

- classified as a collector road under the jurisdiction of the Township of Ramara
- oriented east-west through the study area
- rural cross-section with a posted speed limit of 50 km/h within study area
- assumed planning capacity of 600 vphpl

2.1.2 Intersections

A total of 7 intersections were selected for review in this study, details of which (including approach lane configurations and control) are summarized in Table 1 and further illustrated in Figure 3. It is noted that for the purposes of this study, County Road 47 is assumed to be oriented north-south at its intersection with Concession Road 4.



Table 1: Study Area Intersections

INTERSECTION	CONTROL	INTERSECTION APPROACH CONFIGURATION			
		NB	SB	EB	WB
Highway 12 & Ramara Road 47/Conc Road 4	signalized	L + TR	L + TR	LTR	LTR
Highway 12 & Gladstone Street	stop control on Gladstone Street	TR	L + T	-	LR
Highway 12 & County Road 47	stop control on County Road 47	T + R	L + T	-	LR
Highway 12 & Concession Road 3	stop control on Conc Road 3	L + T + R	L + TR	LTR	LTR
Ramara Road 47 & Simcoe Road	stop control on Simcoe Road	LR	-	TR	LT
Concession Road 4 & Church Street	stop control on Church Street	LR	-	TR	LT
Concession Road 4 & County Road 47	stop control on Conc Road 4	LT	TR	LR	-
L - left LT - shared left-thru LTR - shared left-thru-right	T - thru TR - shared thru-right	R - right LR - shared left-right			

2.2 TRAFFIC VOLUMES

2.2.1 Traffic Counts

To establish existing traffic volumes on the road network, traffic counts were conducted at each of the key intersections noted above on Tuesday, May 16, 2023 for the following periods:

- AM 07:00 to 10:00 (3 hours);
- Mid Day 11:00 to 13:00 (2 hours); and
- PM 15:00 to 18:00 (3 hours).

The observed AM and PM peak hour volumes are illustrated in Figure 4 with detailed traffic count sheets provided in Appendix A. As the AM and PM peak hour volumes are considered the more critical, only these periods have been presented and carried forward in this study.



2.2.2 Seasonal Adjustments

MTO publishes Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) volumes for all provincial highways³. Traffic volumes on Highway 12 within the study area for the period of 2012 to 2019 (the latest published year) were investigated to determine if there is a significant increase in traffic volumes during the summer months, given the recreational nature of the study area and the role of Highway 12 in serving surrounding cottage communities. The volumes for the section of Highway 12 between Ramara Road 51 (south of the study area) and County Road 169 (north of the study area) are summarized in Table 2.

Table 2: Highway 12 Daily Volumes

YEAR	HIGHWAY 12 VOLUMES		
	AADT	SADT	SADT:AADT Ratio
2012	10,700	12,700	1.19
2013	10,600	12,900	1.22
2014	10,800	13,200	1.22
2015	10,900	13,300	1.22
2016	10,900	13,300	1.22
2017	11,000	14,700	1.34
2018	11,000	14,700	1.34
2019	11,100	14,800	1.33
Average			1.26

As indicated, the summer average daily traffic volumes (i.e. those expected in July and August) through Brechin are in the order of 19 to 34% greater than the annual average traffic volumes, which are typically observed in April and October.

³ *Provincial Highways Traffic Volumes 1988-2019*. Ministry of Transportation of Ontario.



2.2.3 Adjusted Traffic Volumes

Recognizing that the traffic counts completed for this study were conducted in May, and thus the volumes are expected to be slightly greater than average conditions, a 25% factor was employed to reflect peak summer volumes along Highway 12. In addition, the factor was applied to volumes on the following roads, recognizing that each provides a connection to a summer attraction (such as cottages and/or a lake) and for which seasonal traffic data is unavailable:

- Ramara Road 47;
- Simcoe Road; and
- County Road 47.

For the remaining roads, the volumes as counted were employed.

The resulting 2023 traffic volumes are illustrated in Figure 5.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions, which considers operations at the study area intersections and at midblock locations of the key roads, provides the baseline against which future traffic volumes and operations can be investigated.

2.3.1 Intersection Operations

The capacity, and hence operations, of a road system is effectively governed by its intersections, recognizing that they serve as pinch points within a given road system. The intersection operations were reviewed based on the following:

- the 2023 adjusted traffic volumes (representative of peak summer conditions);
- the existing configuration and control of each intersection; and
- procedures outlined in the *2000 Highway Capacity Manual*⁴ (using Synchro v.11 software).

For signalized intersections, the analysis considers:

- the average delay (measured in seconds);
- level of service (LOS); and
- volume to capacity (v/c) for each signalized movement.

⁴ *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.



For unsignalized intersections, the analysis considers the same metrics but assesses only critical movements, namely those operating under stop control.

With respect to the noted metrics:

- level of service 'A' corresponds to the best operating condition with minimal delays whereas level of service 'F' corresponds to poor operations resulting from high intersection delays (additional details regarding Level of Service definitions are provided in Appendix B); and
- a v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

A summary of the analysis is provided in Table 3 with detailed operations worksheets provided in Appendix C. Any movements operating at LOS F or near/above capacity ($v/c \geq 0.95$) have been bolded in the summary table. To ensure the model more accurately represents existing conditions, the overall peak hour factor (PHF) for each intersection and heavy vehicle percentage (HV%) for each movement was established based on the actual traffic counts and incorporated into the Synchro model. Where the HV% was less than Synchro's default value of 2%, the default value was used in the assessment. The existing signal timing plan in use at the intersection of Highway 12 with Ramara Road 47/Concession Road 4 was obtained from MTO. The timing plan was field verified to ensure the supplied plan matched that currently in operation at the intersection; after verification of such, the plan was input into the Synchro model.

As indicated, the network currently provides excellent operations at each intersection (LOS C or better) with significant reserve capacity remaining ($v/c \leq 0.59$) during both the AM and PM peak periods. No improvements are currently required to accommodate the existing traffic volumes on the road network.

2.3.2 Road Operations

Road operations assess the peak hour directional volumes on the subject road sections in consideration of the assumed respective lane capacities of each. The capacity thresholds contained herein reflect those typically assumed for each class of road (i.e. local, collector, etc.), with higher capacities assigned to higher-order roads.

A summary of the volume to capacity ratios (i.e. the degree to which the available capacity is utilized) is provided in Table 4 for the existing conditions, with the following noted:

- a volume-to-capacity ratio (v/c) ratio below 1.0 indicates there is available capacity remaining on that road section;
- a v/c ratio at or above 1.0 indicates that road capacity has been reached or surpassed; and
- as the v/c ratio approaches/exceeds 1.0, congestion is more likely to occur.



Table 3: Intersection Operations – 2023

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB LTR	signal	17	B	0.43	18	B	0.45
	WB LTR	signal	15	B	0.13	16	B	0.11
	NB L	signal	6	A	0.08	7	A	0.19
	NB TR	signal	8	A	0.42	9	A	0.48
	SB L	signal	6	A	0.03	6	A	0.07
	SB TR	signal	8	A	0.44	11	B	0.64
	overall	signal	9	A	0.44	11	B	0.59
Highway 12 & Gladstone Street	WB LR	stop	12	B	0.01	13	B	0.07
Highway 12 & County Road 47	WB LR	stop	21	C	0.25	16	C	0.09
Highway 12 & Concession Road 3	EB LTR	stop	16	C	0.02	21	C	0.04
	WB LTR	stop	18	C	0.03	22	C	0.04
Ramara Road 47 & Simcoe Road	NB LR	stop	9	A	0.05	9	A	0.03
Concession Road 4 & Church Street	NB LR	stop	9	A	0.01	9	A	0.02
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06

Any road segments operating near or over capacity ($v/c \geq 0.95$) have been bolded in the summary table. As indicated, each road section is operating well below the planning capacity of each road ($v/c \leq 0.57$). Therefore, no improvements are required to increase road capacity of the study area road network under existing conditions.



Table 4: Road Operations – 2023

ROAD SECTION & LOCATION		CAPACITY (VPHPL) ¹	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Road	W of Ramara Rd 47	600	0.21	0.14	0.23	0.26
Ramara Road 47	W of Highway 12	600	0.25	0.13	0.26	0.22
	S of Simcoe St	600	0.06	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000	0.43	0.36	0.53	0.57
	N of County Rd 47	1,000	0.34	0.34	0.48	0.52
	S of Concession Rd 3	1,000	0.39	0.36	0.44	0.51
Concession Road 4	E of Highway 12	600	0.07	0.11	0.09	0.11
	W of County Rd 47	600	0.04	0.08	0.07	0.05
County Road 47	E of Highway 12	700	0.09	0.10	0.03	0.04
	E of Concession 4	700	0.11	0.16	0.08	0.08
Church Street	S of Concession Rd 4	400	0.01	0.02	0.03	0.03
Gladstone Street	E of Highway 12	400	0.03	0.02	0.09	0.08
Concession Road 3	W of Highway 12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.01	0.02	0.01	0.02

¹ Capacity is denoted as vehicles per hour per lane

2.3.3 Operational Summary

Results of the traffic operational assessments under existing conditions indicate that the existing road network readily accommodates the current traffic volumes. In this regard, no road system improvements to address operational shortcomings are currently required.



3 Future Background Conditions

This chapter will describe the road network and background traffic volumes expected for the years 2033 and 2043 (i.e. 10 and 20 year horizons).

3.1 ROAD NETWORK

Per communications with MTO, no improvements are currently planned for Highway 12 within the study area. Similarly, no improvements are currently planned for the remaining County and Township roads.

3.2 TRAFFIC VOLUMES

Background traffic volumes for each future horizon have been determined based on the 2023 summer traffic volumes and historical and projected growth within the surrounding area.

3.2.1 Background Growth

Historical Population Growth

Population data from the 2016 and 2021 censuses was reviewed to determine recent historical growth trends in the area. Resulting growth within the Township, Simcoe County (excluding Barrie and Orillia), Orillia, and adjacent upper-tier municipalities is summarized in Table 5.

Table 5: Historical Population Growth

AREA	POPULATION			ANNUAL GROWTH RATE		
	2011	2016	2021	2011-16	2016-21	2011-21
Ramara	9,275	9,488	10,377	0.46%	1.81%	1.13%
Simcoe County	279,414	307,035	351,929	1.90%	2.77%	2.33%
Orillia	30,586	31,166	33,411	0.38%	1.40%	0.89%
Muskoka District	58,017	60,599	66,674	0.87%	1.93%	1.40%
Durham Region	608,124	645,862	696,992	1.21%	1.54%	1.37%
Kawartha Lakes	73,219	75,423	79,247	0.59%	0.99%	0.79%



As indicated, Ramara's population grew by approximately 1.1% per annum between 2011 and 2021, whereas Simcoe County has grown more than twice as fast over the same period. Adjacent upper-tier municipalities grew at comparable rates to Ramara, averaging between approximately 0.8% and 1.4% per annum over the 2011 to 2021 period.

Future Population Growth

Future population projections for each of the noted areas have been obtained from the respective Official Plans (Simcoe, Durham⁵), Transportation Master Plan (Orillia⁶), or growth reports (Muskoka⁷, Kawartha Lakes⁸, Ramara⁹) and are summarized in Table 6. It is noted that the presented base populations may not reflect the census population at the noted base year due to differences between forecast growth and realized growth in the years since publication of the source reports.

Table 6: Future Population Growth

AREA	HORIZON YEAR		POPULATION		ANNUAL GROWTH RATE
	Base	Future	Base	Future	
Ramara	2019	2031	10,380	13,000	1.89%
Simcoe County	2021	2031	351,929	416,000	1.69%
Orillia	2016	2036	31,165	44,000	1.74%
Muskoka District	2016	2036	60,600	71,700	0.84%
Durham Region	2016	2031	729,030	960,000	1.85%
Kawartha Lakes	2011	2031	79,526	100,000	1.15%

As indicated, growth in Ramara, Simcoe County, and adjacent regions is expected to be in the order of 0.8% to 1.9% over the next 10 to 15 years, assuming the noted population targets are met.

⁵ *Durham Regional Official Plan*. Durham Region. Consolidated May 26, 2020.

⁶ *City of Orillia Multi-Modal Transportation Master Plan*. City of Orillia & Stantec. November 2019.

⁷ *Muskoka District 2019 Growth Strategy - Forecast & Growth Allocation Report*. Hemson Consulting. February 8, 2019.

⁸ *City of Kawartha Lakes Growth Management Strategy*. MHBC Planning & UEM. May 2011.

⁹ *Simcoe County Residential Land Budget 2019 - Ramara*. Hemson Consulting. March 2021.



Historical Highway 12 Traffic Volumes

As per traffic data published by MTO (as summarized in Table 2), average annual daily traffic volumes on Highway 12 experienced a yearly growth in the order of 0.5% per year from 2012 to 2019. Over the same period, the summer volumes experienced an average yearly growth in the order of 2.3%. It is noted that this elevated summer growth is impacted by the significant jump in summer volumes observed between 2016 and 2017 (13,300 to 14,700 vehicles per day – nearly 11% growth in 1 year). In the years before and after this increase, the annual summer growth is in the order of 1.0% on average.

Background Growth Rate

In considering the historical growth and growth projections in and around the Brechin area, the following growth rates have been applied to the study area road network:

- Highway 12 – 2.0% per annum;
- Ramara Road 47 & County Road 47 – 1.0% per annum; and
- all remaining roads – no growth

Higher growth was applied to Highway 12 recognizing its function as an interregional link which will be more impacted by growth outside of the immediate study area. This ensures a conservative estimate of future traffic volumes on the road.

A lesser growth rate was applied to Ramara Road 47 and County Road 47 acknowledging their use as primary routes within the study area, connecting to other settlement areas adjacent to Brechin, such as those along the shores of Lake Simcoe and Dalrymple Lake. No growth was applied to the remaining roads within the study area, acknowledging that each serves a more local function within the Brechin area, and whose growth will be primarily driven by local development (for which the resulting traffic volumes will be considered separately as detailed in Chapters 4 and 5).

3.2.2 Background Traffic Volumes

The resulting background traffic volumes for each future horizon are illustrated in Figure 6 and Figure 7, reflective of the 2023 traffic volumes plus additional traffic due to the noted background growth rates.

3.3 TRAFFIC OPERATIONS

An analysis of the key operations of the key intersections and assessment of road capacity was reviewed for each future horizon year.



3.3.1 Intersection Operations

Results of the operations of the key intersections under the 2033 and 2043 background conditions are summarized in Table 7 and Table 8 with detailed worksheets provided in Appendix D. As indicated, operations at each intersection remain acceptable (LOS E or better) through the 2043 horizon under background conditions. Reserve capacity remains available throughout the network, with each movement operating at or below 85% capacity (i.e. $v/c \leq 0.85$). At the signalized intersection of Highway 12 with Ramara Road 47 and Concession Road 4, the existing traffic signal timing plan was maintained in that it yields acceptable operations (optimization of the timing plan could be considered and would likely yield improved operations).

Table 7: Intersection Operations - 2033 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB LTR	signal	18	B	0.48	21	C	0.51
	WB LTR	signal	15	B	0.13	18	B	0.11
	NB L	signal	7	A	0.09	8	A	0.26
	NB TR	signal	9	A	0.51	9	A	0.56
	SB L	signal	6	A	0.03	7	A	0.08
	SB TR	signal	9	A	0.53	13	B	0.75
	overall	signal	10	B	0.51	13	B	0.68
Highway 12 & Gladstone Street	WB LR	stop	13	B	0.01	14	B	0.08
Highway 12 & County Road 47	WB LR	stop	28	D	0.34	20	C	0.13
Highway 12 & Concession Road 3	EB LTR	stop	19	C	0.02	27	D	0.06
	WB LTR	stop	22	C	0.04	29	D	0.06
Ramara Road 47 & Simcoe Road	NB LR	stop	9	A	0.06	9	A	0.03
Concession Road 4 & Church Street	NB LR	stop	9	A	0.01	9	A	0.02
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06



Table 8: Intersection Operations – 2043 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB LTR	signal	19	B	0.52	26	C	0.59
	WB LTR	signal	16	B	0.12	20	B	0.11
	NB L	signal	7	A	0.13	9	A	0.44
	NB TR	signal	9	A	0.61	11	B	0.65
	SB L	signal	7	A	0.04	7	A	0.10
	SB TR	signal	11	B	0.63	18	B	0.85
	overall	signal	12	B	0.60	16	B	0.78
Highway 12 & Gladstone Street	WB LR	stop	14	B	0.01	17	C	0.10
Highway 12 & County Road 47	WB LR	stop	45	E	0.51	27	D	0.20
Highway 12 & Concession Road 3	EB LTR	stop	24	D	0.03	39	E	0.09
	WB LTR	stop	29	D	0.05	42	E	0.08
Ramara Road 47 & Simcoe Road	NB LR	stop	9	A	0.06	9	A	0.04
Concession Road 4 & Church Street	NB LR	stop	9	A	0.01	9	A	0.02
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06

3.3.2 Road Operations

Road operations were assessed under the future background conditions and are summarized in Table 9 and Table 10. As indicated, reserve capacity remains available throughout the road network with each road section operating at or below 82% capacity through the 2043 horizon. Excluding Highway 12 (which has the highest volumes and utilized capacity of the study area roads), each road section operates at or below 32% capacity through the 2043 horizon. Therefore,



no improvements are required to accommodate the projected background traffic growth through the 2043 horizon.

Table 9: Road Operations – 2033 Background

ROAD SECTION & LOCATION		CAPACITY (VPHPL) ¹	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Rd	W of Ramara Rd 47	600	0.21	0.14	0.23	0.26
Ramara Rd 47	W of Highway 12	600	0.28	0.14	0.29	0.25
	S of Simcoe St	600	0.06	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000	0.50	0.43	0.63	0.68
	N of County Rd 47	1,000	0.42	0.42	0.58	0.63
	S of Concession Rd 3	1,000	0.47	0.44	0.54	0.62
Concession Rd 4	E of Highway 12	600	0.07	0.11	0.09	0.11
	W of County Rd 47	600	0.04	0.08	0.07	0.05
County Rd 47	E of Highway 12	700	0.10	0.11	0.03	0.05
	E of Concession 4	700	0.12	0.17	0.08	0.09
Church St	S of Concession Rd 4	400	0.01	0.02	0.03	0.03
Gladstone St	E of Highway 12	400	0.03	0.02	0.09	0.08
Concession Rd 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.01	0.02	0.01	0.02



Table 10: Road Operations – 2043 Background

ROAD SECTION & LOCATION		CAPACITY (VPHPL) ¹	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Rd	W of Ramara Rd 47	600	0.21	0.14	0.23	0.26
Ramara Rd 47	W of Highway 12	600	0.31	0.15	0.32	0.27
	S of Simcoe St	600	0.07	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000	0.60	0.52	0.75	0.82
	N of County Rd 47	1,000	0.51	0.51	0.70	0.76
	S of Concession Rd 3	1,000	0.58	0.53	0.65	0.75
Concession Rd 4	E of Highway 12	600	0.07	0.11	0.09	0.11
	W of County Rd 47	600	0.04	0.08	0.07	0.05
County Rd 47	E of Highway 12	700	0.11	0.12	0.03	0.05
	E of Concession 4	700	0.12	0.18	0.08	0.09
Church St	S of Concession Rd 4	400	0.01	0.02	0.03	0.03
Gladstone St	E of Highway 12	400	0.03	0.02	0.09	0.08
Concession Rd 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.01	0.02	0.01	0.02

3.3.3 Operational Summary

The results of the operational assessments under background conditions indicate that the road network is expected to provide acceptable operations with reserve capacity available through the 2043 horizon. Therefore, no improvements are considered necessary to accommodate the projected background volumes and their associated traffic operations.



4 Future Development

This chapter will provide additional details on future development within the study area, including location, land uses and trip estimates. Each future development has been identified through consultation with Township planning staff with consideration given to the existing planning areas of Lagoon City and Brechin (as presented in the Township's *Official Plan*). The location of each is illustrated in Figure 8.

The future developments consist of a mix of residential developments, commercial developments, and industrial/employment developments, as follows:

Residential Developments

- OPA 17 Addition
- Northwest Subdivision
- Brechin Subdivision

Commercial/Industrial Developments

- Ramara Road 47 Commercial
- 2175 Highway 12 Commercial
- Ramara Industrial Park

As many of these developments are not yet under formal development processes (either development applications or actively under construction), some assumptions were made regarding key development factors, such as unit density and/or lot coverage, as detailed below.

4.1 RESIDENTIAL DEVELOPMENTS

As dictated by Township staff, unless otherwise specified, each future residential development has considered:

- a minimum base unit density of 30 units per hectare; and
- a unit mix consisting of:
 - 60% detached units;
 - 20% townhouse units; and
 - 20% low-rise apartment/stacked townhouse units.

In addition to these criteria, it is assumed that 25% of the gross land area of each site will be undevelopable, representing land needed for uses such as roads, parks, and stormwater management facilities. Specifics of each development are detailed below.



OPA 17 Addition

OPA 17 Addition is an approximately 59 ha area located immediately north of Ramara Road 47 and west of the CN railway. It is part of the Lagoon City planning area, created as part of a land-swap where undeveloped lands within the then-current planning area were removed and replaced with the noted site. Based on the noted development criteria, the site is assumed to consist of:

- 44.25 ha of developable land (75% of 59 ha); and
- 1,328 residential units (796 detached, 266 townhouse and 266 apartment/stacked townhouse units).

Northwest Subdivision

The Northwest Subdivision is an approximate 15 ha area located in the northwest corner of the Brechin planning area. It consists of a parcel of land bounded by the CN railway to the west, Highway 12 to the east, existing developed areas to the south, and the north edge of the Brechin Village planning area. Based on the noted development criteria, the site is assumed to consist of:

- 11.25 ha of developable land (75% of 15 ha); and
- 338 residential units (202 detached, 68 townhouse and 68 apartment/stacked townhouse units).

Brechin Subdivision

Brechin Subdivision is an approximate 27 ha area located at 2123 Concession Road 4, within the Brechin Village planning area. A *Traffic Impact Study*¹⁰ was completed for the development, which assumed the development would consist of:

- 550 residential units consisting of an approximately 80/20 mix of detached units to townhouse units.

The currently approved development plan calls for:

- 431 total residential units (345 detached and 86 townhouse units).

¹⁰ *Proposed Residential and Commercial Development – Township of Ramara (Brechin) – Traffic Impact Study*. Totten Sims Hubiki Associates. September 17, 2008.



4.2 COMMERCIAL/INDUSTRIAL DEVELOPMENTS

Unless otherwise specified, it was assumed that the lot coverage (i.e. gross floor area of buildings on the ground level) on each site represents 15% of the gross area. Additional details of each development are provided below.

Ramara Road 47 Commercial

The Ramara Road 47 Commercial area consists of several lots located in the triangular area bounded by Ramara Road 47, Highway 12, and the CN railway. The Township intends to construct a new municipal road through this area to allow for access to undeveloped lands and to limit direct connections to Highway 12. The following lots were considered for development as commercial sites; the approximate gross area of each has been determined through aerial measurements:

- Brechin Park (2.53 ha);
- 3251 Ramara Road 47 (1.92 ha);
- 2226 Highway 12 (0.41 ha); and
- vacant lot south of 2202 Highway 12 (4.37 ha).

Combined, these lots result in a total of approximately 9.23 ha of land, or 13,850 m² of assumed gross floor area.

2175 Highway 12 Commercial

The site at 2175 Highway 12 is approximately 2.64 ha in size and is to be developed as a commercial area, with access directly to Highway 12. Based on the noted site area, the development is assumed to consist of approximately 3,960 m² of gross floor area.

Ramara Industrial Park

The Ramara Industrial Park is an industrial/employment region located in the southern portion of the Brechin planning area. Multiple vacant lots exist within the development area, totaling approximately 18.21 ha, which were detailed in the *Ramara Industrial Park Traffic Impact Study*¹¹. Based on details within the study, new development within the Ramara Industrial Park was anticipated to consist of approximately 27,315 m² of gross floor area.

Since completion of the noted study, some of the lots have been fully or partially built-out, namely 3362 County Road 47 (0.40 ha, fully built out) and 3390 County Road 47 (2.02 ha, 50%

¹¹ *Ramara Industrial Park Traffic Impact Study*. C.C. Tatham & Associates. August 13, 2018.



built out). This results in a remaining gross area of approximately 16.8 ha left to be developed within the Ramara Industrial Park as of June 2023.

4.3 PHASING

With respect to phasing and build out, all developments are assumed to be complete by 2038. Those developments already approved/under development are assumed to be completed first (namely Brechin Subdivision, 2175 Highway 12 Commercial, and Ramara Industrial Park). The assumed development phasing is summarized in Table 11.

Table 11: Development Phasing

DEVELOPMENT	BUILD-OUT LEVEL			
	2028	2033	2038	2043
OPA 17 Addition	0%	50%	100%	100%
Northwest Subdivision	0%	50%	100%	100%
Brechin Subdivision	100%	100%	100%	100%
Ramara Road 47 Commercial	0%	50%	100%	100%
2175 Highway 12 Commercial	100%	100%	100%	100%
Ramara Industrial Park	100%	100%	100%	100%

4.4 TRIP GENERATION

4.4.1 Trip Rates

To determine the number of vehicle trips to be generated by the future developments, trip generation rates per the *ITE Trip Generation Manual, 11th Edition*¹² were considered. For the residential developments, the trip rates as summarized in Table 12 have been employed.

For the commercial sites, given that each is to be located within Brechin's *Village Commercial* zoned area (as per the Township's *Official Plan*), an average trip generation rate was derived based on uses permitted within the *Village Commercial* areas in the Township's *Zoning Bylaw*¹³. The following ITE land uses were selected for use in the average rate:

¹² *ITE Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers. September 2021.

¹³ *Township of Ramara Zoning Bylaw No. 2005.85*. Township of Ramara. October 24, 2005.



- small office building (ITE land-use code 712);
- medical/dental office building (ITE land-use code 720); and
- strip retail plaza (ITE land-use code 822).

Table 12: Trip Rates – Residential

ITE LAND USE (LAND USE CODE)	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
single family detached (210) – detached houses	per unit	0.18	0.52	0.70	0.59	0.35	0.94
single family attached (215) – townhouses	per unit	0.15	0.33	0.48	0.32	0.25	0.57
multifamily housing – low-rise (220) – stacked towns	per unit	0.10	0.30	0.40	0.32	0.19	0.51

The strip retail plaza land-use is itself representative of multiple uses typically found in such a development, such as restaurants, convenience stores, personal services, financial institutions, and other commercial/retail uses. As such, use of the strip retail plaza rates was considered appropriate in lieu of individual consideration for other uses permitted within the Village Commercial zone. The trip rates of each individual use and resulting average generation rates are summarized in Table 13.

Table 13: Trip Rates – Commercial

ITE LAND USE (LAND USE CODE)	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
small office building (712)	1,000 ft ² GFA	1.37	0.30	1.67	0.73	1.43	2.16
medical/dental office building (720)	1,000 ft ² GFA	2.45	0.65	3.10	1.18	2.75	3.93
strip retail plaza (822)	1,000 ft ² GFA	1.42	0.94	2.36	3.30	3.30	6.59
Average Rate	1,000 ft² GFA	1.74	0.63	2.38	1.74	2.49	4.23



For the industrial/employment uses within the Ramara Industrial Park, the *Ramara Industrial Park Traffic Impact Study* developed an average trip generation rate based on the permitted uses within the *Zoning Bylaw*. This average rate has been considered in this study and is summarized in Table 14.

Table 14: Trip Rates - Industrial

LAND USE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
industrial/ employment average	1,000 ft ² GFA	0.46	0.13	0.59	0.26	0.54	0.80

4.4.2 Trip Generation

The number of vehicle trips to be generated by each of the development sites during the weekday AM and PM peak periods has been determined based on the proposed land use, development size and trip generation rates identified above. The corresponding trip estimates are summarized in Table 15.

Table 15: Trip Generation – Future Developments

DEVELOPMENT	SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
OPA 17 Addition	1,328 units	210	582	792	643	392	1,035
Northwest Subdivision	338 units	53	148	201	164	100	264
Brechin Subdivision	431 units	76	208	284	232	141	373
Residential Total	2,097 units	339	938	1,277	1,039	633	1,672
Ramara Road 47 Commercial	149,026 ft ²	260	94	354	259	371	630
2175 Highway 12 Commercial	42,625 ft ²	74	27	101	74	106	180
Commercial Total	191,651 ft²	334	121	455	333	477	810
Ramara Industrial Park	271,163 ft ²	124	35	159	70	147	217
Development Total		797	1,094	1,891	1,442	1,257	2,699



As indicated, when fully built out, the future development within the Brechin and Lagoon City area is expected to generate in the order of 1,900 trips during the weekday AM peak hour and 2,700 trips during the weekday PM peak hour. These trips are the combined total of both inbound and outbound trips.

The trip estimates noted above will not consist of entirely new trips on the network. For the commercial/retail sites, it is common practice to consider non-primary trips – these are trips which are already on the road network for another reason (such as a home-to-work trip) which will visit a commercial site as they pass by, generating a *pass-by* trip. ITE data suggests that up to 33% of vehicle trips generated by a commercial site consist of such trips. Additionally, it is anticipated that there will be interactions between the different land uses proposed within the study area. Trips are expected between residential and employment/commercial areas, resulting in trips which are contained entirely within the study area, rather than assigned exclusively to routes which leave the study area. The chosen assessment method (i.e. neglecting non-primary trips and assigning all trips to external routes) ensures the highest traffic volumes are considered on the road network, thus resulting in the most conservative assessment.

4.5 TRIP DISTRIBUTION & ASSIGNMENT

The distribution of the site-generated trips generated by each of the noted future developments has been derived based on several factors. Consideration was given to the travel patterns observed in the *2016 Transportation Tomorrow Survey* (TTS) which is a comprehensive travel survey conducted every 5 years in the Greater Golden Horseshoe. Regarding the study area, it is located within 2006 GTA Zone 8589, which covers the southern portion of the Township, including Brechin and Lagoon City. Based on the travel data within the TTS, the following overall distribution of trips to/from Zone 8589 was obtained:

- to/from the north – 60%;
- to/from the south – 25%;
- to/from the east – 5%; and
- to/from the west – 10%.

Further consideration was given to local traffic patterns observed in the 2023 traffic counts, the type of development being considered, and the expected travel routes for each site based on their location within the study area.

The resulting assignments of development generated trips to the road network for each development horizon are detailed in Figure 9 through Figure 12 and is based on the assumed development phasing detailed in Section 4.3. The assignments for each development individually (reflective of full build-out of each) are provided in Appendix E.



5 Future Total Conditions

This chapter will address the resulting impacts of the planned and potential developments (detailed in Chapter 4) on the study area road system for each identified horizon year. The following areas will be addressed:

- operations of the road network including;
 - operations of the key intersections;
 - road capacity assessment;
- potential improvements to the project area road network including;
 - a controlled pedestrian crossing across Highway 12 at Gladstone Street;
 - a channelized northbound right turn on Highway 12 at County Road 47; and
 - other improvements needed to accommodate the future total traffic volumes.

5.1 ROAD NETWORK

The road network considered in the future background assessment has been maintained. However, in considering the noted future developments, a new road connection between Ramara Road 47 and Highway 12 has been considered for the 2033 and beyond horizons, with its intersection to Highway 12 opposite County Road 47 (thus creating the 4th leg of this existing 3 leg intersection). Additional discussion and detail for this new road, referred as the Highway 12 Access Road, are provided in 6.2.1.

5.2 TRAFFIC VOLUMES

To assess the impacts of the noted future development on the study area road network, the development-generated volumes were added to the future background volumes at each horizon year. The resulting future total volumes are illustrated in Figure 13 through Figure 16.

5.3 TRAFFIC OPERATIONS

An analysis of the operations of the key intersections and midblock capacity was conducted considering the future total volumes to assess the impact of the future development on the study area network.



5.3.1 Intersection Operations

The operations of the key intersections were reviewed for each horizon under the future total conditions. Results of the analyses are summarized in Table 16 through Table 19 with detailed worksheets provided in Appendix F. Improvements to each intersection (such as auxiliary turn lanes, control changes, etc.) were made as required to ensure acceptable operations were provided at each horizon; the summary tables below reflect such changes with further discussion as to the scope of the improvements required under each planning horizon.

A further summary of all improvements implemented throughout the network is provided in Section 5.4.

2028 Horizon

The existing road network (as assessed under existing and background conditions) was found to be sufficient to accommodate the future total volumes for the 2028 horizon, with minor adjustments needed to signal timings to ensure peak operations were maintained. No other intersection improvements are considered necessary to support the projected traffic volumes.

Table 16: Intersection Operations – 2028 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB LTR	signal	18	B	0.49	34	C	0.67
	WB LTR	signal	15	B	0.18	26	C	0.17
	NB L	signal	7	A	0.18	11	B	0.53
	NB TR	signal	11	B	0.64	11	B	0.64
	SB L	signal	7	A	0.07	7	A	0.20
	SB TR	signal	12	B	0.68	14	B	0.78
	overall	signal	13	B	0.61	15	B	0.75
Highway 12 & Gladstone Street	WB LR	stop	19	C	0.42	32	D	0.55
Highway 12 & County Road 47	WB LR	stop	47	E	0.57	26	D	0.48



INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Concession Road 3	EB LTR	stop	20	C	0.03	29	D	0.07
	WB LTR	stop	24	C	0.08	41	E	0.27
Ramara Road 47 & Simcoe Road	NB LR	stop	10	A	0.06	11	B	0.13
Concession Road 4 & Church Street	NB LR	stop	9	A	0.07	9	A	0.06
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06

2033 Horizon

By the 2033 horizon, owing to the high level of development complete by this horizon, significant improvements were required along the Highway 12 corridor to accommodate the anticipated traffic volumes. Additional north-south through capacity was required at each intersection along Highway 12 to improve operations and reduce delays, which was accomplished by provision of a second travel lane in each direction (further discussion on increasing the capacity of Highway 12 is provided in Section 5.4.1). In context of this, it is assumed that the entirety of Highway 12 through Brechin would be widened to accommodate this improvement – simply expanding the north and south approaches at each intersection may result in bottlenecks in locations where the cross-section reduces back to a single through lane per direction.

Further improvements were required at the intersection of Highway 12 with Ramara Road 47/Concession Road 4, namely the provision of eastbound and westbound left turn lanes on Ramara Road 47 and Concession Road 4, in addition to permitted-protected northbound and southbound left turn phases on Highway 12 (e.g. advance green phases). The provision of the left turn lanes on Ramara Road 47 and Concession Road 4 allows the left turning volumes to be separated from the through and right turning volumes, thus reducing the delays incurred by the latter movements.

At the intersection of Highway 12 with County Road 47 and the future Access Road, poor operations are realized on the stop-controlled approaches. Traffic signal warrants were completed at the intersection based on OTM Book 12, Justification 7 criteria. The completed warrants are provided in Appendix G. Based on the results of the warrants, traffic signals are not warranted at the intersection under 2033 total conditions. Warrants were not reviewed at the



intersection of Highway 12 with Concession Road 3; the delays at the intersection are not considered onerous (approximately 1 minute or less) and volumes on Concession Road 3 are very low.

No further improvements were required at the remaining intersections to accommodate the 2033 total conditions.

Table 17: Intersection Operations – 2033 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB L	signal	28	C	0.76	54	D	0.89
	EB TR	signal	17	B	0.28	26	C	0.29
	WB L	signal	25	C	0.21	34	C	0.14
	WB TR	signal	25	C	0.21	35	D	0.26
	NB L	signal	9	A	0.41	28	C	0.77
	NB TR	signal	12	B	0.42	12	B	0.43
	SB L	signal	11	B	0.07	13	B	0.17
	SB TR	signal	16	B	0.58	26	C	0.82
	overall	signal	17	B	0.68	25	C	0.87
Highway 12 & Gladstone Street	WB LR	stop	16	C	0.38	26	D	0.49
Highway 12 & County Road 47/ Access Road	EB LTR	stop	30	D	0.07	70	F	0.45
	WB LTR	stop	258	F	1.25	49	E	0.68
Highway 12 & Concession Road 3	EB LTR	stop	24	C	0.04	41	E	0.10
	WB LTR	stop	31	D	0.11	66	F	0.39
Ramara Road 47 & Simcoe Road	NB LR	stop	11	B	0.07	11	B	0.04
Concession Road 4 & Church Street	NB LR	stop	9	A	0.09	9	A	0.08



INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06
Ramara Road 47 & Access Road	NB LR	stop	16	B	0.11	28	D	0.51

2038 Horizon

Under 2038 conditions, further improvements were required at the intersection of Highway 12 and Ramara Road 47/Concession Road 4 to accommodate the traffic volumes associated with the completion of the OPA 17 and Northwest Subdivision developments. Eastbound and southbound right turn lanes were added to the intersection. The configuration of the eastbound lanes was also revised, changing the through lane to a through-left lane to accommodate left-turning traffic volumes. This non-standard configuration required the eastbound and westbound signal phases to be split to prevent movement conflicts. The intersection was found to operate acceptably in this configuration.

Signal warrants were reviewed at each unsignalized intersection experiencing poor operations (completed warrants provided in Appendix G). Based on the results of the warrants, traffic signals are not warranted at any of the reviewed intersections. Notwithstanding, the warrants at the intersection of Highway 12 with County Road 47 and the future Access Road are borderline (i.e. are very nearly warranted). Furthermore, signalization of the intersection of Ramara Road 47 and the future Access Road was necessary to address very high delays to northbound traffic on the Access Road.

No further improvements were required to accommodate the 2038 total conditions.



Table 18: Intersection Operations – 2038 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB L	signal	34	C	0.65	62	E	0.80
	EB T	signal	34	C	0.66	61	E	0.79
	EB R	signal	28	C	0.29	46	D	0.41
	WB L	signal	38	D	0.18	55	E	0.11
	WB TR	signal	40	D	0.38	62	E	0.54
	NB L	signal	22	C	0.67	66	E	0.95
	NB TR	signal	21	C	0.52	21	C	0.49
	SB L	signal	19	B	0.09	32	C	0.27
	SB T	signal	27	C	0.65	57	E	0.92
SB R	signal	22	C	0.18	41	D	0.57	
	overall	signal	27	C	0.66	47	D	0.90
Highway 12 & Gladstone Street	WB LR	stop	19	C	0.43	44	E	0.66
Highway 12 & County Road 47/ Access Road	EB LTR	stop	57	F	0.23	546	F	1.74
	WB LTR	stop	839	F	2.45	270	F	1.35
Highway 12 & Concession Road 3	EB LTR	stop	62	F	0.10	242	F	0.45
	WB LTR	stop	49	E	0.17	212	F	0.80
Ramara Road 47 & Simcoe Road	NB LR	stop	11	B	0.07	12	B	0.05
Concession Road 4 & Church Street	NB LR	stop	9	A	0.10	9	A	0.10
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06
Ramara Road 47 & Access Road	EB TR	signal	12	B	0.71	12	B	0.69
	WB L	signal	13	B	0.52	14	B	0.50
	WB T	signal	6	A	0.28	17	B	0.82
	NB LR	signal	36	D	0.14	29	C	0.66
	overall	signal	12	B	0.61	17	B	0.78



2043 Horizon

All developments are assumed to be complete by the 2038 horizon. Therefore, under 2043 total conditions, the operations at each intersection were not observed to differ significantly from those observed under 2038 total conditions.

Signal warrants were again reviewed at each unsignalized intersection experiencing poor operations (completed warrants provided in Appendix G). Based on the results of the warrants, signalization is not warranted at any of the intersections. As observed at the 2038 horizon, the signal warrants at the intersection of Highway 12 with County Road 47 and future the Access Road are borderline (i.e. are very nearly warranted). Implementation of signals at this location would address the poor operations observed on the cross-roads. Furthermore, such would likely improve operations at the intersection of Highway 12 and Concession Road 3 - traffic experiencing high delays on Concession 3 can divert north to County Road 47 and access Highway 12 via the lower-delay signalized intersection.

No further improvements were required to accommodate the 2043 total conditions.

Table 19: Intersection Operations - 2043 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Ramara Road 47/ Concession Road 4	EB L	signal	36	D	0.67	64	E	0.81
	EB T	signal	37	D	0.68	63	E	0.80
	EB R	signal	29	C	0.29	47	D	0.42
	WB L	signal	36	D	0.14	57	E	0.11
	WB TR	signal	38	D	0.30	64	E	0.56
	NB L	signal	31	C	0.77	76	E	0.98
	NB TR	signal	24	C	0.59	21	C	0.52
	SB L	signal	21	C	0.11	31	C	0.27
	SB T	signal	30	C	0.72	62	E	0.95
	SB R	signal	23	C	0.18	42	D	0.60
	overall	signal	29	C	0.70	50	D	0.93
Highway 12 & Gladstone Street	WB LR	stop	20	C	0.45	51	F	0.71
Highway 12 & County Road 47/ Access Road	EB LTR	stop	68	F	0.27	>600	F	2.16
	WB LTR	stop	>600	F	3.11	403	F	1.64



INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Concession Road 3	EB LTR	stop	76	F	0.12	346	F	0.58
	WB LTR	stop	58	F	0.20	297	F	0.97
Ramara Road 47 & Simcoe Road	NB LR	stop	11	B	0.08	12	B	0.05
Concession Road 4 & Church Street	NB LR	stop	9	A	0.10	9	A	0.10
Concession Road 4 & County Road 47	EB LR	stop	9	A	0.03	9	A	0.06
Ramara Road 47 & Access Road	EB TR	signal	12	B	0.72	13	B	0.70
	WB L	signal	14	B	0.53	15	B	0.51
	WB T	signal	6	A	0.28	17	B	0.83
	NB LR	signal	36	D	0.14	29	C	0.66
	overall	signal	12	B	0.62	17	B	0.78

5.3.2 SimTraffic Assessment

At many unsignalized intersections (namely those along Highway 12), operations are shown to be poor (LOS F) with high delays on the stop-controlled approaches. Considering that traffic signals are not warranted based on traffic volumes, an alternative assessment method was reviewed wherein each intersection is simulated using *SimTraffic* (the traffic microsimulation module which accompanies Synchro). Compared to the HCM 2000 methodology, the SimTraffic simulations consider additional dynamic factors such as gaps in cross-traffic flow which allow for vehicles queued on a stop-controlled approach to advance. Review of these simulations indicate that the intersections are expected to perform acceptably without the need for signalization through the 2038 horizon. The intersection of Ramara Road 47 with the future Access Road did, however, require signalization by 2038 to otherwise ensure acceptable traffic operations.

5.3.3 Road Operations

Road operations were assessed under the future total conditions and are summarized in Table 20 through Table 23. It is noted that Highway 12 is assumed to be widened to provide 2 through lanes per direction by the 2033 horizon (thus providing a directional capacity in the order of 2,000 vehicles per hour per direction); further discussion on such is provided in Section 5.4.1.



As indicated, most road sections are expected to operate under capacity through the 2043 horizon. Should the widening of Highway 12 not occur by the 2033 horizon, the road is expected to operate at or over capacity over each assessed section through the 2033 horizon, and over capacity on all sections by the 2038 horizon.

The section of Ramara Road 47 west of Highway 12 is expected to operate over capacity by the 2033 horizon and well over capacity by the 2038 horizon. This is largely driven by the traffic generated by the OPA 17 development, which is assumed to use Ramara Road 47 exclusively to access the wider road network. Should another connection be available (such as across the CN railway through the Northwest Subdivision development or via extension to Concession Road 5), it is expected that a significant portion of OPA 17's traffic may use an alternate route, mitigating the need to increase the capacity of Ramara Road 47.

Table 20: Road Operations - 2028 Total

ROAD SECTION & LOCATION		CAPACITY (VPHPL)	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Road	W of Ramara Rd 47	600	0.28	0.18	0.31	0.36
Ramara Road 47	W of Highway 12	600	0.33	0.19	0.36	0.34
	S of Simcoe St	600	0.06	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000	0.62	0.54	0.79	0.84
	N of County Rd 47	1,000	0.44	0.53	0.71	0.68
	S of Concession Rd 3	1,000	0.51	0.48	0.59	0.67
Concession Road 4	E of Highway 12	600	0.10	0.17	0.17	0.15
	W of County Rd 47	600	0.04	0.09	0.07	0.05
County Road 47	E of Highway 12	800	0.23	0.14	0.11	0.22
	E of Concession 4	800	0.11	0.16	0.08	0.09
Church Street	S of Concession Rd 4	400	0.12	0.06	0.10	0.14
Gladstone Street	E of Highway 12	400	0.18	0.45	0.58	0.38
Concession Road 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.09	0.04	0.05	0.09



Table 21: Road Operations – 2033 Total

ROAD SECTION & LOCATION		CAPACITY (VPHPL)	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Road	W of Ramara Rd 47	600	0.35	0.21	0.39	0.46
Ramara Road 47	W of Highway 12	600	0.87	0.49	0.87	1.00
	S of Simcoe St	600	0.06	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000 ¹	0.42	0.36	0.52	0.56
	N of County Rd 47	1,000 ¹	0.28	0.38	0.49	0.44
	S of Concession Rd 3	1,000 ¹	0.32	0.35	0.43	0.44
Concession Road 4	E of Highway 12	600	0.10	0.19	0.19	0.17
	W of County Rd 47	600	0.04	0.09	0.07	0.05
County Road 47	E of Highway 12	800	0.24	0.15	0.11	0.22
	E of Concession 4	800	0.12	0.17	0.08	0.09
Church Street	S of Concession Rd 4	400	0.14	0.06	0.13	0.18
Gladstone Street	E of Highway 12	400	0.19	0.45	0.59	0.38
Concession Road 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.09	0.04	0.05	0.09

¹ with 2 through lanes per direction, directional capacity of 2,000 vph per direction is realized.



Table 22: Road Operations – 2038 Total

ROAD SECTION & LOCATION		CAPACITY (VPHPL)	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Road	W of Ramara Rd 47	600	0.42	0.25	0.47	0.56
Ramara Road 47	W of Highway 12	600	1.42	0.79	1.38	1.66
	S of Simcoe St	600	0.07	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000 ¹	0.53	0.45	0.66	0.71
	N of County Rd 47	1,000 ¹	0.34	0.49	0.63	0.54
	S of Concession Rd 3	1,000 ¹	0.39	0.46	0.56	0.54
Concession Road 4	E of Highway 12	600	0.11	0.21	0.22	0.19
	W of County Rd 47	600	0.04	0.09	0.07	0.05
County Road 47	E of Highway 12	800	0.24	0.15	0.11	0.22
	E of Concession 4	800	0.12	0.17	0.08	0.09
Church Street	S of Concession Rd 4	400	0.17	0.07	0.15	0.22
Gladstone Street	E of Highway 12	400	0.19	0.46	0.60	0.39
Concession Road 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.09	0.04	0.05	0.09

¹ with 2 through lanes per direction, directional capacity of 2,000 vph per direction is realized.



Table 23: Road Operations – 2043 Total

ROAD SECTION & LOCATION		CAPACITY (VPHPL)	AM PEAK HOUR V/C RATIO		PM PEAK HOUR V/C RATIO	
			NB/EB	SB/WB	NB/EB	SB/WB
Simcoe Road	W of Ramara Rd 47	600	0.42	0.25	0.47	0.56
Ramara Road 47	W of Highway 12	600	1.43	0.80	1.40	1.68
	S of Simcoe St	600	0.07	0.04	0.04	0.04
Highway 12	N of Ramara Rd 47	1,000 ¹	0.55	0.47	0.69	0.75
	N of County Rd 47	1,000 ¹	0.36	0.51	0.66	0.58
	S of Concession Rd 3	1,000 ¹	0.41	0.48	0.59	0.58
Concession Road 4	E of Highway 12	600	0.11	0.21	0.22	0.19
	W of County Rd 47	600	0.04	0.09	0.07	0.05
County Road 47	E of Highway 12	800	0.25	0.16	0.11	0.23
	E of Concession 4	800	0.12	0.18	0.08	0.09
Church Street	S of Concession Rd 4	400	0.17	0.07	0.15	0.22
Gladstone Street	E of Highway 12	400	0.19	0.46	0.60	0.39
Concession Road 3	W of Highway12	400	0.02	0.03	0.03	0.04
	E of Highway 12	400	0.09	0.04	0.05	0.09

¹ with 2 through lanes per direction, directional capacity of 2,000 vph per direction is realized.

5.3.4 Operational Summary

Results of the operational assessments under future total conditions indicate that the road network is expected to provide acceptable operations with minimal improvements through the 2028 horizon. By the 2033 horizon, significant improvements are required to address both poor intersection performance and capacity constraints experienced through the network.



5.4 ROAD NETWORK IMPROVEMENTS

Improvements are required throughout the road network to accommodate the future total conditions. This section summarizes the changes made, and therefore the upgrades recommended to accommodate the future total conditions.

5.4.1 Road Improvements

Highway 12

Highway 12 currently consists of a single through lane per direction within the study area. By the 2033 horizon (corresponding to 50% completion of the Ramara Road 47 Commercial area, OPA 17 Addition and Northwest Subdivision), Highway 12 is expected to operate at or over capacity during the PM peak period within the community of Brechin and experience poor operations at most intersections along its length. In this regard, Highway 12 will require 2 through lanes per direction within Brechin to serve the 2033 planning horizon. Should development proceed as detailed in this report, MTO may be required to widen Highway 12 beyond the Brechin area to provide sufficient midblock capacity for the anticipated future volumes.

Within Brechin, the existing Highway 12 right-of-way (ROW) was reviewed to determine the feasibility of the recommended widening. As illustrated in Figure 17, the existing ROW varies between 20 metres and 30 metres in width, as follows:

- 20 m ROW from 160m south to 460m north of Ramara Road 47;
- 23 m ROW from 460m north to 540m north of Ramara Road 47;
- 26 m from 540m north of Ramara Road 47 to Concession 5; and
- 30 m from 160m south of Ramara Road 47 to beyond Concession 1.

At its narrowest, a 20 metre ROW is sufficient to accommodate a 4-lane road, however, the outer travel lanes would be in close proximity to boulevard features such as utility poles and sidewalks, also precluding other features such as on-street bike lanes, on-street parking, or a two-way left turn lane. The narrow ROW (and limited boulevard space) also limits capacity for snow storage in winter months. Furthermore, as discussed below, the intersection upgrades required to accommodate the future total volumes on the existing road corridors – resulting in up to 6-lane cross-sections (2 through lanes per direction plus auxiliary left and right turn lanes) at some intersections – will not fit within the existing ROW through Brechin. Expropriation or acquisition of land adjacent to these intersections would be required to expand the ROW around such intersections and provide sufficient space for the required improvements. Alternatively, given the timelines of the recommended improvements, the downtown Brechin corridor will likely



redevelop, allowing the opportunity for the Township to acquire widenings through development applications.

Ramara Road 47

Ramara Road 47 currently consists of a single through lane per direction within the study area and is classified as a collector road. To address capacity constraints which occur by the 2033 horizon (corresponding to development progress in OPA 17, Northwest Subdivision and Ramara Road 47 commercial area), the Township may consider upgrading the road to an arterial classification between Highway 12 and Simcoe Street. This would serve to limit direct land access of future developments, improve road characteristics (such as urbanization and provision of wider travel lanes), and ultimately boost the capacity of the road. This may prove sufficient to accommodate the anticipated future traffic volumes, particularly if alternative travel routes are available to/from OPA 17 (such as via Concession Road 5 or a mid-block connection through the Northwest Subdivision). Should alternative travel routes not be available, widening Ramara Road 47 may be necessary to accommodate the anticipated future traffic volumes.

5.4.2 Intersection Improvements

Listed below is each intersection which will require improvements from its existing configuration in order to provide acceptable operations through the 2043 horizon. The listed improvements are cumulative; for example, a left turn lane added at an earlier horizon will remain in place at each subsequent horizon unless otherwise specified. The improvements assume that the noted ROW constraints within the study area (which may ultimately limit the ability of all noted improvements to be implemented) are overcome. The horizon year at which the improvements must be implemented to maintain acceptable performance of the road network is also listed. New intersection/lane construction is recommended to be in place by the start of the horizon that it will serve to ensure the benefits can be realized as the developments are built out. General adjustments to signal timing plans were made at each horizon (e.g. adjusting cycle/phase lengths) to improve performance, with unique changes noted.

Highway 12 & Ramara Road 47/Concession Road 4

- 2033
 - addition of second northbound and southbound through lane to accommodate through traffic (increasing the maximum cross-section at intersection to 5 lanes, more than what can be accommodated within the existing ROW)
 - addition of eastbound and westbound left turn lanes to accommodate turning traffic
 - addition of protected northbound and southbound left signal phases



- 2038
 - addition of eastbound and southbound right turn lanes to accommodate turning traffic (increasing the maximum cross-section at intersection to 6 lanes, more than what can be accommodated within the existing ROW)
 - conversion of eastbound through lane to a shared left-through lane to accommodate high left turning volumes
 - split eastbound and westbound signal phases to accommodate non-standard eastbound lane configuration

Highway 12 & Gladstone Street

- 2033
 - addition of second northbound and southbound through lane to accommodate through traffic

Highway 12 & County Road 47/Access Road

- 2033
 - addition of west leg (new Access Road) to serve Ramara Road 47 commercial area with following modifications to intersection configuration:
 - South Leg: addition of a northbound left turn lane to mirror that present on the north leg
 - West Leg: one new shared left/through/right turn lane, operating under stop control
 - addition of second northbound and southbound through lane to accommodate through traffic
- 2038
 - recommend signalization of intersection to reduce delays to cross-traffic

In addition to the noted improvements, a review of the possible channelization of the northbound right turn was conducted. A basic right turn lane with 60 metres of storage/deceleration length is currently provided at the intersection, in part to accommodate the significant heavy truck traffic using County Road 47. As per standards published by the Transportation Association of Canada (TAC) in their *Geometric Design Guide for Canadian Roads* (GDG), channelized right-turns are generally considered for implementation where the following criteria are met:

- right-turning volume during the design hour exceeds 60 vehicles per hour (vph).



- property is readily available; and
- the terminal points of the acceleration/deceleration lanes do not conflict with adjacent commercial development.

Should channelization be recommended, the most appropriate type to consider would be a *merge* design (detailed in GDG Figure 9.15.2), as this would most easily accommodate higher turning speeds and the wider turning radii required by heavy trucks.

With respect to the turning volumes, the following northbound right-turning volumes were realized at the intersection:

- | | |
|---------------------------------|-----------------------|
| ▪ existing volume - 6 to 53 vph | |
| ▪ background volumes: | ▪ total volumes: |
| ▪ 2033 - 7 to 58 vph | ▪ 2033 - 11 to 65 vph |
| ▪ 2043 - 8 to 64 vph | ▪ 2043 - 12 to 72 vph |

As indicated, turning volumes at the intersection generally do not meet the volume threshold for consideration of a right turn channel, only passing the threshold under future conditions during a limited portion of the day. Property is also not readily available for the installation of a large-radius channel - land would most likely need to be acquired from adjacent commercial properties. Additionally, depending on the ultimate length of the merge taper on County Road 47, access to the adjacent commercial property may be impacted. Therefore, considering the limited turning volumes, possible impacts to adjacent properties, and existing separation of turning movements from the through traffic stream, a channelized northbound right turn is not considered necessary at this intersection.

Highway 12 & Concession Road 3

- 2033
 - addition of second northbound and southbound through lane to accommodate through traffic

Ramara Road 47 & Access Road

- 2033
 - Construction of a new unsignalized T-intersection to serve the Ramara Road 47 Commercial developments, connecting the proposed Access Road to Ramara Road 47 with the following configuration:

East Leg: one left turn lane and one through lane



West Leg: shared through/right turn lane

South leg: shared left/right turn lane operating under stop control

- 2038
 - installation of traffic signals to accommodate increased cross-traffic on Ramara Road
 - 47. Protected eastbound left movement not necessary

5.5 PEDESTRIAN CROSSING REVIEW

With both the existing and proposed commercial developments located west of Highway 12 and the Brechin Subdivision located east of Highway 12, pedestrian traffic travelling between these locations will be required to cross Highway 12. Therefore, the Township wishes to explore the opportunity for a pedestrian crossing of Highway 12 at Gladstone Street.

Decision Support Tool

The pedestrian crossing warrants used in the analysis have followed the guidelines set forth in *OTM Book 15 - Pedestrian Crossing Treatments*. To support an efficient deployment of the hierarchy of pedestrian crossing treatment systems, OTM Book 15 provides a *Decision Support Tool* based on a number of guiding principles and the latest safety research involving pedestrian crossing control. The corresponding tool is illustrated in Figure 18, as are the resulting findings which consider the following:

- traffic signals are not warranted for pedestrians;
- 8-hour pedestrian volumes exceed 100 “equivalent adult persons”;
- 8-hour vehicle volumes exceed 750 vehicles; and
- greater than 200 metre distance to the existing crossings at the intersection of Highway 12 with Ramara Road 47 and Concession 4.

While existing pedestrian crossing volumes of Highway 12 at Gladstone Street are minimal (a total of 8 crossings were observed over the 8 hours of traffic counting), it is assumed that the noted pedestrian threshold will be exceeded upon build-out of the Brechin Subdivision/Ramara Road 47 Commercial developments. Therefore, the warrants for a pedestrian crossing have been reviewed at the 2033 and 2043 horizons under total conditions.

Traffic Volumes

In order to complete the pedestrian crossing assessment, 8-hour vehicle volumes are needed at each assessment horizon. To determine the volumes at future horizons, the existing count data



can be employed to determine what proportion of the 8-hour volumes are observed during the AM and PM peak hours.

As per the 2023 traffic count data, a total of 5,441 vehicles were counted on Highway 12 (i.e. northbound + southbound traffic) immediately north of Gladstone Street over the count period. Of this, 645 vehicles and 843 vehicles were observed during the AM and PM peak periods, respectively, for a total of 1,488 vehicles. This represents approximately 27% of the observed 8-hour volumes. Assuming a similar proportion is maintained through the future horizon periods, this results in the following 8-hour volumes on Highway 12:

- 2033 - approximately 13,500 vehicles; and
- 2043 - approximately 17,500 vehicles

Pedestrian Crossover Selection

The OTM Book 15 Pedestrian Crossover Selection Matrix is illustrated in Figure 19, which establishes the most appropriate form of crossover in consideration of traffic volumes, speed limit and lane configuration. The following have been considered:

- An 8-hour vehicle volume of approximately 13,500 vehicles in 2033 and 17,500 vehicles in 2043 (based on anticipated future peak hour volumes and calculations detailed above);
- a posted speed limit of 50 km/h; and
- a 5-lane cross-section at each horizon.

As per the completed matrix (see Figure 19), under both 2033 and 2043 total conditions, considering the recommended widening of Highway 12 to 5 lanes at Gladstone Street and significant volumes expected, the selection matrix does not recommend a pedestrian crossover. Instead, a review of *OTM Book 12 - Traffic Signals* is recommended to determine if installation of traffic signals - either an Intersection Pedestrian Signal or conventional full signalization - is warranted. Given that full signalization of the intersection was not warranted (see Appendix G) under such conditions, an IPS is the likely candidate for a pedestrian crossing at the intersection, as illustrated in Figure 20.

Should the 3-lane cross-section within Brechin be maintained through the future horizons (such as if a bypass is constructed) a Level 2 Type B pedestrian crossover is the appropriate pedestrian crossing type at the intersection, as illustrated in Figure 20.

Regardless of the findings of this review, it is recommended that the need for a pedestrian crossing of Highway 12 at Gladstone Street be revisited in the future. At minimum, the Brechin Subdivision and/or Ramara Road 47 Commercial area should be at least partially built-out (thus



generating new pedestrian traffic) with updated vehicle and pedestrian data used in a future assessment.



6 Other Network Improvements

In addition to the traffic operational improvements being considered by the Township as a result of future growth, additional network improvements have been considered as they relate to the following:

- reducing service disruptions at the Ramara Road 47 railway crossing;
- providing alternate access to Highway 12 to allow future commercial/industrial uses along this corridor; and
- improving/formalizing parking on key roads.

6.1 RAILWAY CROSSINGS

The existing at-grade CN railway crossing on Ramara Road 47 between Brechin and Lagoon City results in increased congestion and long delays to vehicular traffic during train events. In some cases, trains are stopped through the crossing for extended periods, causing significant delays to traffic entering or exiting Lagoon City, resulting in potentially dangerous delays for emergency services.

In response to this, the feasibility and potential cost of constructing a grade separated crossing of Ramara Road 47 over the railway has been investigated, as has the potential for a second grade separated crossing to the north, at the future intersection of the CN railway with Concession Road 5. The locations of both crossings are illustrated in Figure 21.

6.1.1 Grade Separated Warrant

Transport Canada has prepared guidelines¹⁴ for road authorities to assess when a grade separated crossing is warranted, premised on the criteria noted below:

- | | |
|------------------|---|
| ▪ Traffic Volume | Average Annual Daily Traffic (AADT) exceeds 100,000 |
| ▪ Train Volume | Average of 150 or more trains per day |
| ▪ Vehicle Speed | Posted/unposted highway speed equals or exceeds 90 km/h |
| ▪ Cross Product | Traffic volumes x train volumes exceeds 1,000,000 |

¹⁴ *Grade Separation Assessment Guidelines*. Transport Canada, undated.



- Queuing Existing crossings where there are known queuing issues and an entranceway or intersection is within 30m of the nearest rail of the crossing
- Maximum train Speed Train speed exceeds 177 km/h (110 mph)
- Vehicle Delay Exceeds 40 vehicle hours per day
- Level of Service If the highway/roadway facility is performing at a level of service below its intended minimum design level 10 percent or more of the time

In addition, Transport Canada has identified a number of other criteria for consideration in identifying locations for further assessment, which includes (among others):

- collision history or predicted collisions;
- blocked crossing issues;
- type of roadway traffic (pedestrians and cyclists, vulnerable road users, emergency services, school buses, dangerous goods); and
- development, community and social impacts (quality of life, community cohesion, aesthetics, business disruption).

Based on the noted Transport Canada guidelines listed above and in considering the road and railway volumes (AADT of 2000; 35 to 40 trains per day), the warrants for the Ramara Road 47 crossing do not substantiate a grade separated crossing. However, the guidelines acknowledge the following: “... *these guidelines do not preclude further evaluation of a location. A site-specific study and feasibility analysis are essential to establish whether or not a grade separation is possible.*”

The primary factor for consideration of a grade separated crossing at this location is the requirement to provide continuous emergency access to Lagoon City, as crossing (and stopped) trains cause significant delays at this crossing, impeding the ability of the Township to provide appropriate levels of service in relation to emergency response. In this regard, a grade separated crossing at Ramara Road 47 has been further considered despite the warrant reviews.



6.1.2 Design Criteria

The following design guidelines and standards have been implemented as follows:

- Road Classification Collector
- Road Speeds 40 km/h posted speed and 50 km/h design speed
- Minimum K Value 13 for sag vertical curve and 7 for crest vertical curves
- Maximum Road Grade 8%
- Lane Widths Urban Collector Lane Widths of 5.0 m including gutter (based on Township of Ramara Standard 209)
- Boulevard Widths 3.0 m boulevards on Ramara Road 47 to allow for future active transportation. 2.0 m boulevards on Concession 5 recognizing a reduced need for active transportation in the more rural setting;
- Vertical Clearance 7.1 metres between rail and underside of structure

6.1.3 Ramara Road 47 Grade Separation

A preliminary design of the grade separation on Ramara Road 47 has been prepared based on the above design criteria and is illustrated in Drawings P-1 and P-2 in Appendix H. Key elements of the design are summarized below.

Vertical Alignment

The vertical profile of the Ramara Road 47 grade separation would extend approximately 250 metres to the west and 210 metres to the east, measured from the centre of the railway (a 1% slope to the east was provided along the structure to limit the extent of the separation to the east, recognizing there is more room to transition the profile back to the existing road to the west.) West of the railway, there are minimal impacts as the nearest property accesses are located approximately 280 metres from the railway. To the east, a number of accesses would be impacted, including the access to Brechin Public School which would have to be fully reconstructed to accommodate the increased grade, or relocated to O'Neill Street at the rear of the school property. If relocation were to occur, neighbouring O'Neill and Mary Streets would need to be urbanized, including the provision of sidewalks, to accommodate the increase in vehicular and pedestrian traffic. For the property at 3232 Ramara Road 47, the existing access would have to be relocated from the west limit of the property to the east limit of his property, aligning with the Brechin Park access. The elevation of the road at this location would be increased approximately 1 metre and thus the new access points would have to be reconfigured accordingly.



Horizontal Alignment

The horizontal alignment of Ramara Road 47 would stay the same and be centered within the existing right-of-way, which is approximately 20 and 30 metres to the east and west of the railway respectively.

There is an existing hydro line on the north side of the road that will likely require relocation.

Cross-Section

An urban cross section along the grade separation has been assumed due to the 8.0 % grades on each approach and the need to mitigate drainage. Lane widths of 5.0 metre have been incorporated as have 1.5 metre sidewalks on both sides, with appropriate separation from the travel lanes to increase pedestrian safety and comfort.

Retaining Walls

To keep grading within the existing right-of-way, retaining walls have been proposed along the approaches to the overpass. However, these walls come at a significant capital and future maintenance costs. Ideally, grading should slope onto neighbouring lands. The Township should consider seeking widenings either through development applications or direct acquisition to avoid the need for retaining walls where possible (it is recognized that the opportunities to the east of the railway are limited given the existing development).

Structure Design

The minimum clear span between abutments and the elevation of the underside of the overpass has been established based on the clearance requirements of the railway, and the assumption that an access road is provided on one side of the railway only. It has also been assumed that ditching will not be required under the overpass. The geometry has been assumed to provide skewed abutments so that they are parallel with the railway rather than perpendicular to the roadway. Adjacent concrete box girders are proposed to minimize the thickness of the structure thereby minimizing the overall road elevation.

Municipal Class EA

The construction of the new bridge falls under Project 38 (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023). Therefore, a Schedule B Class Environmental Assessment will be required.



Cost Estimate

Our preliminary cost estimate for the grade crossing for Ramara Road 47 over the CN railway is \$14.8 M including a 10% contingency but exclusive of HST. The cost estimate excludes property acquisition and utility relocations should they be required. A detailed breakdown is included in Appendix N. This estimate assumes the structure can be constructed on shallow foundations and will not require a deep pile foundation (to be confirmed through the completion of a geotechnical investigation).

6.1.4 Concession Road 5 Grade Separation

The design of the grade separated crossing on Concession Road 5 is not subject to the same constraints as the crossing on Ramara 47 Road as the abutting areas are largely undeveloped. A preliminary design on the Concession 5 grade separation is included in Appendix I (Drawings P3 and P-4).

Vertical & Horizontal Alignments

Since the proposed grade separation location is within an undeveloped area, the preliminary design utilizes a 6% maximum road grade slope (as opposed to an 8% grade on Ramara Road 47) which is centered within the future 20 metre right-of-way. For future development of the area, it is expected that any limitations due to the change in elevation of the road, such as drainage and property access, will be factored into the overall design of Concession Road 5.

Cross-Section

Similar to Ramara Road 47, an urban cross section has been utilized due to the 6.0 % grades on each approach, and the need to mitigate drainage. Lane widths of 5.0 metres have been maintained. Given the rural and undeveloped nature of the area, sidewalks have not been assumed, thus resulting in a slightly narrower structure as compared to Ramara Road 47.

Retaining Walls

Similar to the Ramara Road 47 grade separation, retaining walls have been shown along the structure approaches. The Township should consider seeking widenings either through development applications or direct acquisition to avoid the need for retaining walls where possible (the resulting slope footprints are noted on the preliminary design drawings).

Municipal Class EA

Similar to the Ramara Road 47 overpass, this project will require a Schedule B Class Environmental Assessment.



Cost Estimate

The preliminary cost estimate for the grade crossing of Concession 5 over the CN railway is \$12.6 M including a 10% contingency but exclusive of HST and property acquisition. A detailed breakdown is included in Appendix N.

6.2 HIGHWAY 12 ACCESS

In accordance with the MTO's corridor management policy, future developments along the Highway 12 corridor will be subject to access restrictions. While it is understood that MTO has minimal concerns with additional entrances, egress (exit) movements should be avoided and provided through alternative locations where such exist. In this regard, consideration has been provided for the provision of improved access to the highway.

6.2.1 Highway 12 Access Road

The proposed Highway 12 Access Road is envisioned between the CN railway and Highway 12. As per Figure 22, the road extends from Ramara Road 47 at its north limit to the intersection of County Road 47 with Highway 12 (becoming the west leg of the intersection). Further details of the road and its alignment are provided in Drawing P-5 included in Appendix J.

Alignment

The conceptual design of the Highway 12 Access Road alignment has been developed with due consideration of the available right-of-way and the obligatory south termination to align with the existing intersection of County Road 47 on the east side of Highway 12. In addition, the desire was to minimize land acquisitions so available municipal/private right-of-way was utilized where possible along the corridor. This has resulted in the mid-section having reverse curves with radii of 25 metres which are situated within the existing parcel currently occupied by the boat storage facility. The road has an approximate length of 940 metres.

Throughout the mid-section to the south end of the proposed right-of-way, the Access Road borders the east side of the right-of-way of the CN Railway. The conceptual design will require tree removals but not within the CN rail corridor. A full topographic survey will be required to assess drainage requirements and ensure the proposed grading can be constructed and stormwater directed to the appropriate outlets along this corridor.

Abutting Lands & Land Uses

The corresponding properties within which the Access Road is proposed are comprised of a boat storage facility, farmland, and an undeveloped parcel on the south end.



The road will serve to comply with MTO corridor management policy to limit the number of direct access connections to Highway 12. At present, Subway, Brechin Artifacts, Shell gas station, Tim Hortons, Brechin Timber Mart, and Brechin Foodland customers have direct access to Highway 12 along this stretch. Once complete, consideration can be made to provide new access to these businesses from the Highway 12 Access Road. Given the current restrictions on Highway 12 by MTO, this future Access Road is expected to be vital in promoting land development along this new corridor.

A segment of the road lies within the Lake Simcoe Regional Conservation Authority regulated boundary. The area's terrain can be characterized as rolling, with the highest point approximately 4 metres above the lowest point.

Cross-Section

The road has been designed and classified as urban local industrial. Township of Ramara Engineering Design Criteria and Standard Drawings, 2014, was referenced in determining the cross-section, width and corresponding design elements. The road cross-section has a right-of-way width of 20 metres with a 10 metre urban roadway with curb and gutter (two 5 metre wide lanes in each direction which includes gutters). The cross section also accommodates a sidewalk on the east side of the Access Road to provide future access to the rear of the businesses on Highway 12, and boulevards for various utilities.

Road Ownership

Should all the property owners abutting the Access Road agree to provide the required land and financing, the road could be constructed and maintained under private ownership. Municipally owned land along the rail corridor would have to be declared excess and sold to the development group. Alternatively, if the landowners cannot agree, the Township could construct the road themselves.

Municipal Class EA

The construction of the new Access Road falls under Project 34 (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023). Therefore, a Schedule C Environmental Assessment will be required as construction costs are anticipated to exceed \$3 M.

Cost Estimate

Our preliminary cost estimate for the Highway 12 alternate Access Road to Highway 12 is \$3.1 M including a 10% contingency but exclusive of HST. The cost estimate excludes property



acquisition and utility relocations should they be required. A detailed breakdown is included in Appendix N.

6.2.2 O'Neill Street Access Road

The proposed O'Neill Street Access Road is in the northwest quadrant of the intersection of Ramara Road 47 and Highway 12 and is proposed to be a single lane road connecting Mary Street and O'Neill Street (refer to Figure 23 and Drawing P-6 included in Appendix K.).

Alignment

According to Township records, there is a 4.9 metre lane running south from O'Neill Street which connects to another 4.9 metre Township owned parcel of land that runs west towards Mary Street. There is a small triangular piece of land that will need to be acquired from 2298 Highway 12.

Abutting Lands & Land Uses

The proposed access road is bounded by residential properties to the west and south, and commercial properties to the east and has a length of 133 metres.

The proposed lane will result in the removal of the driveway at 2773 Mary Street which will need to be relocated and addressed during detail design. The proposed location will depend on the drainage outlet of the lane and final configuration of the proposed parallel parking to be implemented in front of the house, in addition to consideration of the existing hydrant and hydro pole.

Cross-Section

The proposed lane width is 3.5 metres, with an average right-of-way width of 4.9 metres. Because of the right-of-way width limitations, the conceptual plan shows an asphalt surface with an asphalt swale on the west side to convey stormwater. Drainage flows will have to be confirmed during detail design but is anticipated to drain in both directions with a high point located in the middle. Due to the existing allotted width for the right-of-way, there are no Township cross sections which apply. Typically, a narrow lane would be one way only, however the existing lane currently operates under a two way scenario. This should be considered in the detail design phase based on a number of factors, including ease of emergency access, vehicle volumes/types, etc.

Municipal Class EA

The construction of this new lane falls under Project 14a (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023).



“Construction of local roads which are required as a condition of approval on a site plan, consent, plan of subdivision or plan of condominium which will come into effect under the Planning Act prior to the construction of the road.”

Therefore, an Environmental Assessment is not required as long as the road is constructed as a condition of Site Plan Approval, which we understand to be the case.

Cost Estimate

Our preliminary cost estimate for the O’Neill Street Lane access road is \$80,500 including a 10% contingency but exclusive of HST. The cost estimate excludes property acquisition and utility relocations should they be required. A detailed breakdown is included in Appendix N.

6.3 ON-STREET PARKING

The Township wishes to formalize on-street parking opportunities along the following roads within Brechin (refer also to Figure 24):

- Ramara Road 47 from Highway 12 to the Brechin Public School;
- Concession Road 4 from Highway 12 to Perry Avenue; and
- Mary Street.

Although vehicles currently park in these areas either along the roadway or on the shoulders, the Township wishes to better delineate parking stalls to maximize parking spaces.

6.3.1 Ramara Road 47

Existing Conditions

The section of Ramara Road 47 between Highway 12 and Brechin Public School is approximately 250 metres in length. While the area is predominantly urban and designated as a local collector, the road does not have curb and gutter on the north side, but rather has an asphalt boulevard and a sidewalk which is at grade and is offset approximately 1.0 metre from the right-of-way limits. On the south side, there is a curb and gutter adjacent to a concrete sidewalk. Curb and gutter exists on both sides of the street within 60 metres of the intersection of Highway 12. The existing right-of-way width is 20 metres.

Proposed Conditions

The existing asphalt platform is approximately 12.5 metres in width, which is sufficient to accommodate two lanes of traffic plus parallel parking. This has enabled the proposed cross section to accommodate 2.0 metre wide parallel parking stalls on the north side of the road, utilizing the large asphalt boulevard between the travelled lane and existing sidewalk.



The parking bays are designed for parallel parking, with stalls measuring 2.0 x 7.0 metres, offset by approximately 2.0 metres from the sidewalk in order to provide an existing amenity zone which includes existing hydro poles and street signage. A total of 16 parking stalls was achieved, as evident in Drawing P-7 provided in Appendix L.

Angle and perpendicular parking were also considered and although they provided additional parking spaces, there was insufficient space within the boulevard to safely accommodate the extra length.

Municipal Class EA

A Class Environmental Assessment is not required as this project falls under Project 22 (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023): “Redesignation of a Linear Paved Facility through signage or pavement marking modifications...including, addition or removal of parking or turning lane markings on an existing roadway.”

Cost Estimate

The preliminary cost estimate for the provision of on-street parking on Ramara Road 47 is \$4,000 including a 10% contingency but exclusive of HST; additional details are included in Appendix N.

6.3.2 Concession Road 4

Existing Conditions

Parking on both sides of the road was considered in the conceptual design for parking stalls on Concession Road 4, between Highway 12 and Perry Avenue, an approximate distance of 100 metres. Concession Road 4 is semi-urban in nature, with sidewalk and curb and gutter on the north side only, from the highway to approximately 35 metres east, beyond which there is an asphalt boulevard. There is a drainage swale in the asphalt boulevard, in addition to utility poles with Bell and Rogers aerial communication attachments. Concession Road 4 has a right-of-way width of 20 metres. On the south side of the road is an asphalt shoulder with catch basins that is intermittently interrupted by gravel driveways. There are also hydro poles and traffic signs located beyond the shoulder which should be avoided.

At Perry Avenue, a culvert conveys the surface runoff from east to west, directly into the asphalt boulevard, within which it is conveyed through the swale to outlet to a catch basin approximately 35 metres east of Highway 12 (at the limit of the curb and gutter). The stormwater is then conveyed to a storm sewer on the south side of the street. It is understood that significant water flows in this swale during rain events rendering the space unusable for parking. The existing lane



widths are approximately 4.25 metres in each direction for a total width of 8.5 metres (including gutters).

Proposed Conditions

Refer to the overall conceptual plan as detailed in Drawing P-8 provided in Appendix M.

Similar to Ramara Road 47, on-street parking on the north side was achieved using the boulevard space between the road and sidewalk. Angle parking was utilized due to the additional boulevard width available and the desire to maximize parking spaces, and measure 2.75 metres wide by an average of 7.4 metres long, angled at 34.5°. This design option assumes the existing utility poles containing Bell and Rogers will be relocated behind the existing sidewalk where an easement on private property will be required. This may result in the removal of trees should a conflict exist between the communication attachments and trees/limbs. To accommodate this design, mountable curb and gutter along the sidewalk on the north side complete with new storm sewer and a new catch basin on the east side of Perry Avenue, to capture and convey drainage to the existing catch basin at the west end of the angled parking stalls, is proposed. The mountable curb will be constructed to match the existing sidewalk grade (while barrier curb will provide a greater level of protection for pedestrians, it would warrant the reconstruction of the sidewalk to ensure matching elevations). No changes to the asphalt boulevard are otherwise proposed.

For the south side, parking is achieved by paving the shoulder and painting parallel parking stalls between the driveways as shown on the concept plan. This design option avoids the existing utility poles and signs located beyond the existing shoulder.

A total of 18 parking stalls was achieved.

Municipal Class EA

An Environmental Assessment is not required for the painting of parking stalls. This project falls under Project #22 (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023): “Redesignation of a Linear Paved Facility through signage or pavement marking modifications...including, addition or removal of parking or turning lane markings on an existing roadway.” Additionally, an Environmental Assessment is not required for the installation of new storm sewer under Project #22b (Table B), “Establish, extend, or enlarge a sewage collection system and all necessary works to connect the system to an existing sewage or natural drainage outlet, provided all such facilities are in either an existing road allowance or an existing utility corridor, including the use of Trenchless Technology for water crossings.”



Cost Estimate

Our preliminary cost estimate for the provision of on-street parking on Concession Road 4 is \$140,000 including a 10% contingency but exclusive of HST. This price includes an approximate cost to relocate the existing hydro poles in the boulevard. A detailed breakdown is included in Appendix N.

6.3.3 Mary Street

Existing Conditions

Mary Street is a semi-urban roadway with a large, paved boulevard on the north side along the side of the Brechtin United Church, with a narrow gravel shoulder and roadside ditch on the south side. Mary Street has an existing right-of-way of 15 metres and the current perpendicular on-street parking encroaches on the southbound traffic lane.

Stormwater is currently conveyed from an existing curb outlet on the northeast corner of Ramara Road 47 to a ditch on the east side of the street. The ditch outlets through a driveway culvert under the proposed O'Neill Street Access Road and continues to flow northward. Within the planned parking area, the ditch is lined with trees, vegetation and traffic signs on the ditch slope.

Proposed Conditions

The Township desires the widening of Mary Street on the east side to accommodate additional on-street parking. The conceptual plan (refer to Drawing P-8 provided in Appendix M) shows angled parking on both sides, with a total road width of 7.0 metres which is in accordance with a local residential standard, albeit with a reduced right-of-way. This will accommodate a total of 19 parking spaces.

Angled parking is preferred over parallel or perpendicular parking in order to maximize parking spaces. We also investigated the option of parallel parking on the east side which would result in fewer parking spaces but reduces the impacts to the drainage ditch and adjacent residence. The property at 3260 Ramara Road 47 has extensive landscaping and mature trees within its Mary Street flankage. While the angled parking will be contained within the Township's right-of-way, significant impacts to this vegetation could occur. Further survey would be required to confirm.

To widen the road on the east side of the street, all existing trees and vegetation within the ditch will have to be removed. The road widening will have a 1 to 2% crossfall towards the new curb and gutter, which will direct stormwater towards the north, outletting to a gutter beyond the O'Neill Street Access Road.



Municipal Class EA

An Environmental Assessment is not required to widen Mary Street for the purpose of adding parking. The project falls under Project #21 (Table A), in Appendix 1 of the Municipal Class Environmental Assessment document (MEA, March 2023): “Reconstruction where the reconstructed road or other linear paved facilities (e.g. HOV lanes) will be for the same purpose, use, capacity and at the same location (e.g. addition or reduction of cycling lanes/facilities, parking lanes, or continuous centre turn lanes – no change to the number of motor vehicle lanes).”

Cost Estimate

The preliminary cost estimate for the provision of on-street parking on Mary Street is \$63,000 including a 10% contingency but exclusive of HST; a breakdown is included in Appendix N.



7 Summary

This report has reviewed the traffic impacts associated with the proposed future developments in the Brechin area of the Township of Ramara (study area). In addition, it has considered several other transportation system improvements through the area to improve the network.

7.1 PROPOSED DEVELOPMENT

The study area consists of a total of approximately 131 ha of land within the Brechin Village and Lagoon City secondary areas in the Township of Ramara, consisting of a mix of residential, commercial, and employment/industrial development. When fully built out, the developments are expected to generate in the order of 1,890 trips during the weekday AM peak hour and 2,700 trips during the weekday PM peak hour.

7.2 TRAFFIC OPERATIONS

In addressing the traffic operations within the immediate area, the key intersections identified for review were assessed under existing (2023) and future (2033 and 2043) horizon periods. To provide a more refined timeline for any network upgrades resulting from future development, 2028 and 2038 horizons were also reviewed under future total conditions.

7.2.1 Intersection Operations

Under the 2023 horizon, the existing key intersections provided acceptable performance in their current configuration. At the 2033 and 2043 horizons, the key intersections also provided acceptable operations under background conditions, with no improvements required to support background traffic growth through 2043. Under future total conditions, the key intersections outside of the Highway 12 corridor continued to provide acceptable operations through the 2043 horizon with no requirement for improvements.

Along Highway 12 under total conditions, no improvements were required to support the assumed development levels at the 2028 horizon. By the 2033 horizon, a number of improvements were required to accommodate the increased traffic volumes, namely widening of Highway 12 to provide two through lanes per direction through the entire study area and provision of auxiliary turn lanes at select intersections. At the 2038 horizon, additional turn lanes and major revisions to signal timing plans were required at some intersections to accommodate high turning volumes. No further improvements were required at the 2043 horizon owing to the assumed full build-out of all development by the 2038 horizon.



7.2.2 Midblock Operations

A review of the volume-to-capacity ratios of the study area roads between the key intersection (i.e. the road of the road sections) was conducted to ensure that the road network has sufficient capacity to accommodate existing and future traffic volumes. The existing network was found to be sufficient to accommodate both the existing and future background traffic volumes through the 2043 horizon.

By the 2033 horizon under total conditions, Highway 12 was observed to operate at capacity north of Ramara Road 47; by the 2038 horizon Highway 12 was observed to operate over capacity throughout the study area, thus widening of the Highway to provide 2 travel lanes per direction was warranted to ensure both acceptable intersection operations and reserve capacity was maintained. Also by the 2038 horizon, Ramara Road 47 was observed to operate over capacity. This may be mitigated through upgrades of the corridor to an arterial road standard to increase lane capacity, and/or through provision of alternative travel routes to/from the development areas served by that road.

7.2.3 Additional Improvements

Beyond the network improvements required to support the proposed future development within the study area, additional network improvements were reviewed at the request of MTO and the Township of Ramara.

Right Turn Channel

The need for channelization of the northbound right turn at the intersection of Highway 12 with County Road 47 was reviewed in context of TAC guidelines for channelization of right turn lanes. Based on the review, channelization of the noted turn is not recommended due to low turning volumes on the movement and impact to adjacent properties which would result from space needed for the recommended channelization type.

Highway 12 PXO

The need for a pedestrian crossing facility across Highway 12 at its intersection with Gladstone Street was reviewed in context of OTM Book 15 guidelines under future total conditions. Based on the review (assuming sufficient pedestrian volumes are realized at future horizons to warrant a crossing facility), by the 2033 horizon, due to the recommended widening of Highway 12, an Intersection Pedestrian Signal is warranted to provide the desired pedestrian crossing facility.



7.3 OTHER ROAD IMPROVEMENTS

7.3.1 At Grade Crossings

Ramara Road 47

The preliminary design of the grade separation on Ramara Road 47 with the CN railway provides a 7.1 metre vertical clearance above the railway and an access road adjacent to the railway under the structure for maintenance. The resulting vertical profile of Ramara Road 47 would extend approximately 250 metres to the west and 210 metres east, measured from the centre of the CN railway. Retaining walls on both sides of the road would be required unless property is acquired to facilitate embankment slopes onto the adjacent lands. The horizontal alignment of Ramara Road 47 would remain the same, which would include two 5.0 metre lanes with curb and gutter, along with 1.5 metre concrete sidewalks on both sides.

West of the railway, there are minimal impacts as the nearest rural accesses are located approximately 280 metres from the railway. To the east, the access to the Brechin Public School will have to be reconfigured or relocated to accommodate the new grade raise. In addition, the access to 3232 Ramara Road 47 will also have to be relocated to the east side of their property to match into the new road profile. The entrance to Brechin Park would also need to be reconstructed to accommodate the change in grade.

Concession Road 5

The geometry of the CN grade separation crossing on Concession Road 5 is similar to the Ramara Road 47 crossing and includes a 7.1 metre vertical clearance above the railway and an access road adjacent to the railway under the structure for maintenance. The resulting vertical profile extends approximately 235 metres to the west and 215 metres east, measured from the centre of the CN railway and includes slightly flatter approach slopes which have been utilized due the rural undeveloped nature of Concession Road 5.

The horizontal alignment is centred within the existing right-of-way and also includes two 5.0 metre lanes with curb and gutter. No sidewalks have been included in the preliminary design based on the rural nature of Concession Road 5 and undeveloped adjacent lands.

The design of the grade separated crossing on Concession Road 5 is not subject to the same constraints as the crossing on Ramara 47 Road as this area is undeveloped. Therefore, property acquisition and provision of 2:1 embankment slopes should be considered in lieu of retaining walls due to their high capital and maintenance costs.



Preliminary Costs

The estimated preliminary cost of the grade separated crossing on Concession Road 5 is less than the crossing on Ramara Road 47 due to the reduced width and absence of sidewalk on either side of the road. The estimated costs of \$14.8 M and \$12.6 M for the grade crossings on Ramara Road 47 and Concession Road 5 respectively could be further reduced through the elimination of retaining walls where feasible.

7.3.2 Alternate Access Roads

Highway 12 Access Road

To accommodate future development of the abutting lands between the CN railway to the west, Ramara Road 47 to the north and Highway 12 to the east, a new Access Road could be constructed, extending from the intersection of Highway 12 with County Road 47 to Ramara Road 47. The conceptual design of the Access Road alignment has been developed with due consideration of the available right-of-way which has resulted in the mid-section having reverse curves with radii of 25 metres, which can be widened to accommodate large tractor trailers if required. The road has an approximate length of 940 metres, a right-of-way width of 20 metres with a 10 metre urban roadway including curb and gutter and a concrete sidewalk on the east side only. Future commercial accesses can be accommodated to service the rear of the properties abutting Highway 12.

The access could be constructed as a private road, through coordination of the abutting landowners, or directly by the Township.

The estimate for the roadway is \$3.1 M, not including engineering, property acquisitions or utility relocations.

O'Neill Street Access Road

The proposed access road between Mary Street and O'Neill Street is in the northwest quadrant of the intersection of Ramara Road 47 and Highway 12 and is proposed to be a single lane road connecting Mary Street and O'Neill Street. The lane is bounded by residential properties to the west and south, and commercial properties to the east and has a length of 133 metres. Property acquisition, considered minor in nature, will be required to accommodate the alignment.

The proposed lane width is 3.5 metres, with an average right-of-way width of 4.9 metres. An asphalt surface with an asphalt gutter has been assumed, which will have to be confirmed during detail design, based on drainage patterns and available stormwater outlets. Ideally this road should be signed as a one-way lane due to the restricted width; it is noted that the existing laneway provides two-way traffic with no known issues.



The preliminary cost estimate is \$80,500, exclusive of engineering or utility relocations if required.

7.3.3 Parking Improvements

Additional parking and associated improvements have been considered on three roadways within the Brechin study area as summarized below.

Ramara Road 47

- Limit of work: Highway 12 to Brechin Public School
- Additional spaces: 16
- Improvements: pavement markings only
- Approximate cost: \$4,000

Concession Road 4

- Limit of work: Highway 12 east to Perry Avenue
- Additional spaces: 18
- Improvements: relocation of utility poles, curb and gutter, storm sewer, reinstatement of asphalt road/boulevard and pavement markings
- Approximate cost: \$140,000

Mary Street

- Limit of work: Ramara Road 47 to approximately 110 metres north
- Additional spaces: 26
- Improvements: road widening, curb and gutter including outlet with rip rap, removal of trees/landscaping features and pavement markings;
- Approximate cost: \$63,000

The parking improvements to Ramara Road 47 are fairly standard, and simply involve the addition of line painting to provide parallel parking stalls where space permits; avoiding driveways, hydro poles and parking in front of hydrants.

For Concession Road 4, we have assumed the utility poles on the north side will have to be relocated to accommodate angled parking which will maximize the number of parking stalls. The south side of the street is already paved so formalized parallel parking spaces can be achieved through the application of pavement markings.



Finally, we have made a number of assumptions for Mary Street in order to maximize the number of proposed parking spaces. However, this does result in significant impacts to the property on the northeast corner of Mary Street and Ramara Road 47. To provide for the angled parking, large trees could require removal and landscaping would be impacted. To avoid these impacts, parallel parking could be provided with minor road widening which would reduce the overall parking stalls on Mary Street by 3 spaces.





Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

Figure 1: Study Area



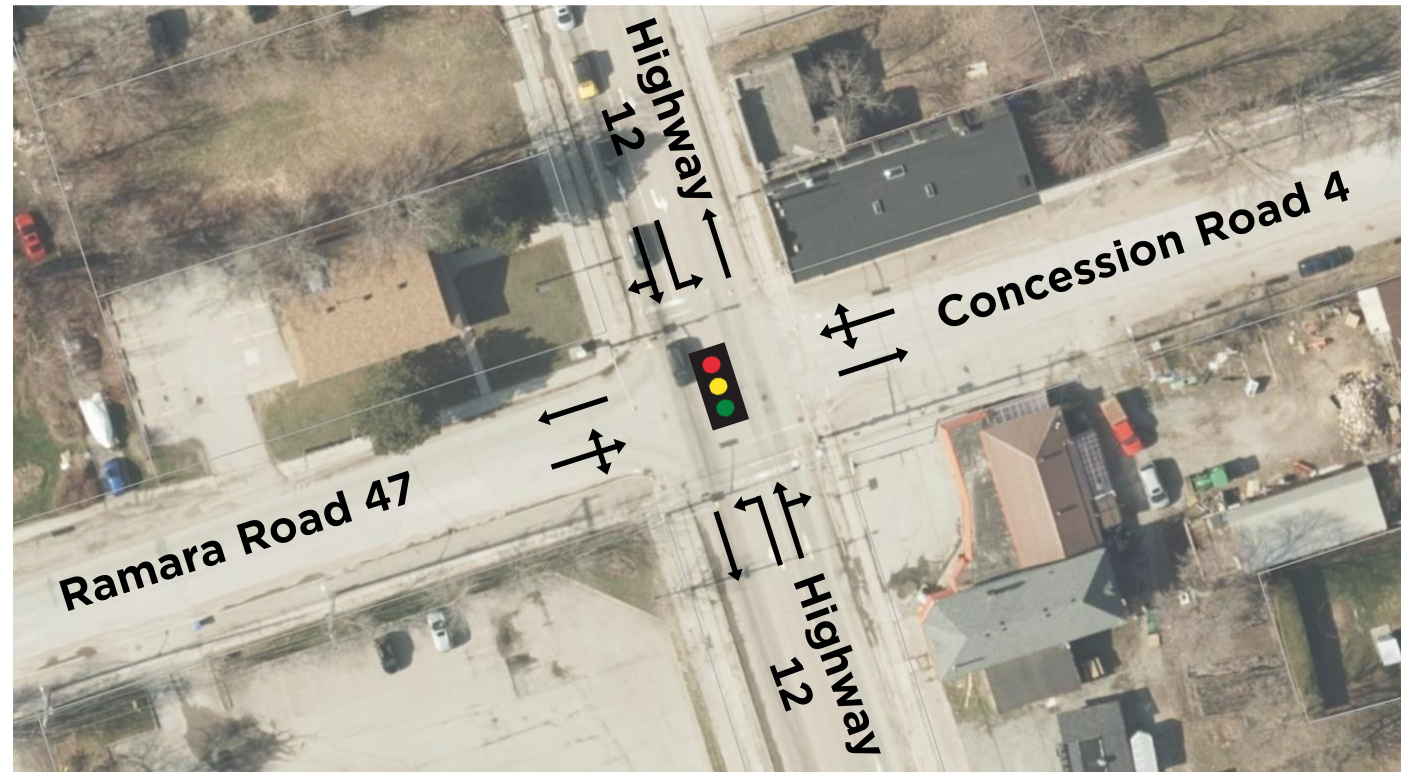


Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

Figure 2: Study Area Road Network





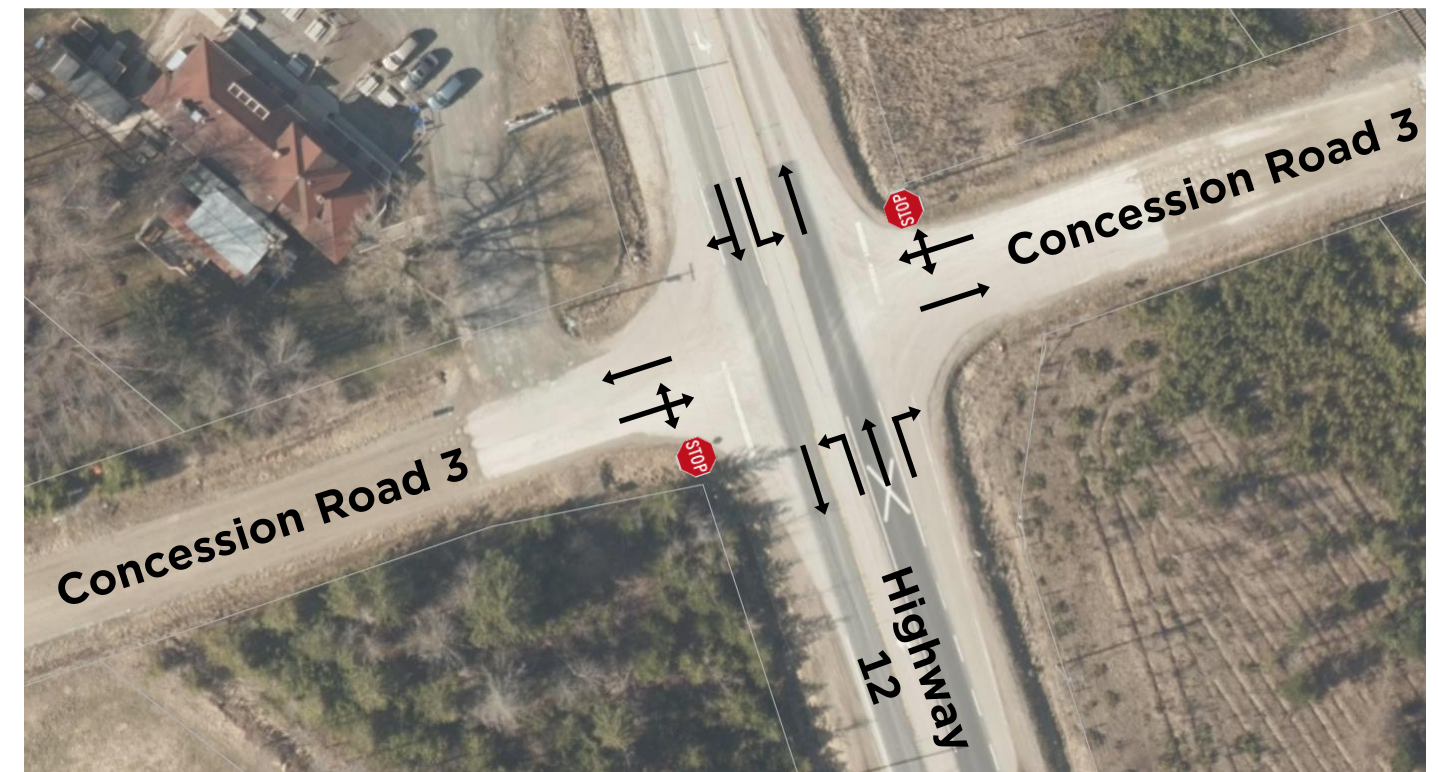
Intersection of Highway 12 with Ramara Road 47 & Concession Road 4



Intersection of Highway 12 with Gladstone Street



Intersection of Highway 12 with County Road 47



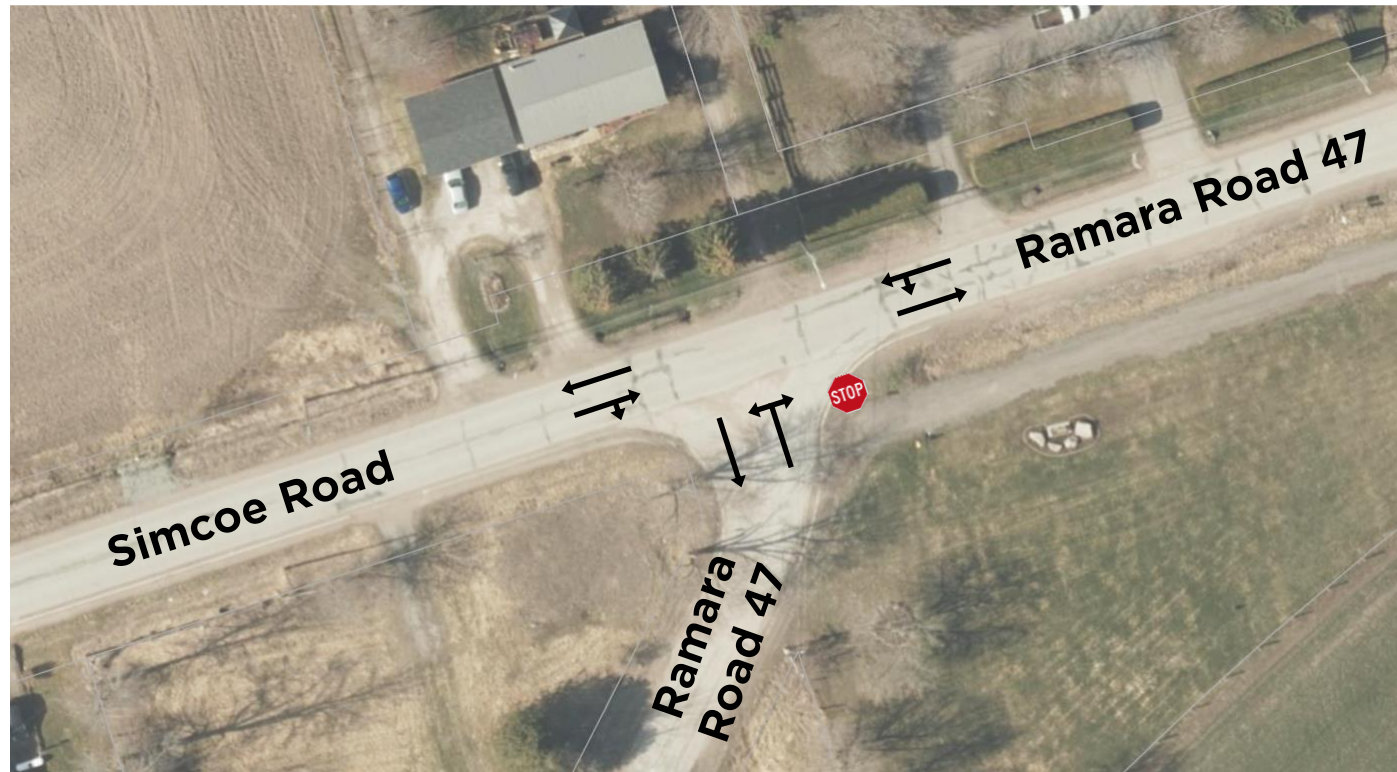
Intersection of Highway 12 with Concession Road 3

Source: opengis.simcoe.ca

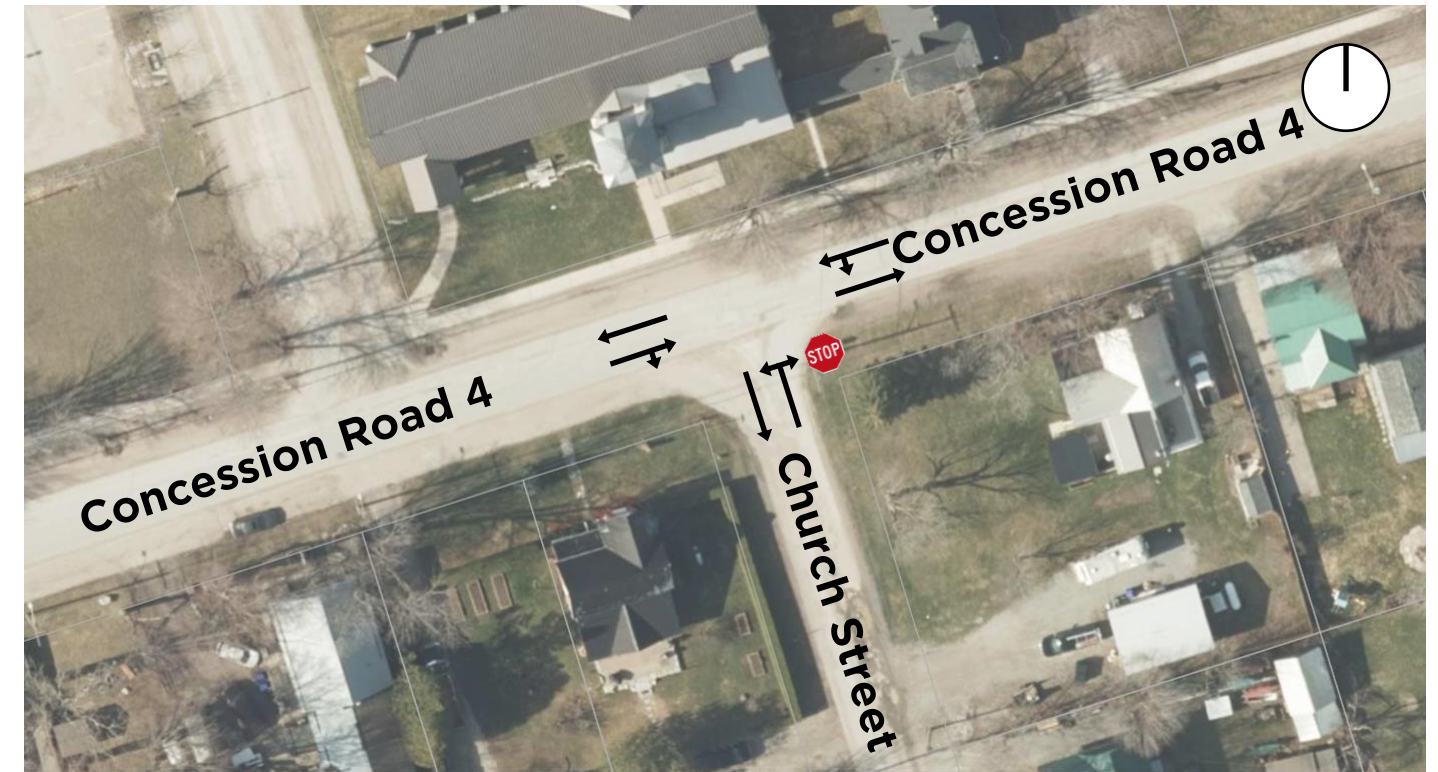
BRECHIN TRANSPORTATION STUDY

Figure 3A: Study Area Intersections

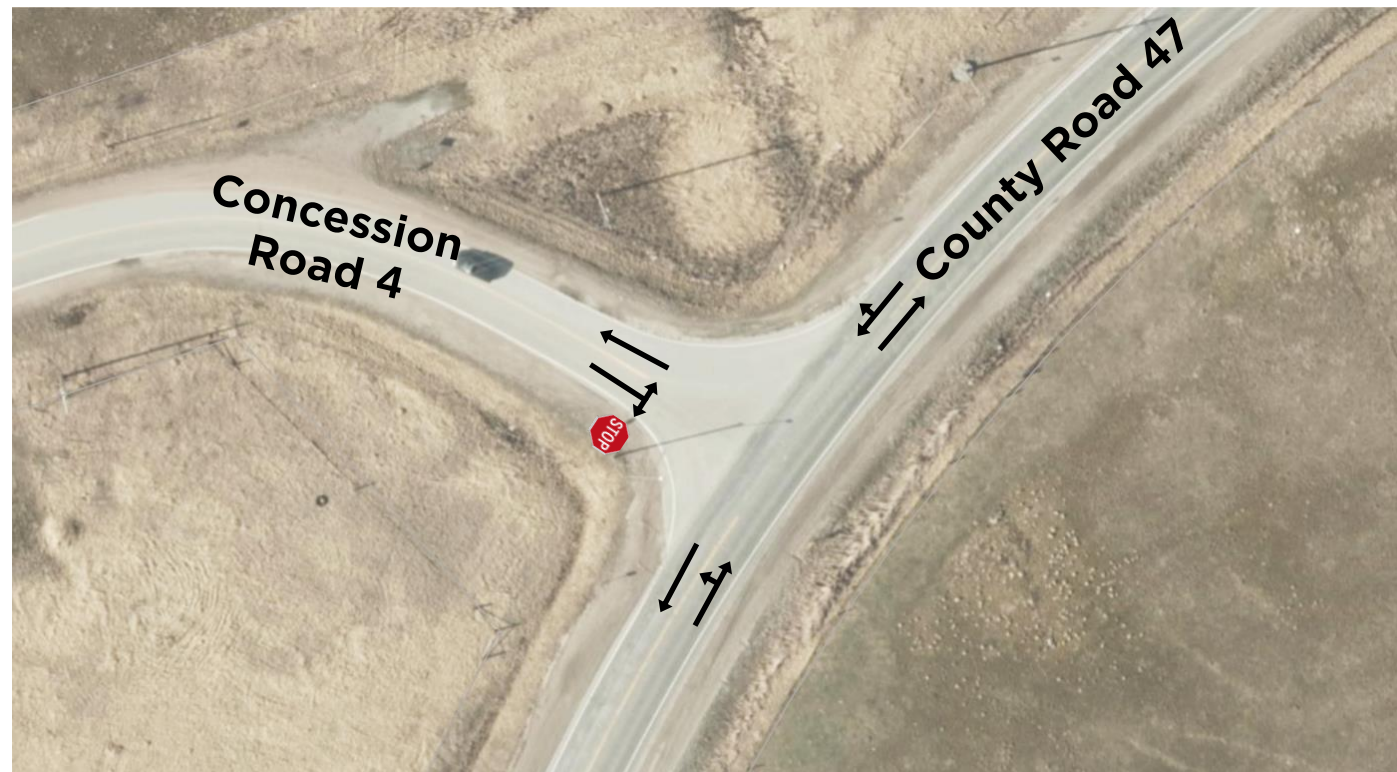




Intersection of Ramara Road 47 with Simcoe Road



Intersection of Concession Road 4 with Church Street



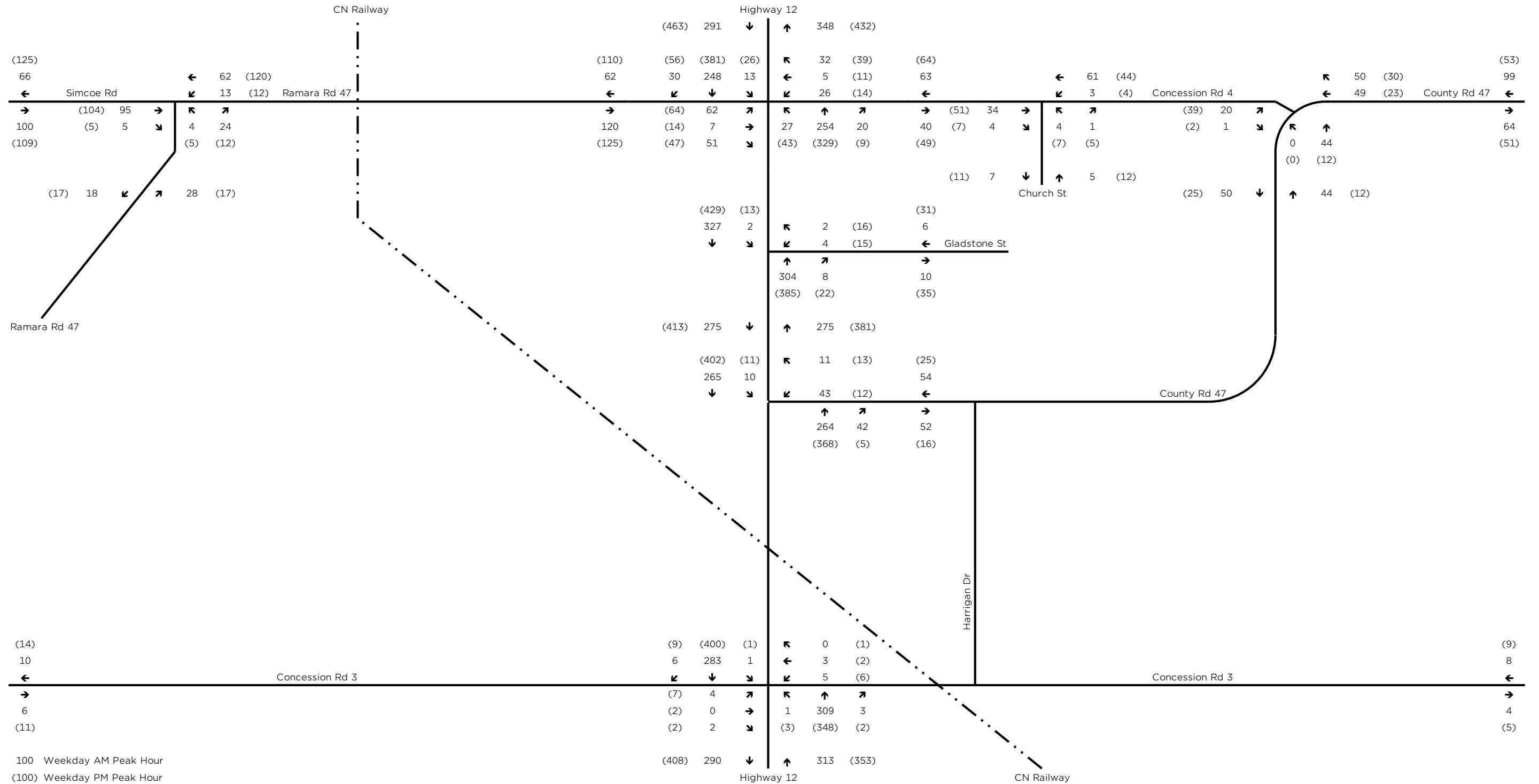
Intersection of Concession Road 4 with County Road 47

Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

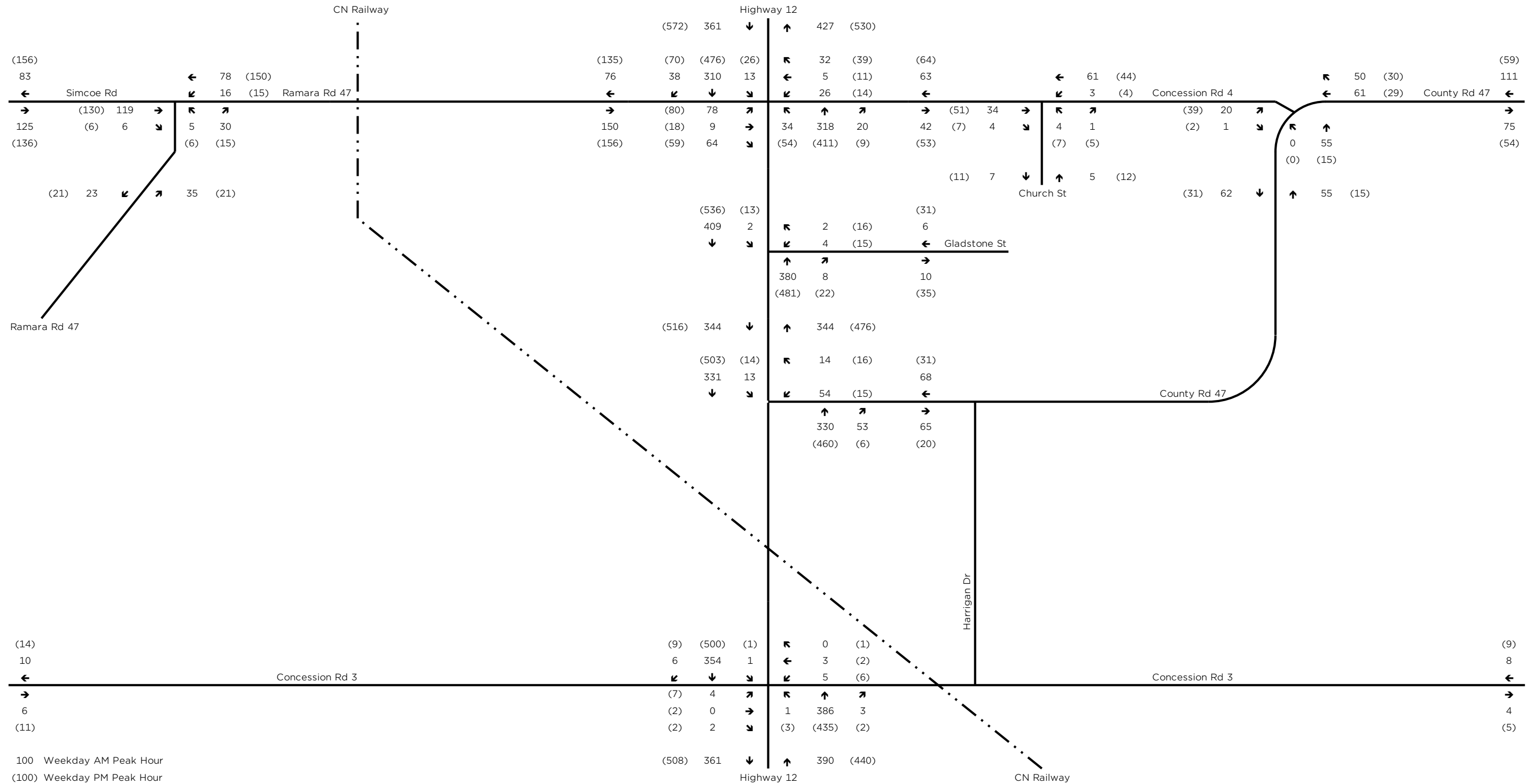
Figure 3B: Study Area Intersections





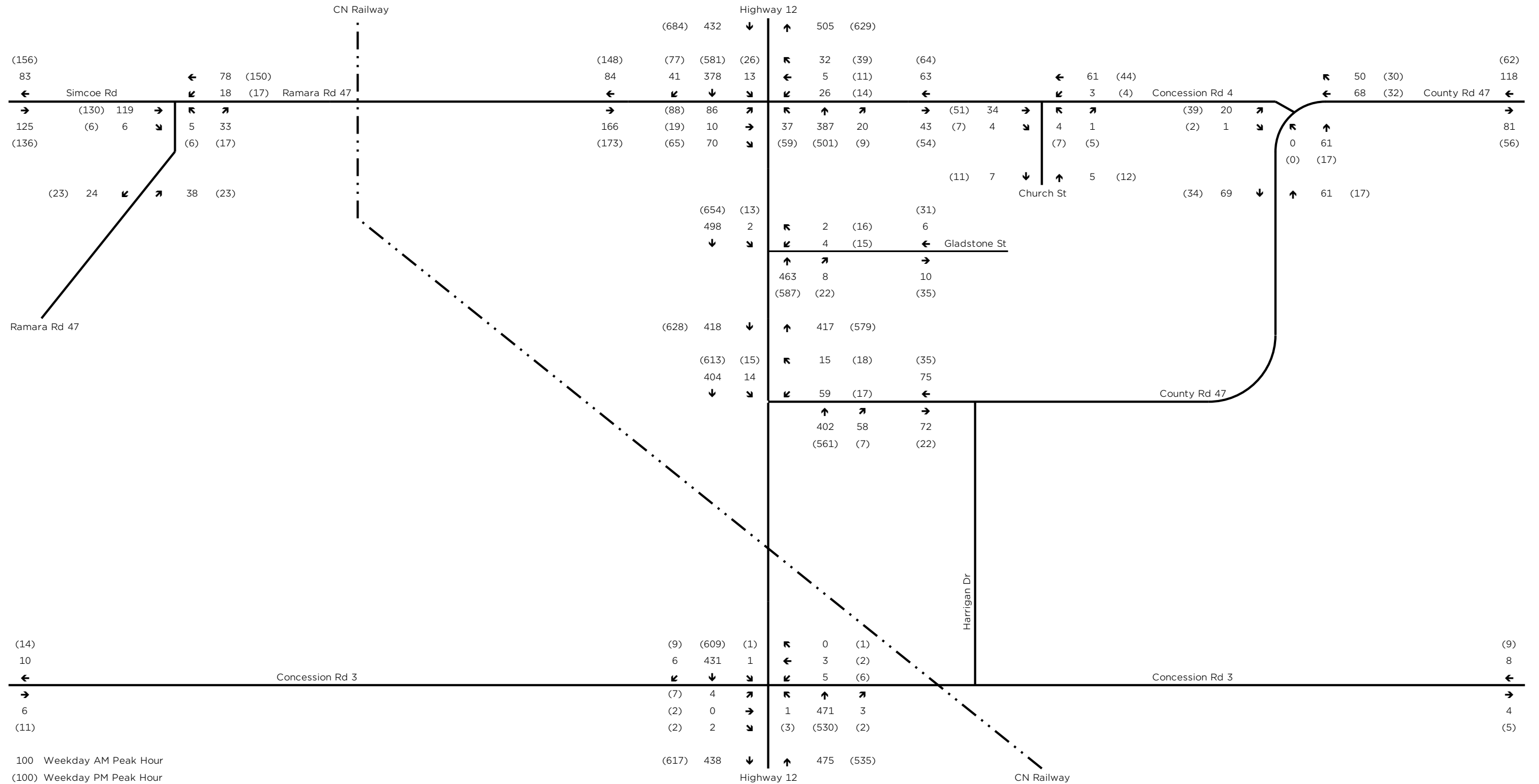
BRECHIN TRANSPORTATION STUDY
 Figure 4: Traffic Volumes - 2023 Counts





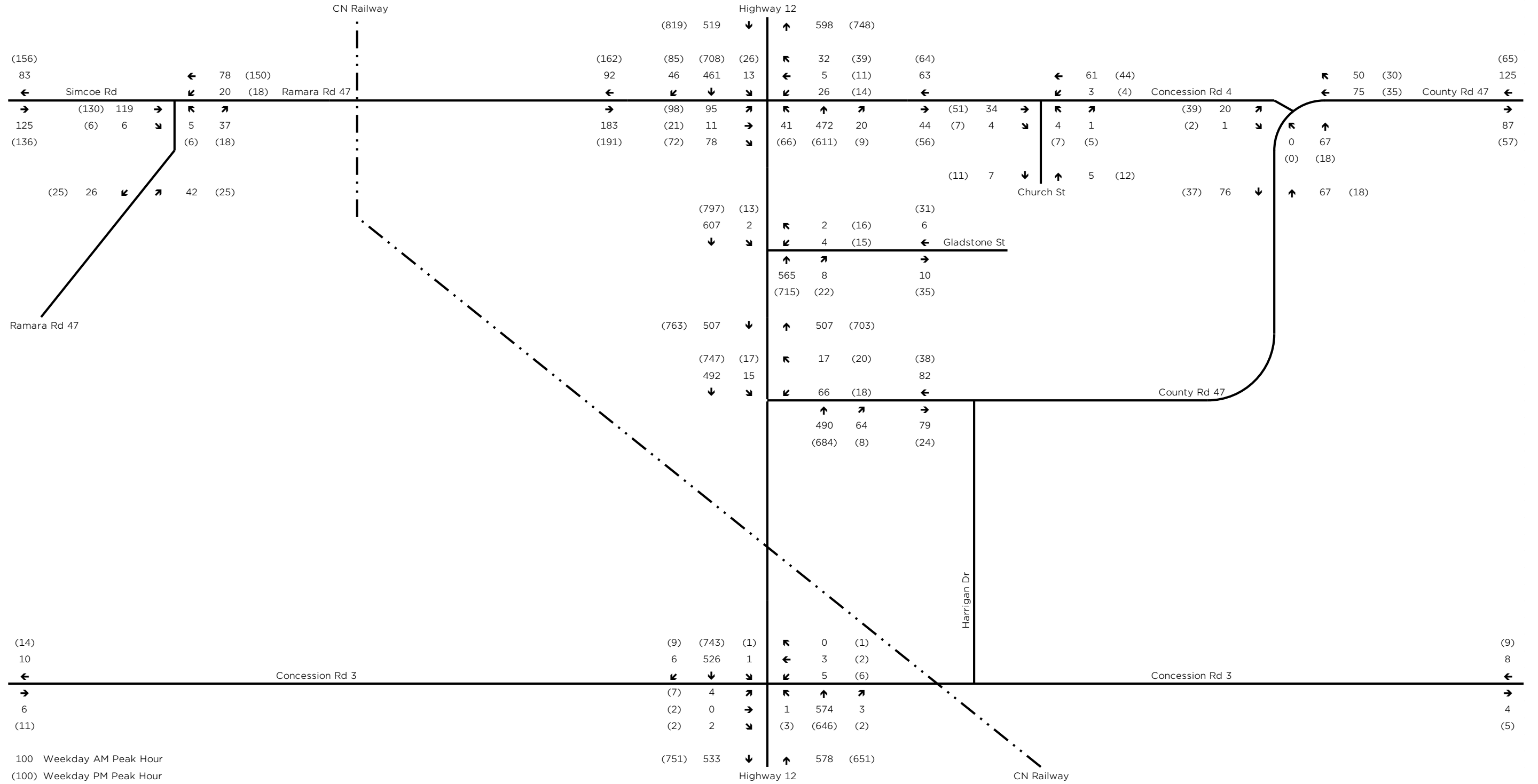
BRECHIN TRANSPORTATION STUDY
Figure 5: Traffic Volumes - 2023 Summer





BRECHIN TRANSPORTATION STUDY
 Figure 6: Traffic Volumes - 2033 Background

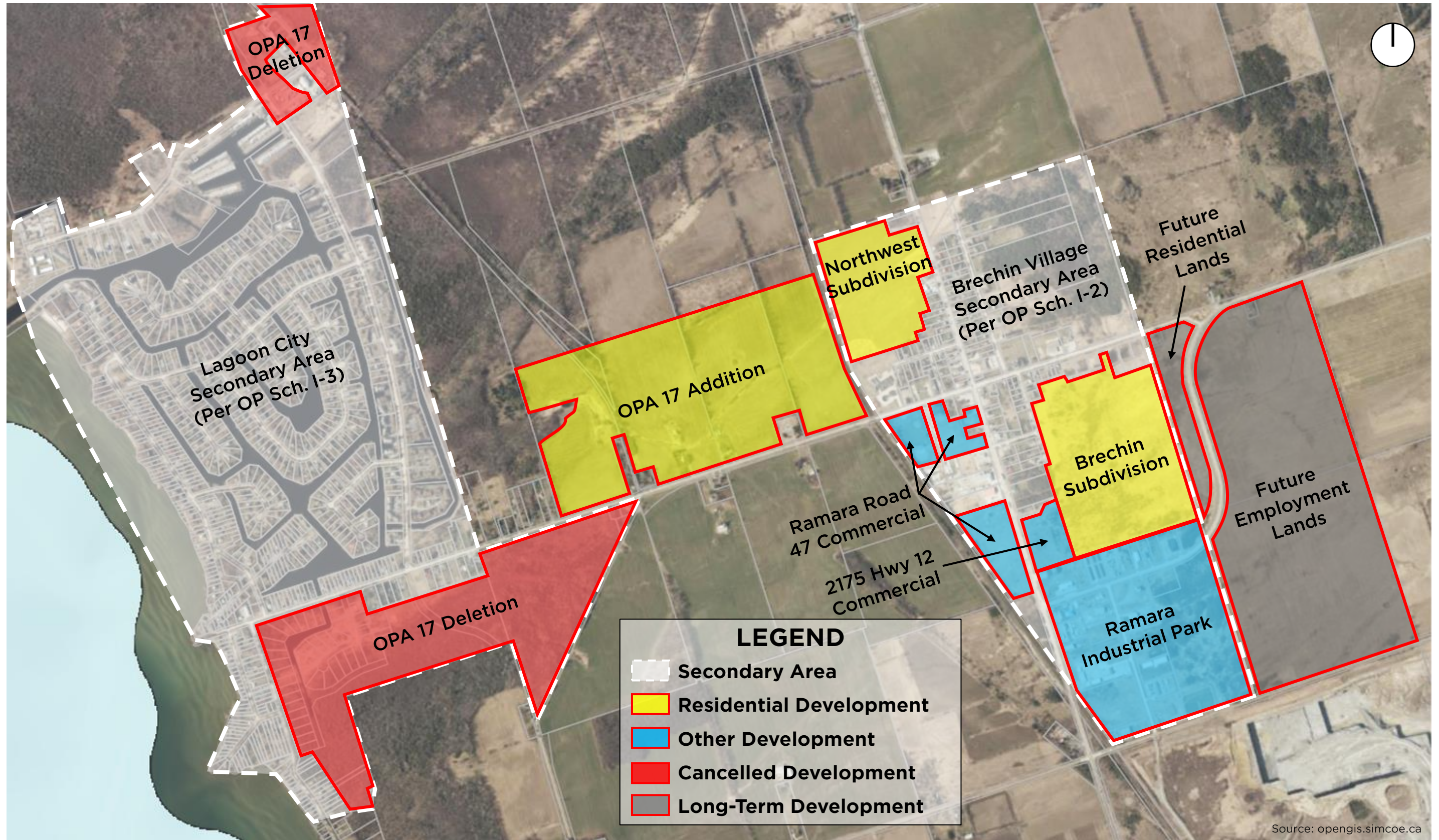




BRECHIN TRANSPORTATION STUDY

Figure 7: Traffic Volumes - 2043 Background

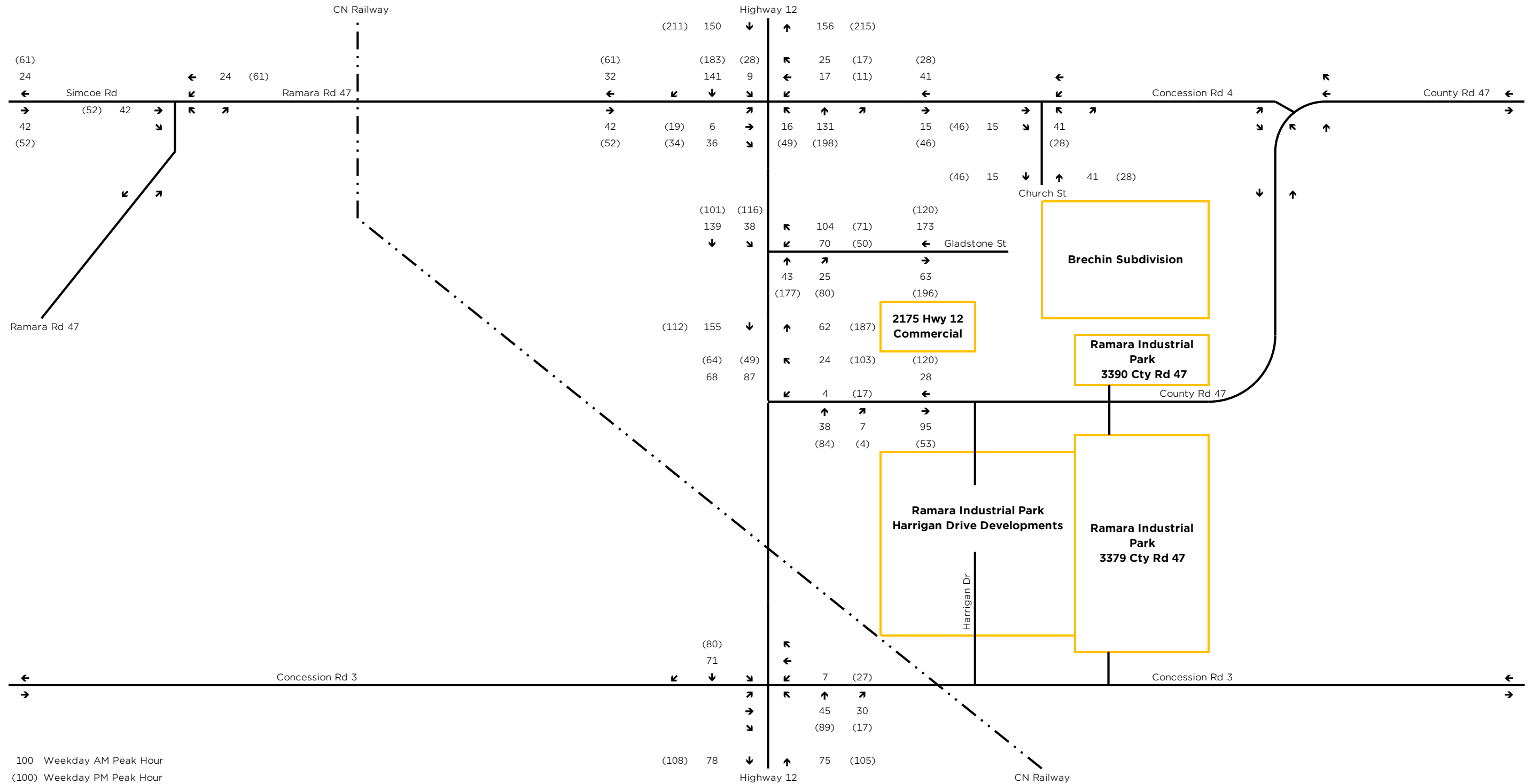




BRECHIN TRANSPORTATION STUDY

Figure 8: Future Development

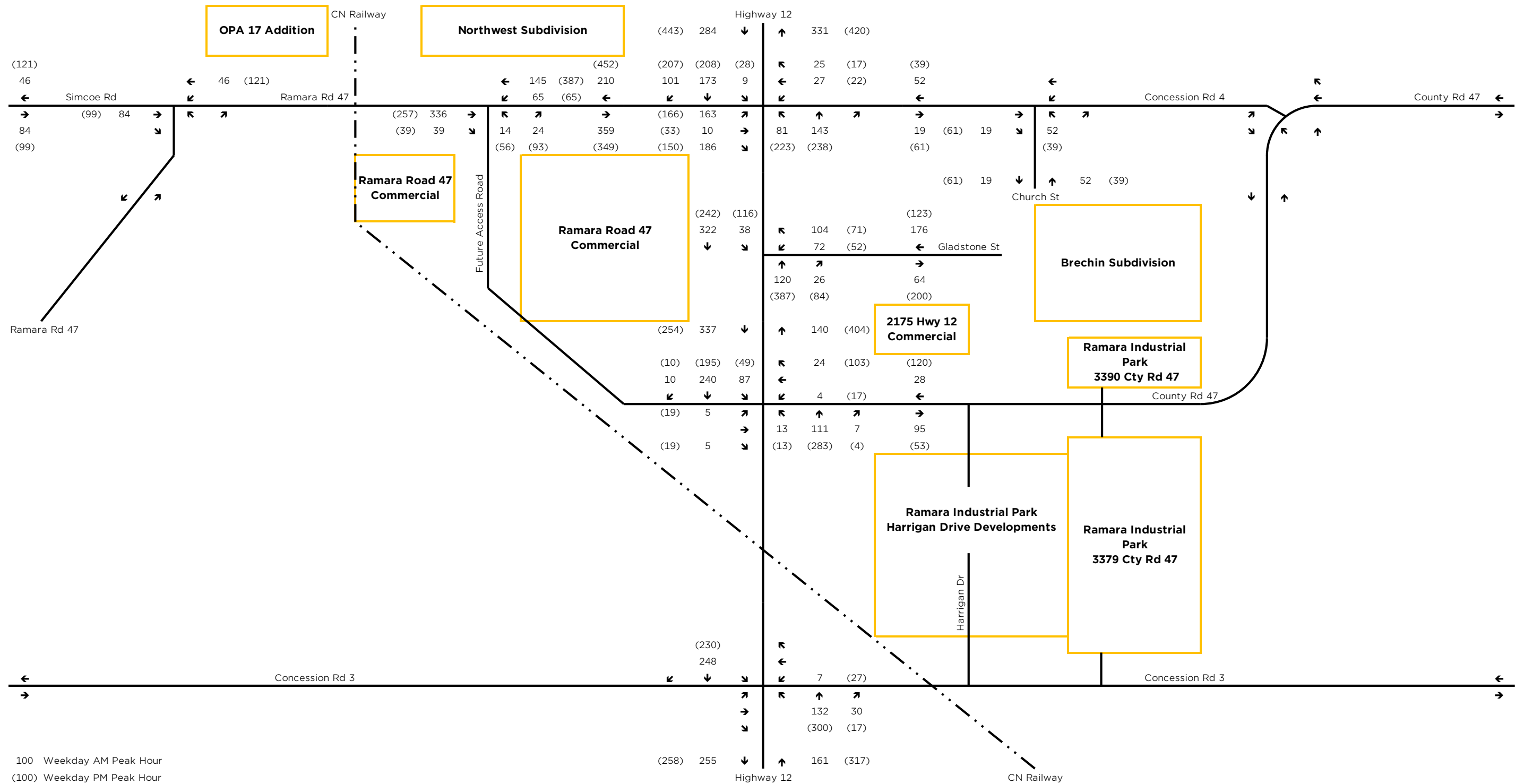




BRECHIN TRANSPORTATION STUDY

Figure 9: Development Traffic - 2028

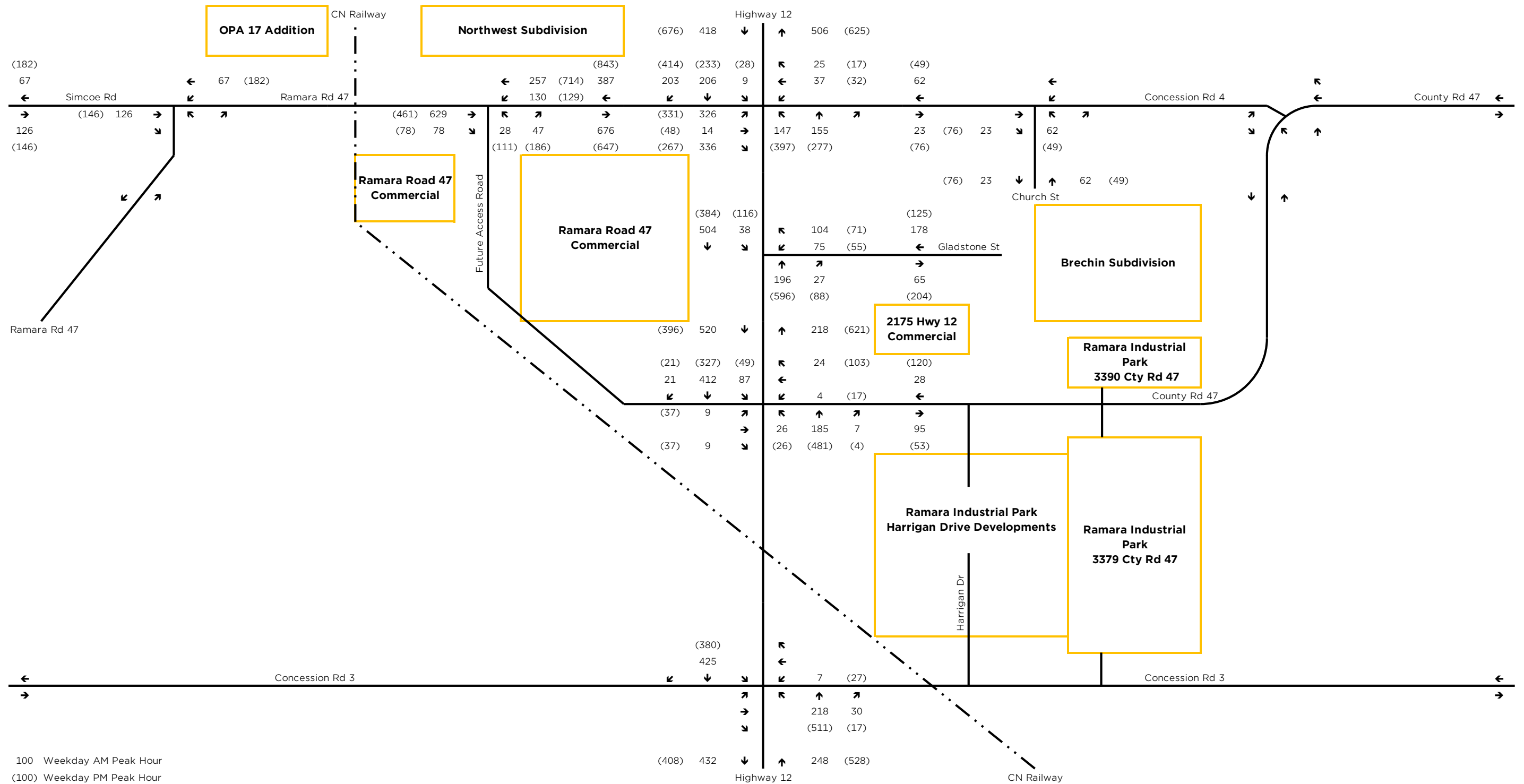




BRECHIN TRANSPORTATION STUDY

Figure 10: Development Traffic - 2033

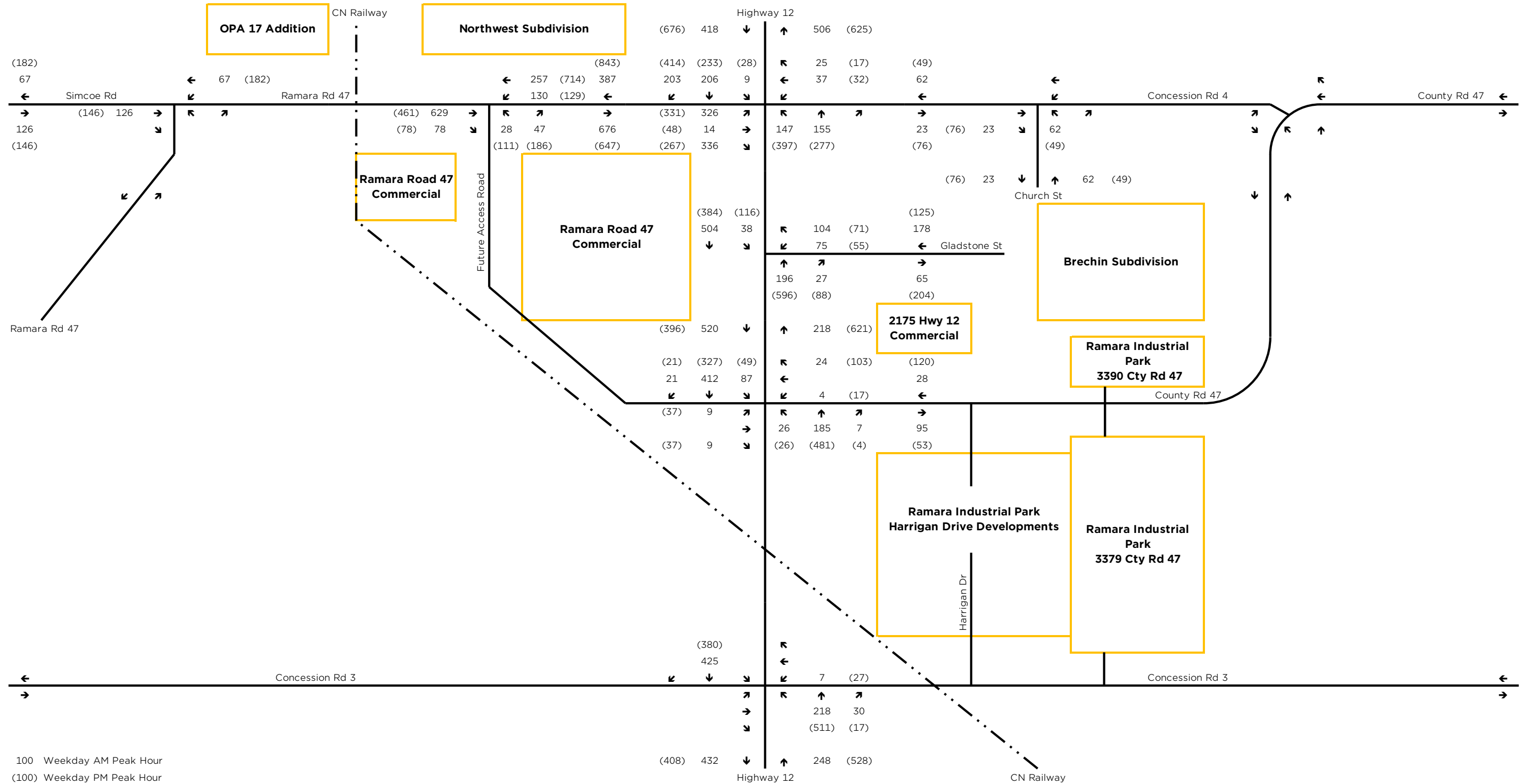




BRECHIN TRANSPORTATION STUDY

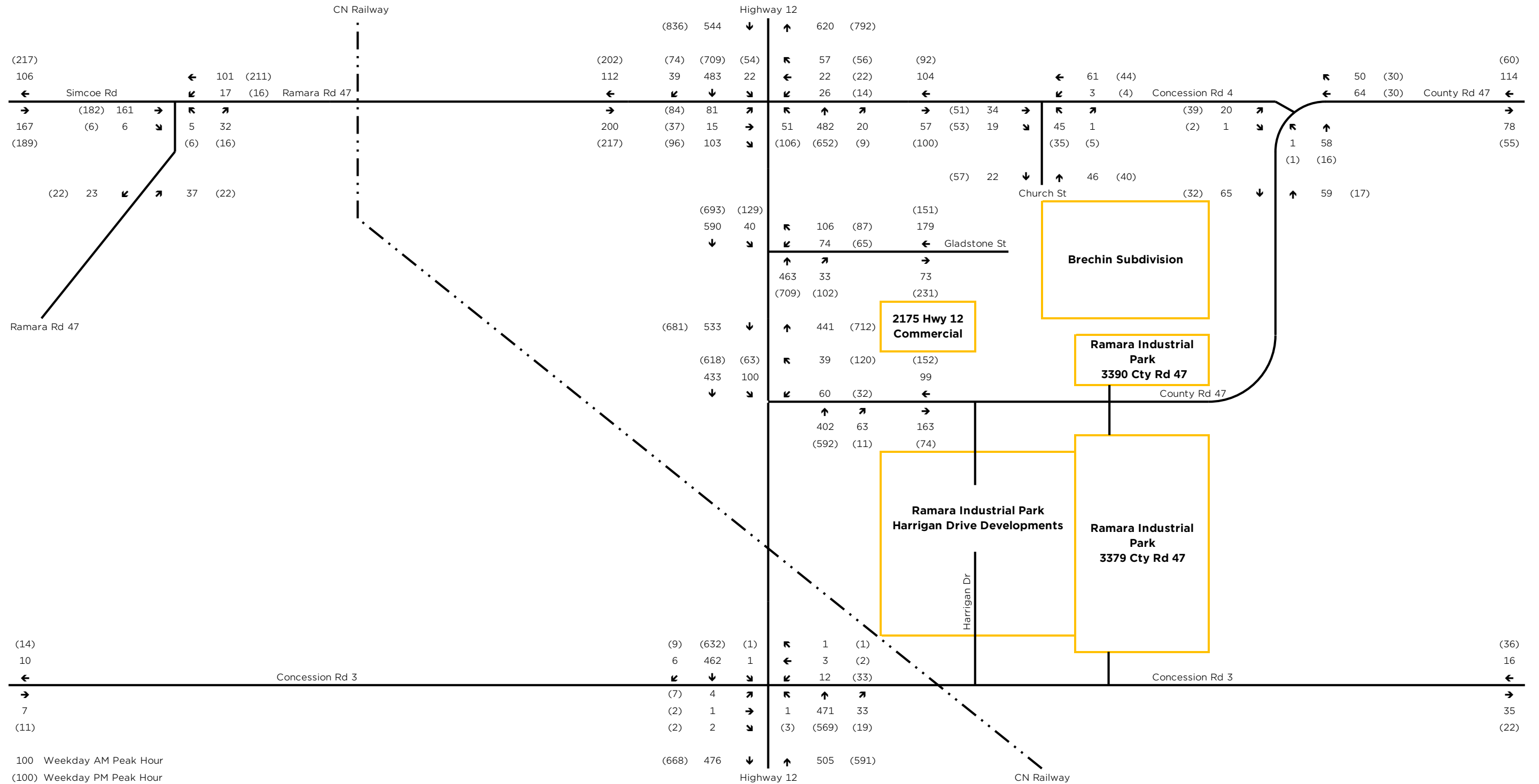
Figure 11: Development Traffic - 2038





BRECHIN TRANSPORTATION STUDY
 Figure 12: Development Traffic - 2043

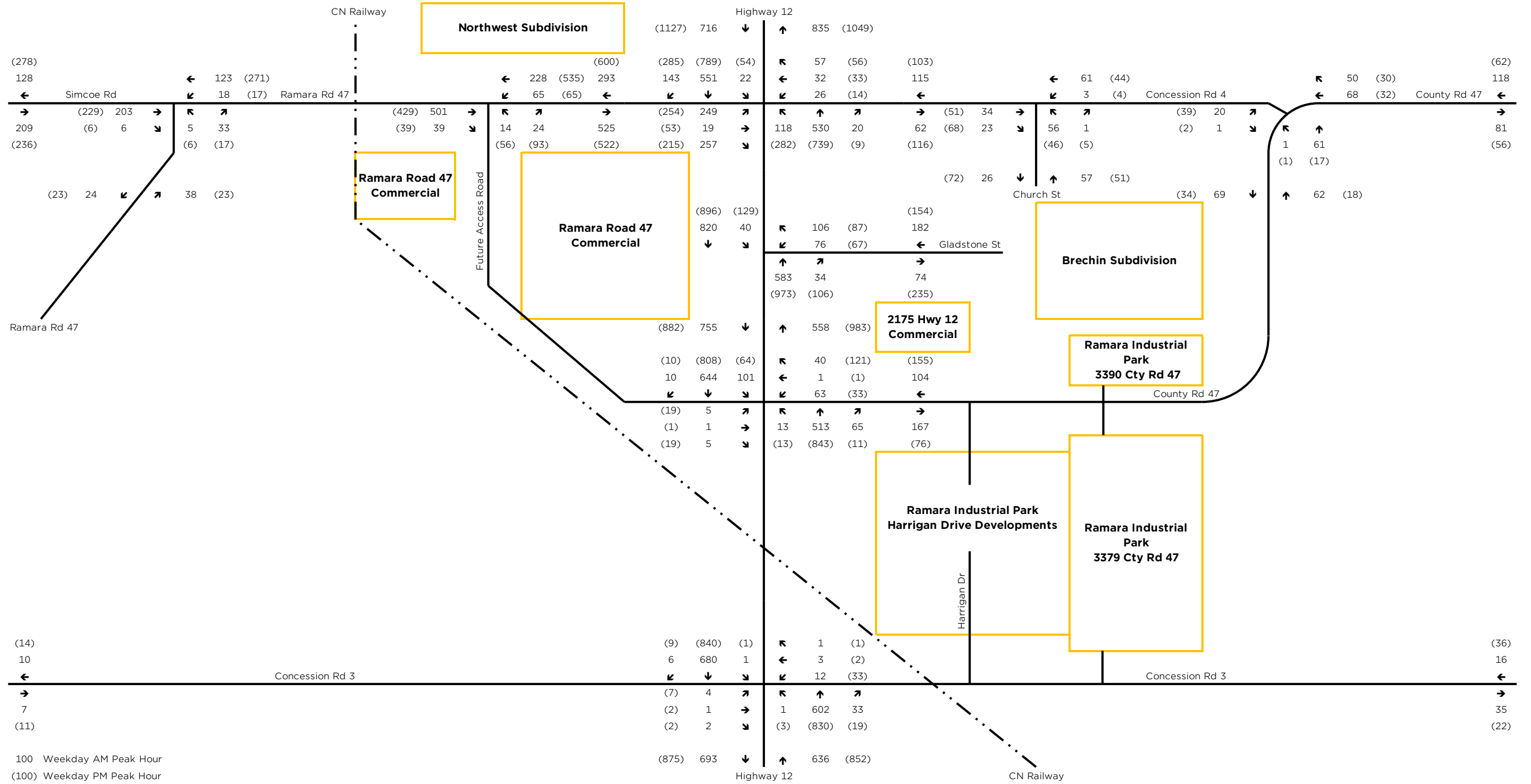




BRECHIN TRANSPORTATION STUDY

Figure 13: Traffic Volumes - 2028 Total

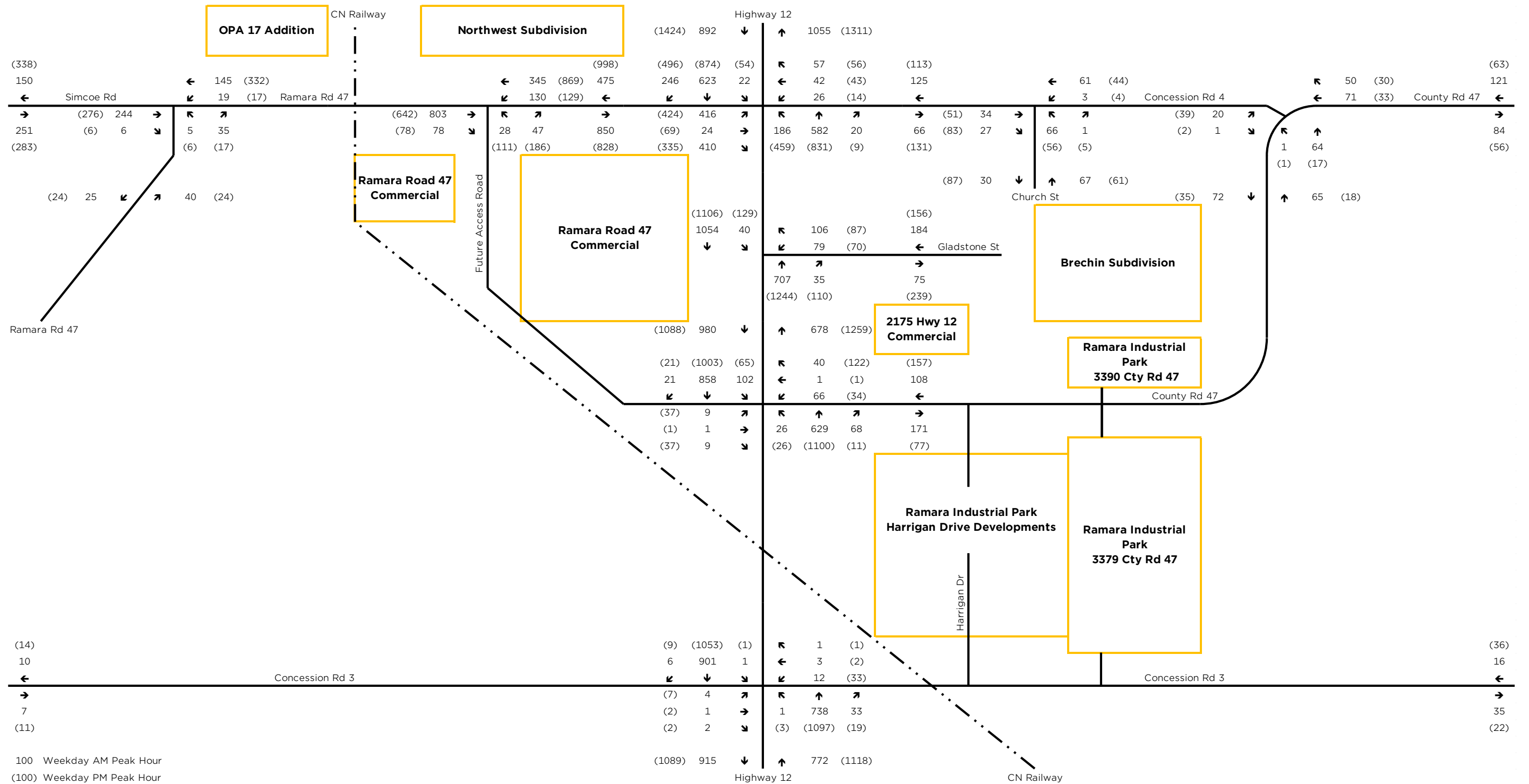




BRECHIN TRANSPORTATION STUDY

Figure 14: Traffic Volumes - 2033 Total

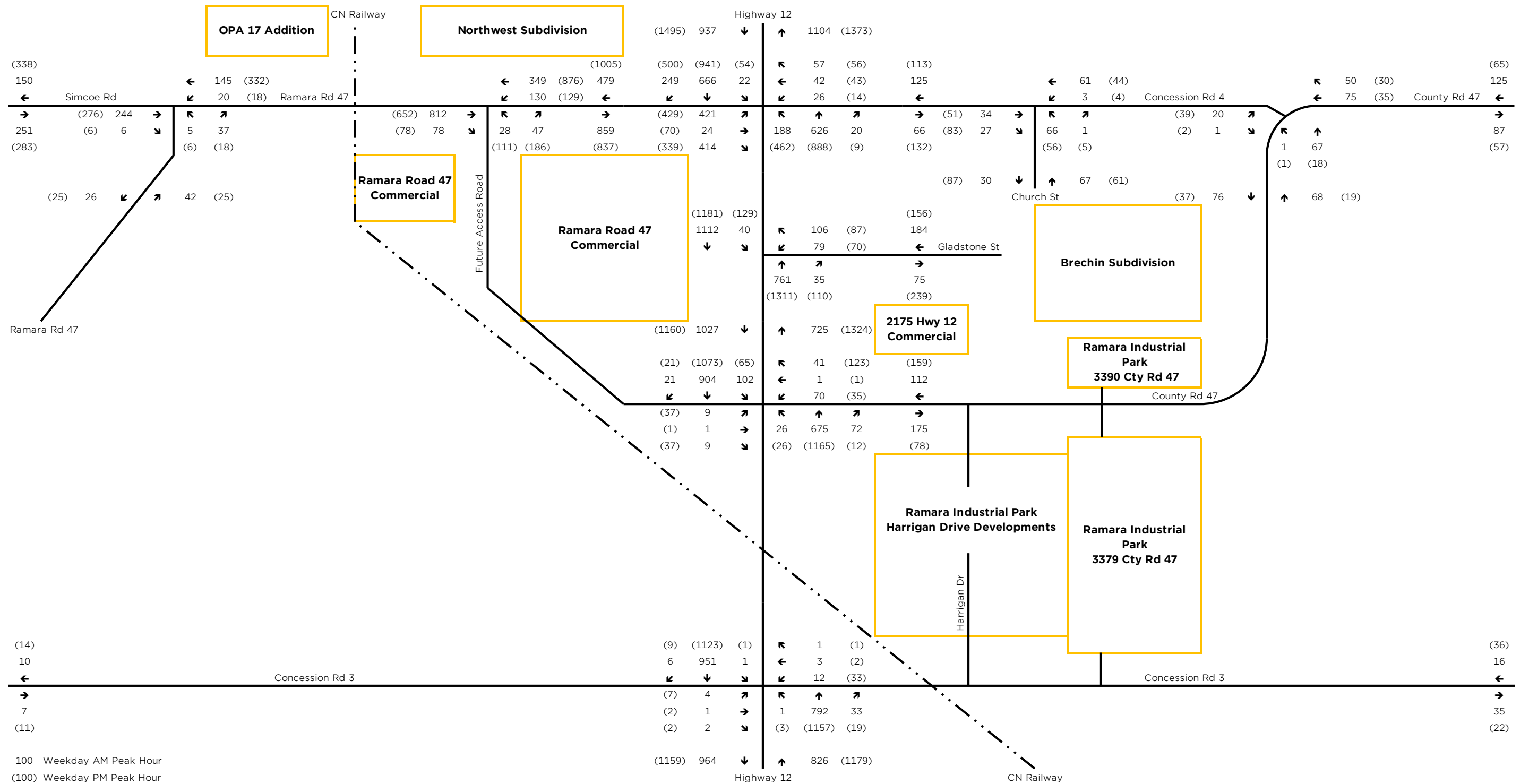




BRECHIN TRANSPORTATION STUDY

Figure 15: Traffic Volumes – 2038 Total





BRECHIN TRANSPORTATION STUDY
 Figure 16: Traffic Volumes – 2043 Total



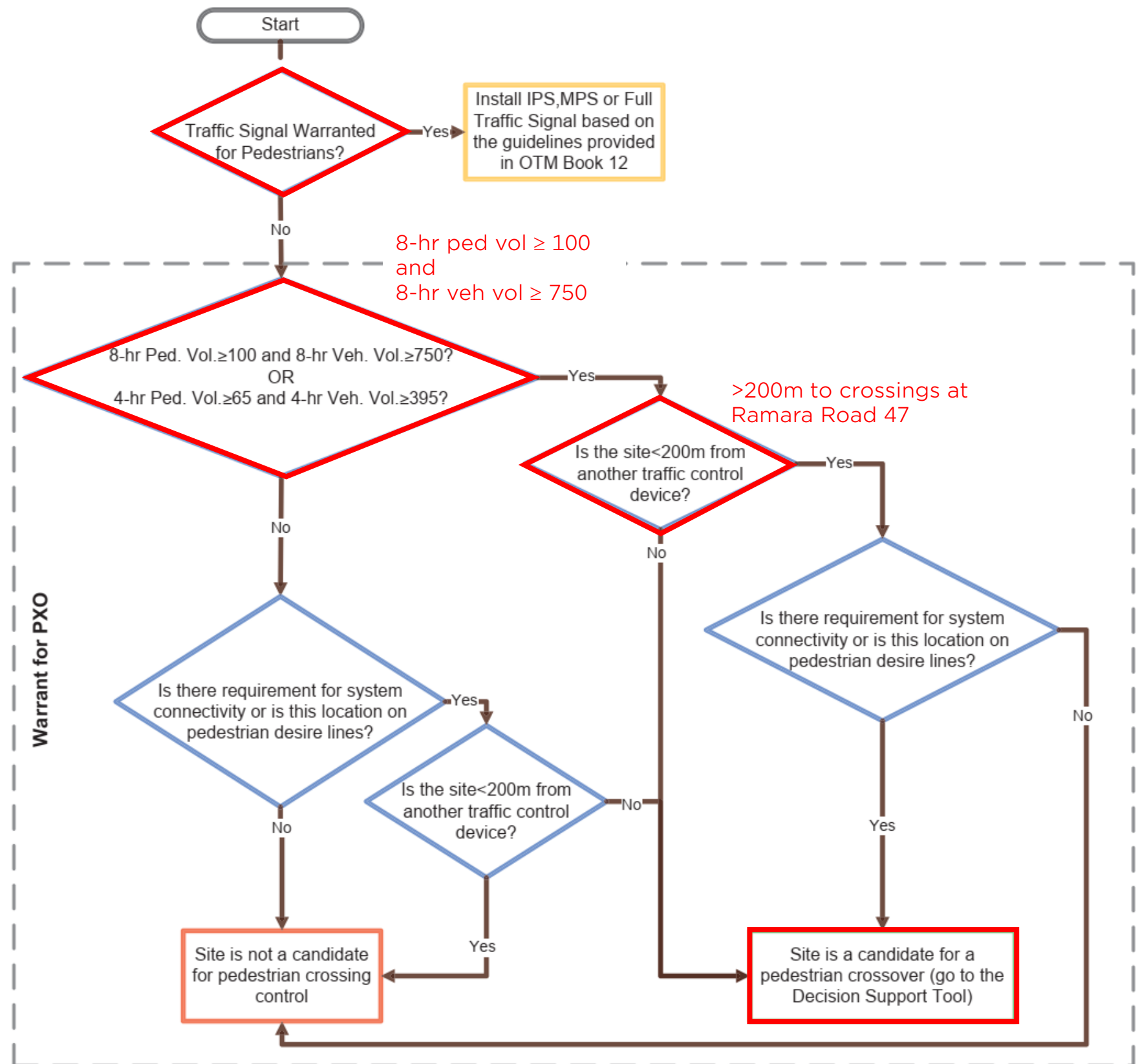


Source: opengis.simcoe.ca

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Figure 17: Highway 12 Right-of-Way





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 Figure 18: Pedestrian Crossover Decision Support Tool

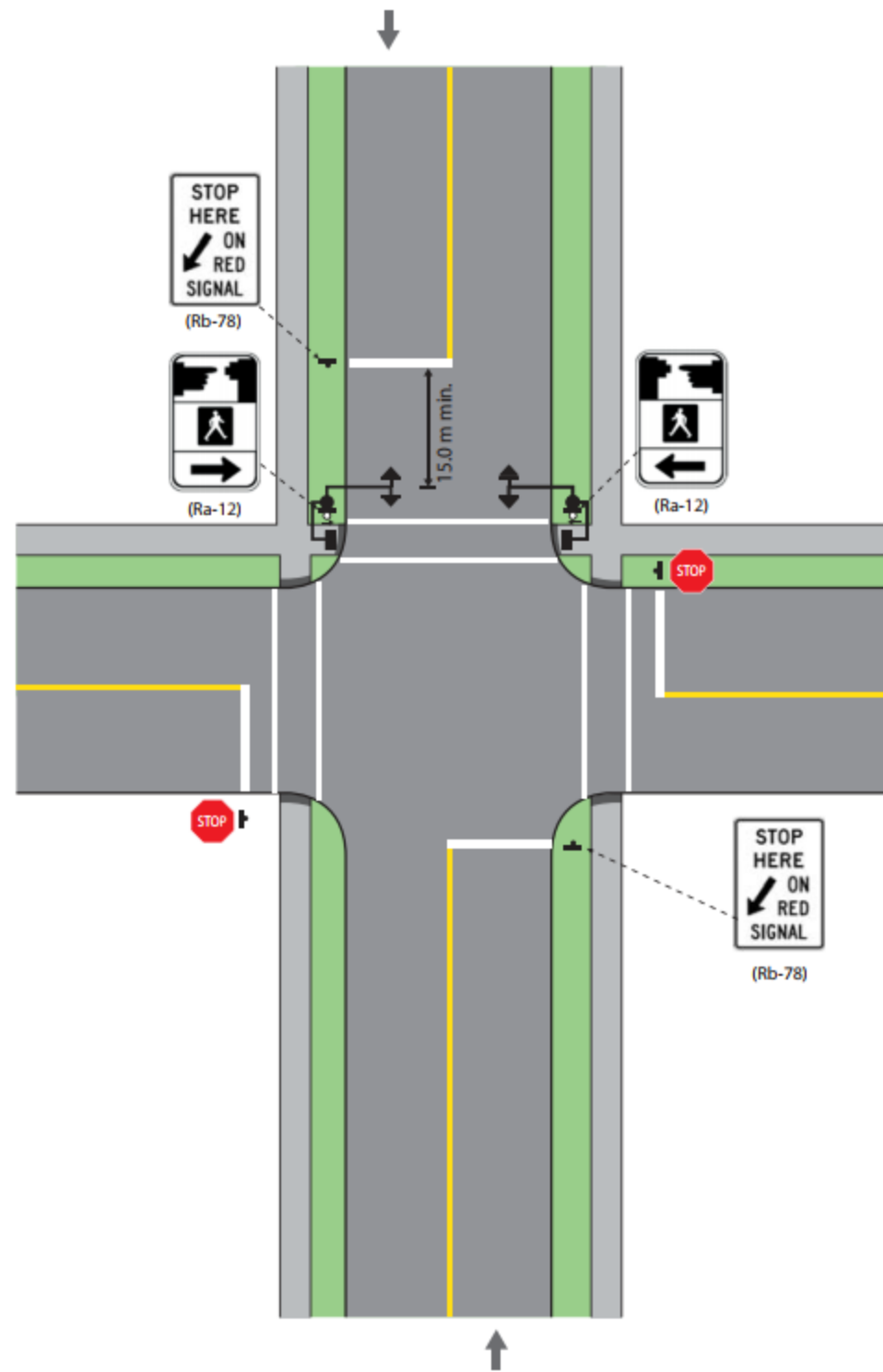


Two-way Vehicular Volume			Posted Speed Limit (km/h)	Total Number of Lanes for the Roadway Cross Section ¹			
Time Period	Lower Bound	Upper Bound		1 or 2 Lanes	3 lanes	4 lanes w/raised refuge	4 lanes w/o raised refuge
8 Hour	750	2,250	≤50	Level 2 Type D	Level 2 Type C ³	Level 2 Type D ²	Level 2 Type B
4 Hour	395	1,185		Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	750	2,250	60	Level 2 Type D	Level 2 Type B	Level 2 Type D ²	Level 2 Type B
4 Hour	395	1,185		Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	2,250	4,500	≤50	Level 2 Type D	Level 2 Type B	Level 2 Type D ²	Level 2 Type B
4 Hour	1,185	2,370		Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	2,250	4,500	60	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	1,185	2,370		Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	4,500	6,000	≤50	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155		Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	4,500	6,000	60	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155		Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
8 Hour	6,000	7,500	≤50	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 1 Type A
4 Hour	3,155	3,950		Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 1 Type A
8 Hour	6,000	7,500	60	Level 2 Type B	Level 2 Type B		
4 Hour	3,155	3,950		Level 2 Type B	Level 2 Type B		
8 Hour	7,500	17,500	≤50	Level 2 Type B	Level 2 Type B		
4 Hour	3,950	9,215		Level 2 Type B	Level 2 Type B		
8 Hour	7,500	17,500	60	Level 2 Type B			
4 Hour	3,950	9,215		Level 2 Type B			

BRECHIN TRANSPORTATION STUDY

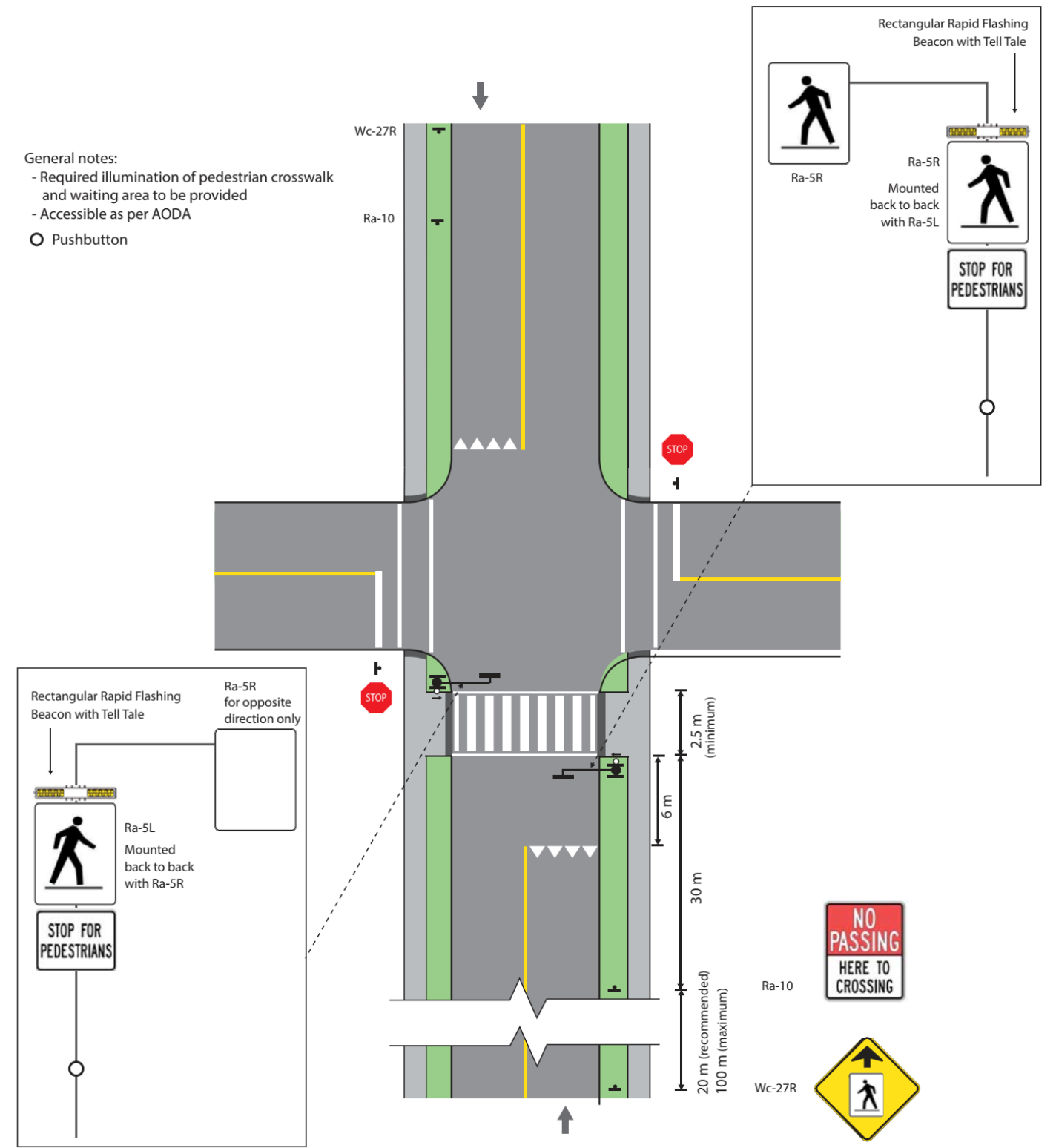
Figure 19: Pedestrian Crossover Selection Matrix





Intersection Pedestrian Signals

General notes:
 - Required illumination of pedestrian crosswalk and waiting area to be provided
 - Accessible as per AODA
 ○ Pushbutton



Level 2 Type B crossover



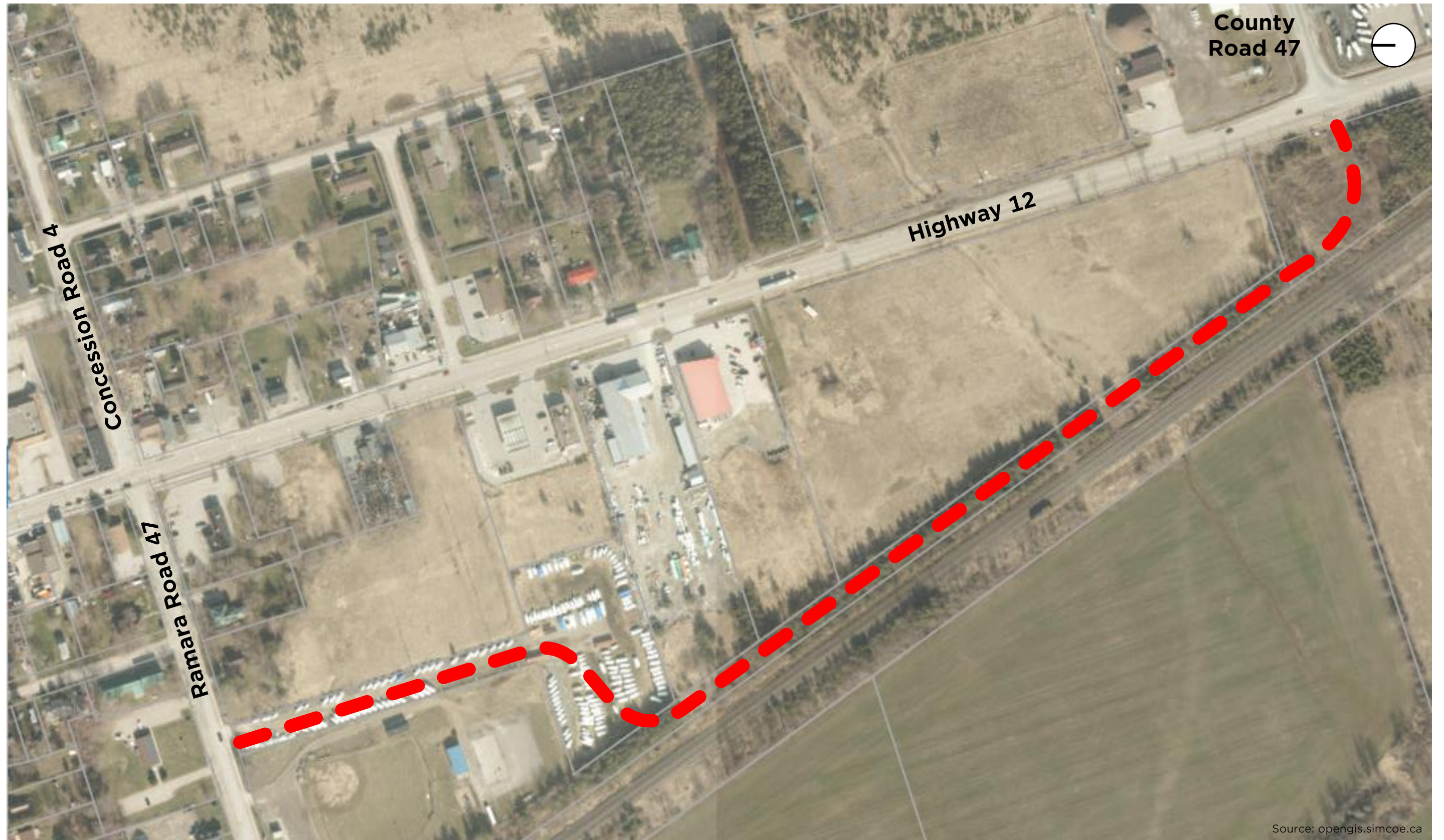


Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

Figure 21: Grade Separated Railway Crossing Locations





Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

Figure 22: Highway 12 Access Road



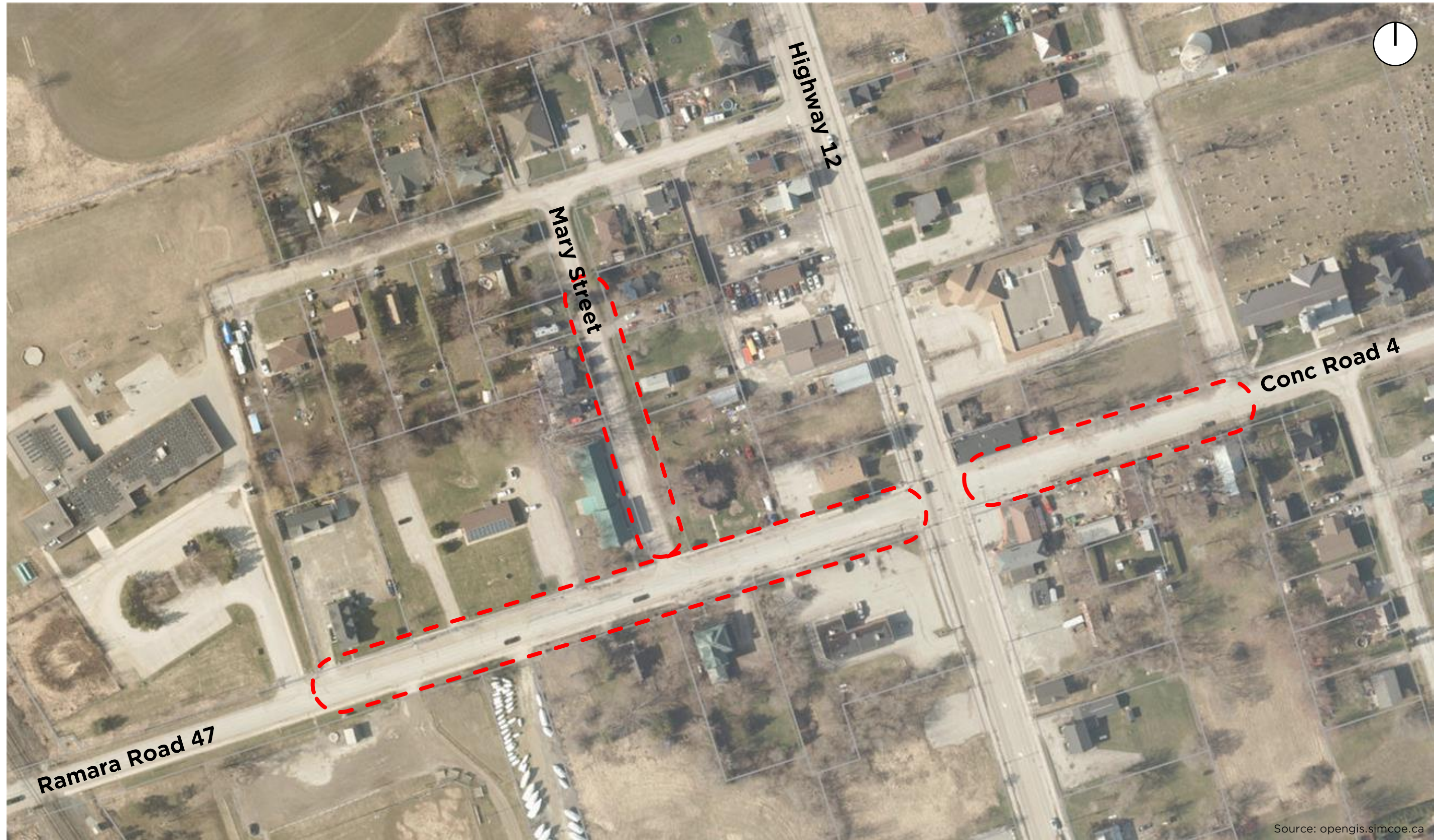


Source: opengis.simcoe.ca

BRECHIN TRANSPORTATION STUDY

Figure 23: O'Neill Lane Access Road





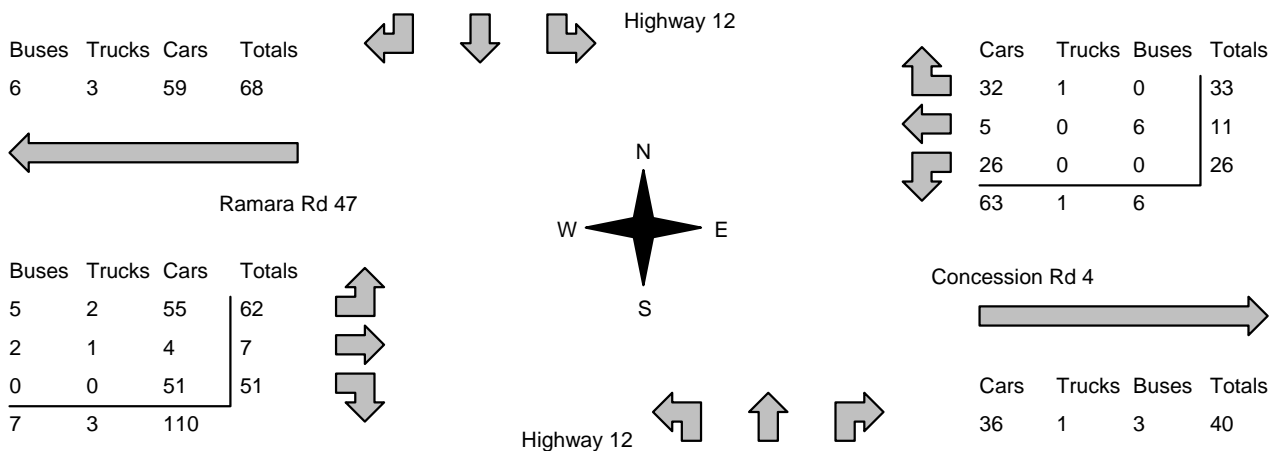
Source: opengis.simcoe.ca

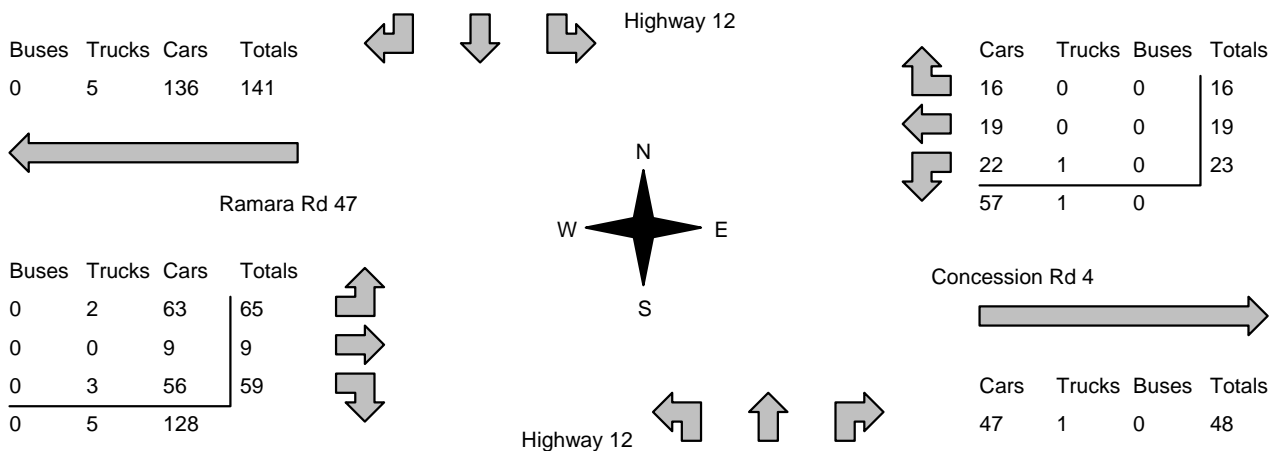
BRECHIN TRANSPORTATION STUDY

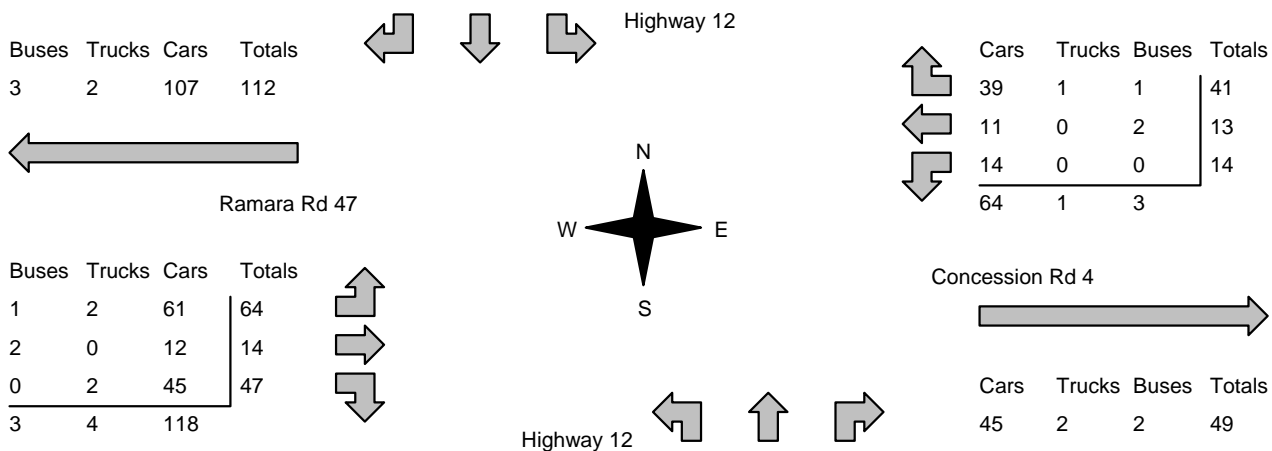
Figure 24: Parking Improvement Locations



Appendix A: Traffic Counts

<h1>Morning Peak Diagram</h1>	Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00																																																									
Municipality: Brechin Site #: 2312100001 Intersection: Highway 12 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																										
** Signalized Intersection **		Major Road: Highway 12 runs N/S																																																									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>North Leg Total: 640</td></tr> <tr><td>North Entering: 291</td></tr> <tr><td>North Peds: 0</td></tr> <tr><td>Peds Cross: ☒</td></tr> </table>	North Leg Total: 640	North Entering: 291	North Peds: 0	Peds Cross: ☒	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>1</td><td>1</td><td>2</td></tr> <tr><td>Trucks</td><td>2</td><td>32</td><td>0</td><td>34</td></tr> <tr><td>Cars</td><td>28</td><td>215</td><td>12</td><td>255</td></tr> <tr><td>Totals</td><td>30</td><td>248</td><td>13</td><td></td></tr> </table>	Buses	0	1	1	2	Trucks	2	32	0	34	Cars	28	215	12	255	Totals	30	248	13		<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>5</td></tr> <tr><td>Trucks</td><td>34</td></tr> <tr><td>Cars</td><td>310</td></tr> <tr><td>Totals</td><td>349</td></tr> </table>	Buses	5	Trucks	34	Cars	310	Totals	349	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>East Leg Total: 110</td></tr> <tr><td>East Entering: 70</td></tr> <tr><td>East Peds: 0</td></tr> <tr><td>Peds Cross: ☒</td></tr> </table>	East Leg Total: 110	East Entering: 70	East Peds: 0	Peds Cross: ☒																				
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<h2>Comments</h2>																																																											

<h2>Mid-day Peak Diagram</h2>	Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 12:00:00 To: 13:00:00																																																									
Municipality: Brechin Site #: 2312100001 Intersection: Highway 12 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																										
** Signalized Intersection **		Major Road: Highway 12 runs N/S																																																									
North Leg Total: 634 North Entering: 322 North Peds: 1 Peds Cross: ☒	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>4</td><td>31</td><td>1</td><td>36</td></tr> <tr><td>Cars</td><td>54</td><td>212</td><td>20</td><td>286</td></tr> <tr><td>Totals</td><td>58</td><td>243</td><td>21</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	4	31	1	36	Cars	54	212	20	286	Totals	58	243	21		<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>27</td></tr> <tr><td>Cars</td><td>285</td></tr> <tr><td>Totals</td><td>312</td></tr> </table>	Buses	0	Trucks	27	Cars	285	Totals	312	East Leg Total: 106 East Entering: 58 East Peds: 1 Peds Cross: ☒																												
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Buses	Trucks	Cars	Totals																																																								
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Peds Cross: ☒ West Peds: 5 West Entering: 133 West Leg Total: 274	Peds Cross: ☒ South Peds: 1 South Entering: 313 South Leg Total: 638																																																										
<h3>Comments</h3>																																																											

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:00:00 To: 17:00:00																																																								
Municipality: Brechin Site #: 2312100001 Intersection: Highway 12 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																																																									
** Signalized Intersection **		Major Road: Highway 12 runs N/S																																																									
North Leg Total: 897 North Entering: 463 North Peds: 3 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>1</td><td>1</td><td>0</td><td>2</td></tr> <tr><td>Trucks</td><td>1</td><td>21</td><td>2</td><td>24</td></tr> <tr><td>Cars</td><td>54</td><td>359</td><td>24</td><td>437</td></tr> <tr><td>Totals</td><td>56</td><td>381</td><td>26</td><td></td></tr> </table>	Buses	1	1	0	2	Trucks	1	21	2	24	Cars	54	359	24	437	Totals	56	381	26		<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>3</td></tr> <tr><td>Trucks</td><td>16</td></tr> <tr><td>Cars</td><td>415</td></tr> <tr><td>Totals</td><td>434</td></tr> </table>	Buses	3	Trucks	16	Cars	415	Totals	434	East Leg Total: 117 East Entering: 68 East Peds: 3 Peds Cross: ☒																												
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Cars	Trucks	Buses	Totals																																																								
45	2	2	49																																																								
Peds Cross: ☒ West Peds: 2 West Entering: 125 West Leg Total: 237	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>418</td></tr> <tr><td>Trucks</td><td>23</td></tr> <tr><td>Buses</td><td>1</td></tr> <tr><td>Totals</td><td>442</td></tr> </table>	Cars	418	Trucks	23	Buses	1	Totals	442	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>42</td><td>315</td><td>9</td><td>366</td></tr> <tr><td>Trucks</td><td>1</td><td>13</td><td>0</td><td>14</td></tr> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Totals</td><td>43</td><td>329</td><td>9</td><td></td></tr> </table>	Cars	42	315	9	366	Trucks	1	13	0	14	Buses	0	1	0	1	Totals	43	329	9		Peds Cross: ☒ South Peds: 0 South Entering: 381 South Leg Total: 823																												
Cars	418																																																										
Trucks	23																																																										
Buses	1																																																										
Totals	442																																																										
Cars	42	315	9	366																																																							
Trucks	1	13	0	14																																																							
Buses	0	1	0	1																																																							
Totals	43	329	9																																																								
Comments																																																											

Total Count Diagram

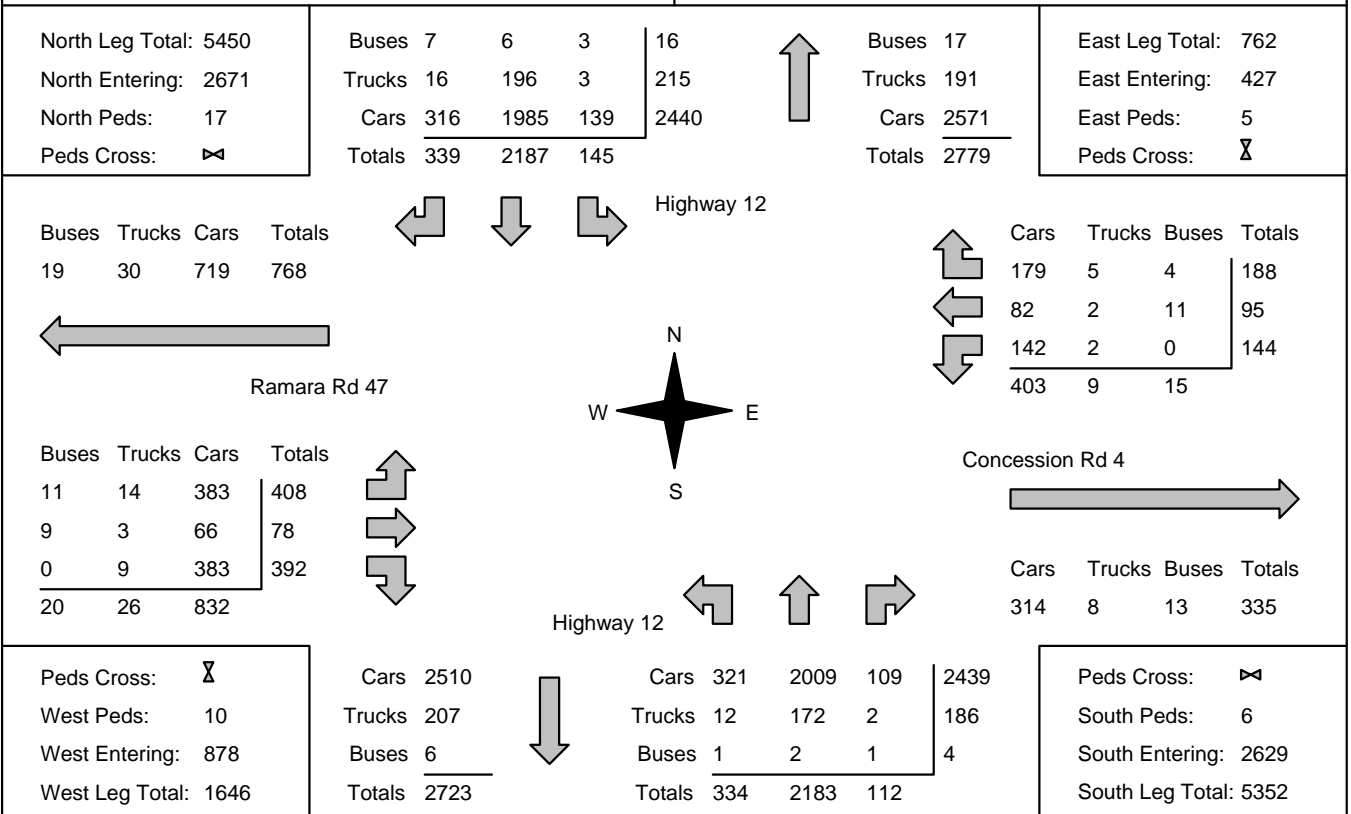
Municipality: Brechin
Site #: 2312100001
Intersection: Highway 12 & Concession Rd 4
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Highway 12 runs N/S



Comments

Traffic Count Summary

Intersection: Highway 12 & Concession Rd 4

Count Date: 16-May-23

Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	6	235	15	256	1	570	8:00:00	22	285	7	314	0
9:00:00	13	206	26	245	0	513	9:00:00	28	221	19	268	0
10:00:00	13	248	30	291	0	592	10:00:00	27	254	20	301	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	12	216	42	270	0	610	12:00:00	47	278	15	340	2
13:00:00	21	243	58	322	1	635	13:00:00	64	231	18	313	1
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	27	316	65	408	12	745	16:00:00	60	269	8	337	2
17:00:00	26	381	56	463	3	844	17:00:00	43	329	9	381	0
18:00:00	27	342	47	416	0	791	18:00:00	43	316	16	375	1
Totals:	145	2187	339	2671	17	5300	S Totals:	334	2183	112	2629	6
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	15	5	27	47	0	111	8:00:00	33	3	28	64	0
9:00:00	21	2	21	44	0	146	9:00:00	55	7	40	102	0
10:00:00	26	11	33	70	0	190	10:00:00	62	7	51	120	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	20	17	26	63	1	165	12:00:00	45	7	50	102	0
13:00:00	23	19	16	58	1	191	13:00:00	65	9	59	133	5
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	17	21	16	54	0	195	16:00:00	53	20	68	141	2
17:00:00	14	13	41	68	3	193	17:00:00	64	14	47	125	2
18:00:00	8	7	8	23	0	114	18:00:00	31	11	49	91	1
Totals:	144	95	188	427	5	1305	W Totals:	408	78	392	878	10
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	12:00			13:00	16:00	17:00	18:00		
Crossing Values:	54	83	99	84			109	105	95	51		

Count Date: 16-May-23 Site #: 2312100001

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Buses - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	1	1	34	34	2	2	0	0	5	5	1	1	0	0	0	0	0	0	1	1
7:30:00	2	1	99	65	4	2	0	0	12	7	1	0	0	0	1	1	0	0	1	0
7:45:00	5	3	162	63	5	1	0	0	15	3	2	1	0	0	1	0	0	0	1	0
8:00:00	6	1	211	49	12	7	0	0	22	7	3	1	0	0	2	1	0	0	1	0
8:15:00	9	3	264	53	18	6	0	0	29	7	4	1	0	0	2	0	0	0	1	0
8:30:00	12	3	306	42	23	5	0	0	32	3	4	0	0	0	2	0	0	0	1	0
8:45:00	13	1	351	45	25	2	0	0	37	5	4	0	0	0	2	0	0	0	1	0
9:00:00	19	6	394	43	36	11	0	0	45	8	5	1	0	0	2	0	0	0	1	0
9:15:00	21	2	436	42	43	7	0	0	54	9	5	0	1	1	3	1	0	0	1	0
9:30:00	24	3	492	56	44	1	0	0	61	7	6	1	1	0	3	0	0	0	1	0
9:45:00	28	4	542	50	49	5	0	0	71	10	7	1	1	0	3	0	0	0	1	0
10:00:00	31	3	609	67	64	15	0	0	77	6	7	0	1	0	3	0	0	0	1	0
10:15:00	31	0	609	0	64	0	0	0	77	0	7	0	1	0	3	0	0	0	1	0
11:00:00	31	0	609	0	64	0	0	0	77	0	7	0	1	0	3	0	0	0	1	0
11:15:00	32	1	652	43	69	5	0	0	79	2	7	0	1	0	3	0	0	0	1	0
11:30:00	34	2	705	53	81	12	0	0	85	6	10	3	1	0	3	0	2	2	1	0
11:45:00	39	5	740	35	91	10	0	0	95	10	10	0	1	0	3	0	2	0	1	0
12:00:00	43	4	799	59	100	9	0	0	103	8	11	1	1	0	3	0	2	0	1	0
12:15:00	50	7	844	45	113	13	1	1	113	10	11	0	1	0	3	0	2	0	1	0
12:30:00	55	5	908	64	126	13	1	0	115	2	12	1	1	0	3	0	2	0	2	1
12:45:00	59	4	959	51	136	10	1	0	125	10	14	2	1	0	3	0	2	0	2	0
13:00:00	63	4	1011	52	154	18	1	0	134	9	15	1	1	0	3	0	2	0	2	0
13:15:00	63	0	1011	0	154	0	1	0	134	0	15	0	1	0	3	0	2	0	2	0
15:00:00	63	0	1011	0	154	0	1	0	134	0	15	0	1	0	3	0	2	0	2	0
15:15:00	68	5	1077	66	174	20	1	0	142	8	15	0	2	1	3	0	3	1	2	0
15:30:00	73	5	1170	93	191	17	1	0	149	7	15	0	2	0	3	0	3	0	2	0
15:45:00	82	9	1240	70	202	11	1	0	151	2	15	0	2	0	3	0	4	1	2	0
16:00:00	88	6	1301	61	215	13	1	0	159	8	15	0	3	1	4	1	6	2	14	12
16:15:00	95	7	1394	93	231	16	2	1	168	9	16	1	3	0	5	1	6	0	16	2
16:30:00	99	4	1482	88	245	14	2	0	173	5	16	0	3	0	5	0	7	1	17	1
16:45:00	108	9	1557	75	258	13	3	1	175	2	16	0	3	0	5	0	7	0	17	0
17:00:00	112	4	1660	103	269	11	3	0	180	5	16	0	3	0	5	0	7	0	17	0
17:15:00	120	8	1735	75	282	13	3	0	183	3	16	0	3	0	5	0	7	0	17	0
17:30:00	132	12	1831	96	298	16	3	0	187	4	16	0	3	0	6	1	7	0	17	0
17:45:00	135	3	1914	83	308	10	3	0	195	8	16	0	3	0	6	0	7	0	17	0
18:00:00	139	4	1985	71	316	8	3	0	196	1	16	0	3	0	6	0	7	0	17	0
18:15:00	139	0	1985	0	316	0	3	0	196	0	16	0	3	0	6	0	7	0	17	0
18:15:15	139	0	1985	0	316	0	3	0	196	0	16	0	3	0	6	0	7	0	17	0

Count Date: 16-May-23 Site #: 2312100001

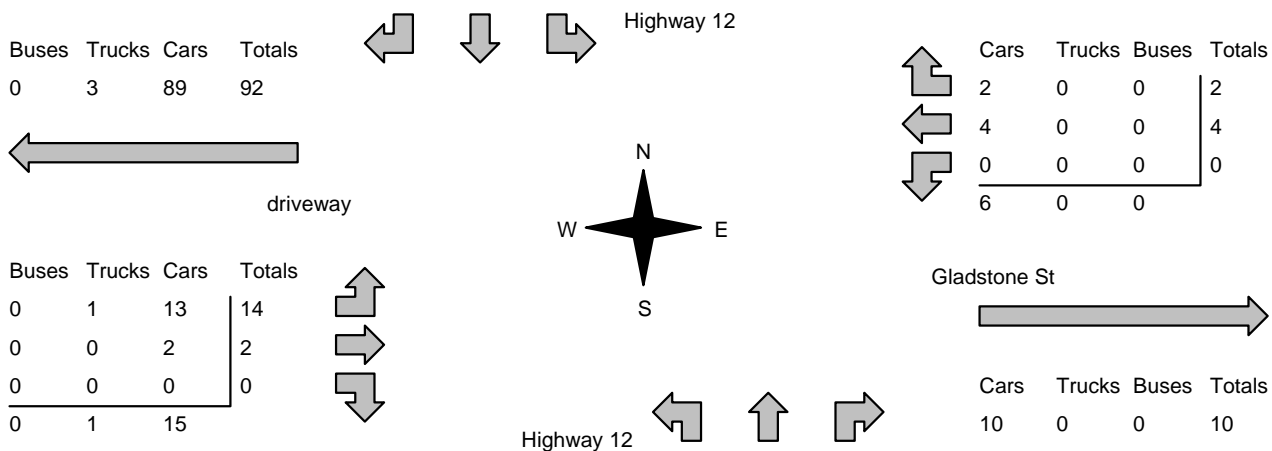
Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Buses - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	7	7	0	0	5	5	0	0	0	0	1	1	0	0	0	0	1	1	0	0
7:30:00	8	1	0	0	12	7	0	0	0	0	1	0	0	0	0	0	1	0	0	0
7:45:00	9	1	3	3	22	10	0	0	1	1	1	0	0	0	0	0	1	0	0	0
8:00:00	15	6	4	1	24	2	0	0	1	0	1	0	0	0	0	0	2	1	0	0
8:15:00	23	8	4	0	32	8	1	1	1	0	1	0	0	0	0	0	2	0	0	0
8:30:00	26	3	4	0	36	4	1	0	1	0	1	0	0	0	0	0	2	0	0	0
8:45:00	27	1	5	1	42	6	1	0	1	0	1	0	0	0	0	0	2	0	0	0
9:00:00	35	8	5	0	45	3	1	0	1	0	1	0	0	0	1	1	2	0	0	0
9:15:00	38	3	6	1	54	9	1	0	1	0	1	0	0	0	2	1	2	0	0	0
9:30:00	48	10	9	3	63	9	1	0	1	0	1	0	0	0	7	5	2	0	0	0
9:45:00	57	9	9	0	73	10	1	0	1	0	2	1	0	0	7	0	2	0	0	0
10:00:00	61	4	10	1	77	4	1	0	1	0	2	0	0	0	7	0	2	0	0	0
10:15:00	61	0	10	0	77	0	1	0	1	0	2	0	0	0	7	0	2	0	0	0
11:00:00	61	0	10	0	77	0	1	0	1	0	2	0	0	0	7	0	2	0	0	0
11:15:00	66	5	13	3	81	4	1	0	1	0	2	0	0	0	7	0	2	0	0	0
11:30:00	71	5	18	5	87	6	1	0	1	0	2	0	0	0	7	0	2	0	0	0
11:45:00	77	6	22	4	93	6	1	0	1	0	3	1	0	0	7	0	2	0	1	1
12:00:00	81	4	27	5	101	8	1	0	1	0	4	1	0	0	7	0	2	0	1	0
12:15:00	84	3	31	4	108	7	2	1	1	0	4	0	0	0	7	0	2	0	1	0
12:30:00	91	7	38	7	112	4	2	0	1	0	4	0	0	0	7	0	2	0	2	1
12:45:00	96	5	41	3	113	1	2	0	1	0	4	0	0	0	7	0	2	0	2	0
13:00:00	103	7	46	5	117	4	2	0	1	0	4	0	0	0	7	0	2	0	2	0
13:15:00	103	0	46	0	117	0	2	0	1	0	4	0	0	0	7	0	2	0	2	0
15:00:00	103	0	46	0	117	0	2	0	1	0	4	0	0	0	7	0	2	0	2	0
15:15:00	108	5	49	3	120	3	2	0	1	0	4	0	0	0	7	0	2	0	2	0
15:30:00	112	4	52	3	126	6	2	0	1	0	4	0	0	0	7	0	2	0	2	0
15:45:00	114	2	61	9	127	1	2	0	1	0	4	0	0	0	9	2	2	0	2	0
16:00:00	120	6	64	3	132	5	2	0	2	1	4	0	0	0	9	0	3	1	2	0
16:15:00	124	4	67	3	143	11	2	0	2	0	4	0	0	0	11	2	4	1	3	1
16:30:00	127	3	71	4	150	7	2	0	2	0	4	0	0	0	11	0	4	0	3	0
16:45:00	132	5	73	2	161	11	2	0	2	0	5	1	0	0	11	0	4	0	3	0
17:00:00	134	2	75	2	171	10	2	0	2	0	5	0	0	0	11	0	4	0	5	2
17:15:00	134	0	76	1	171	0	2	0	2	0	5	0	0	0	11	0	4	0	5	0
17:30:00	138	4	78	2	175	4	2	0	2	0	5	0	0	0	11	0	4	0	5	0
17:45:00	141	3	80	2	179	4	2	0	2	0	5	0	0	0	11	0	4	0	5	0
18:00:00	142	1	82	2	179	0	2	0	2	0	5	0	0	0	11	0	4	0	5	0
18:15:00	142	0	82	0	179	0	2	0	2	0	5	0	0	0	11	0	4	0	5	0
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
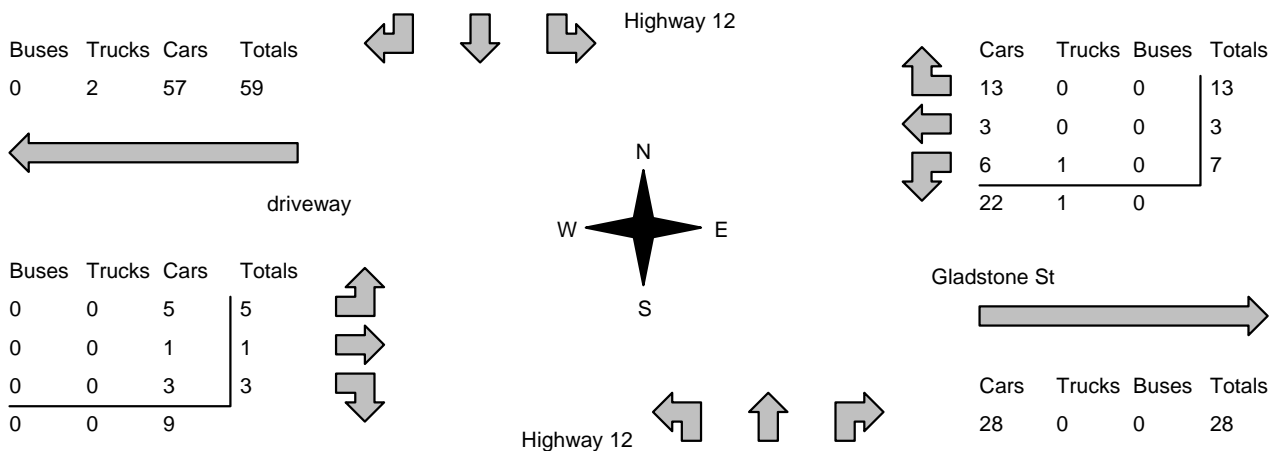
Count Date: 16-May-23 Site #: 2312100001

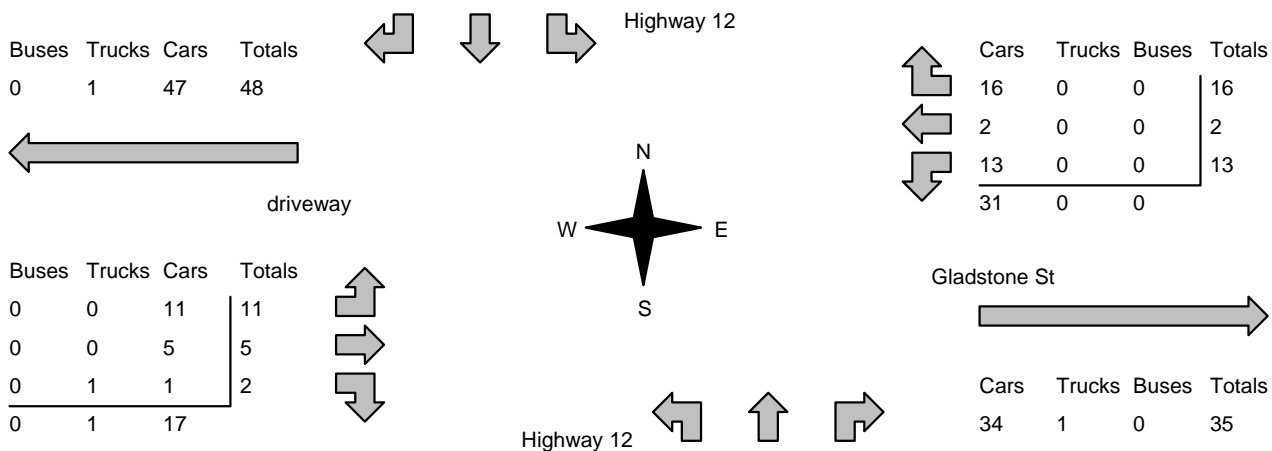
Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Buses - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	4	4	62	62	2	2	0	0	4	4	0	0	0	0	0	0	0	0	0	0
7:30:00	7	3	124	62	4	2	1	1	11	7	0	0	0	0	0	0	0	0	0	0
7:45:00	12	5	196	72	4	0	2	1	14	3	0	0	0	0	0	0	0	0	0	0
8:00:00	20	8	265	69	6	2	2	0	19	5	1	1	0	0	1	1	0	0	0	0
8:15:00	28	8	319	54	9	3	4	2	24	5	1	0	0	0	1	0	0	0	0	0
8:30:00	32	4	368	49	13	4	5	1	28	4	1	0	0	0	1	0	0	0	0	0
8:45:00	38	6	418	50	19	6	5	0	33	5	1	0	0	0	1	0	0	0	0	0
9:00:00	44	6	466	48	25	6	6	1	39	6	1	0	0	0	1	0	0	0	0	0
9:15:00	50	6	526	60	33	8	6	0	46	7	1	0	0	0	1	0	0	0	0	0
9:30:00	55	5	590	64	38	5	7	1	52	6	1	0	0	0	1	0	0	0	0	0
9:45:00	61	6	645	55	42	4	7	0	61	9	1	0	0	0	1	0	0	0	0	0
10:00:00	70	9	689	44	45	3	7	0	70	9	1	0	0	0	1	0	0	0	0	0
10:15:00	70	0	689	0	45	0	7	0	70	0	1	0	0	0	1	0	0	0	0	0
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11:15:00	78	8	754	65	48	3	7	0	75	5	2	1	0	0	1	0	0	0	0	0
11:30:00	91	13	812	58	53	5	7	0	83	8	2	0	0	0	1	0	1	1	0	0
11:45:00	103	12	884	72	58	5	7	0	87	4	2	0	0	0	1	0	1	0	0	0
12:00:00	117	14	939	55	58	0	7	0	98	11	2	0	0	0	1	0	1	0	2	2
12:15:00	130	13	981	42	64	6	8	1	109	11	2	0	0	0	1	0	1	0	2	0
12:30:00	149	19	1041	60	70	6	8	0	113	4	2	0	0	0	1	0	1	0	3	1
12:45:00	164	15	1084	43	71	1	8	0	117	4	2	0	0	0	1	0	1	0	3	0
13:00:00	180	16	1145	61	76	5	8	0	123	6	2	0	0	0	1	0	1	0	3	0
13:15:00	180	0	1145	0	76	0	8	0	123	0	2	0	0	0	1	0	1	0	3	0
15:00:00	180	0	1145	0	76	0	8	0	123	0	2	0	0	0	1	0	1	0	3	0
15:15:00	191	11	1207	62	79	3	8	0	126	3	2	0	0	0	1	0	1	0	3	0
15:30:00	207	16	1278	71	82	3	10	2	132	6	2	0	0	0	1	0	1	0	4	1
15:45:00	224	17	1342	64	82	0	10	0	137	5	2	0	1	1	1	0	1	0	5	1
16:00:00	237	13	1397	55	84	2	10	0	140	3	2	0	1	0	1	0	1	0	5	0
16:15:00	248	11	1484	87	87	3	10	0	143	3	2	0	1	0	1	0	1	0	5	0
16:30:00	256	8	1563	79	87	0	10	0	146	3	2	0	1	0	1	0	1	0	5	0
16:45:00	263	7	1639	76	91	4	11	1	150	4	2	0	1	0	2	1	1	0	5	0
17:00:00	279	16	1712	73	93	2	11	0	153	3	2	0	1	0	2	0	1	0	5	0
17:15:00	294	15	1799	87	101	8	12	1	155	2	2	0	1	0	2	0	1	0	6	1
17:30:00	305	11	1880	81	104	3	12	0	161	6	2	0	1	0	2	0	1	0	6	0
17:45:00	313	8	1948	68	107	3	12	0	166	5	2	0	1	0	2	0	1	0	6	0
18:00:00	321	8	2009	61	109	2	12	0	172	6	2	0	1	0	2	0	1	0	6	0
18:15:00	321	0	2009	0	109	0	12	0	172	0	2	0	1	0	2	0	1	0	6	0
18:15:15	321	0	2009	0	109	0	12	0	172	0	2	0	1	0	2	0	1	0	6	0

Count Date: 16-May-23 Site #: 2312100001

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Buses - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	5	5	0	0	4	4	0	0	0	0	0	0	1	1	0	0	0	0	0	0
7:30:00	13	8	0	0	13	9	0	0	1	1	0	0	1	0	0	0	0	0	0	0
7:45:00	21	8	1	1	18	5	0	0	1	0	0	0	2	1	0	0	0	0	0	0
8:00:00	31	10	2	1	27	9	0	0	1	0	1	1	2	0	0	0	0	0	0	0
8:15:00	44	13	5	3	37	10	1	1	1	0	1	0	4	2	0	0	0	0	0	0
8:30:00	59	15	5	0	48	11	2	1	1	0	1	0	4	0	0	0	0	0	0	0
8:45:00	73	14	7	2	57	9	2	0	2	1	1	0	4	0	0	0	0	0	0	0
9:00:00	81	8	8	1	67	10	3	1	2	0	1	0	4	0	0	0	0	0	0	0
9:15:00	93	12	8	0	79	12	3	0	2	0	1	0	4	0	1	1	0	0	0	0
9:30:00	113	20	11	3	92	13	3	0	2	0	1	0	8	4	2	1	0	0	0	0
9:45:00	125	12	12	1	108	16	5	2	3	1	1	0	9	1	2	0	0	0	0	0
10:00:00	136	11	12	0	118	10	5	0	3	0	1	0	9	0	2	0	0	0	0	0
10:15:00	136	0	12	0	118	0	5	0	3	0	1	0	9	0	2	0	0	0	0	0
11:00:00	136	0	12	0	118	0	5	0	3	0	1	0	9	0	2	0	0	0	0	0
11:15:00	148	12	13	1	131	13	5	0	3	0	3	2	9	0	2	0	0	0	0	0
11:30:00	159	11	15	2	143	12	5	0	3	0	3	0	9	0	2	0	0	0	0	0
11:45:00	172	13	16	1	150	7	5	0	3	0	3	0	9	0	2	0	0	0	0	0
12:00:00	180	8	19	3	165	15	6	1	3	0	4	1	9	0	2	0	0	0	0	0
12:15:00	192	12	23	4	180	15	8	2	3	0	5	1	9	0	2	0	0	0	2	2
12:30:00	209	17	25	2	198	18	8	0	3	0	5	0	9	0	2	0	0	0	5	3
12:45:00	228	19	27	2	209	11	8	0	3	0	6	1	9	0	2	0	0	0	5	0
13:00:00	243	15	28	1	221	12	8	0	3	0	7	1	9	0	2	0	0	0	5	0
13:15:00	243	0	28	0	221	0	8	0	3	0	7	0	9	0	2	0	0	0	5	0
15:00:00	243	0	28	0	221	0	8	0	3	0	7	0	9	0	2	0	0	0	5	0
15:15:00	254	11	31	3	235	14	9	1	3	0	7	0	9	0	2	0	0	0	6	1
15:30:00	264	10	35	4	250	15	9	0	3	0	7	0	9	0	2	0	0	0	6	0
15:45:00	274	10	38	3	265	15	9	0	3	0	7	0	9	0	2	0	0	0	7	1
16:00:00	293	19	43	5	289	24	11	2	3	0	7	0	9	0	7	5	0	0	7	0
16:15:00	308	15	50	7	302	13	11	0	3	0	8	1	9	0	8	1	0	0	7	0
16:30:00	328	20	52	2	317	15	12	1	3	0	8	0	9	0	8	0	0	0	8	1
16:45:00	339	11	53	1	323	6	12	0	3	0	9	1	10	1	9	1	0	0	9	1
17:00:00	354	15	55	2	334	11	13	1	3	0	9	0	10	0	9	0	0	0	9	0
17:15:00	362	8	57	2	346	12	13	0	3	0	9	0	11	1	9	0	0	0	10	1
17:30:00	371	9	61	4	359	13	13	0	3	0	9	0	11	0	9	0	0	0	10	0
17:45:00	381	10	64	3	370	11	14	1	3	0	9	0	11	0	9	0	0	0	10	0
18:00:00	383	2	66	2	383	13	14	0	3	0	9	0	11	0	9	0	0	0	10	0
18:15:00	383	0	66	0	383	0	14	0	3	0	9	0	11	0	9	0	0	0	10	0
18:15:15	383	0	66	0	383	0	14	0	3	0	9	0	11	0	9	0	0	0	10	0

<h1>Morning Peak Diagram</h1>	Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00																																																									
Municipality: Brechin Site #: 2312100002 Intersection: Highway 12 & Gladstone St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																										
** Non-Signalized Intersection **	Major Road: Highway 12 runs N/S																																																										
<table style="width:100%; border-collapse: collapse;"> <tr><td>North Leg Total: 635</td></tr> <tr><td>North Entering: 329</td></tr> <tr><td>North Peds: 2</td></tr> <tr><td>Peds Cross: \boxtimes</td></tr> </table>	North Leg Total: 635	North Entering: 329	North Peds: 2	Peds Cross: \boxtimes	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses 0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks 2</td><td>32</td><td>0</td><td>34</td></tr> <tr><td>Cars 68</td><td>225</td><td>2</td><td>295</td></tr> <tr><td>Totals 70</td><td>257</td><td>2</td><td></td></tr> </table>	Buses 0	0	0	0	Trucks 2	32	0	34	Cars 68	225	2	295	Totals 70	257	2		<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses 0</td></tr> <tr><td>Trucks 32</td></tr> <tr><td>Cars 274</td></tr> <tr><td>Totals 306</td></tr> </table>	Buses 0	Trucks 32	Cars 274	Totals 306	<table style="width:100%; border-collapse: collapse;"> <tr><td>East Leg Total: 16</td></tr> <tr><td>East Entering: 6</td></tr> <tr><td>East Peds: 1</td></tr> <tr><td>Peds Cross: \boxtimes</td></tr> </table>	East Leg Total: 16	East Entering: 6	East Peds: 1	Peds Cross: \boxtimes																												
North Leg Total: 635																																																											
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<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses 0</td><td>Trucks 3</td><td>Cars 89</td><td>Totals 92</td></tr> <tr><td>0</td><td>1</td><td>13</td><td>14</td></tr> <tr><td>0</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>15</td><td></td></tr> </table>	Buses 0	Trucks 3	Cars 89	Totals 92	0	1	13	14	0	0	2	2	0	0	0	0	0	1	15		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars 225</td></tr> <tr><td>Trucks 32</td></tr> <tr><td>Buses 0</td></tr> <tr><td>Totals 257</td></tr> </table>	Cars 225	Trucks 32	Buses 0	Totals 257	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars 17</td><td>259</td><td>6</td><td>282</td></tr> <tr><td>Trucks 1</td><td>31</td><td>0</td><td>32</td></tr> <tr><td>Buses 0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals 18</td><td>290</td><td>6</td><td></td></tr> </table>	Cars 17	259	6	282	Trucks 1	31	0	32	Buses 0	0	0	0	Totals 18	290	6		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars 2</td><td>Trucks 0</td><td>Buses 0</td><td>Totals 2</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>4</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>6</td><td>0</td><td>0</td><td></td></tr> </table>	Cars 2	Trucks 0	Buses 0	Totals 2	4	0	0	4	0	0	0	0	6	0	0	
Buses 0	Trucks 3	Cars 89	Totals 92																																																								
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<table style="width:100%; border-collapse: collapse;"> <tr><td>Peds Cross: \boxtimes</td></tr> <tr><td>West Peds: 4</td></tr> <tr><td>West Entering: 16</td></tr> <tr><td>West Leg Total: 108</td></tr> </table>	Peds Cross: \boxtimes	West Peds: 4	West Entering: 16	West Leg Total: 108	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars 10</td><td>Trucks 0</td><td>Buses 0</td><td>Totals 10</td></tr> </table>		Cars 10	Trucks 0	Buses 0	Totals 10	<table style="width:100%; border-collapse: collapse;"> <tr><td>Peds Cross: \boxtimes</td></tr> <tr><td>South Peds: 0</td></tr> <tr><td>South Entering: 314</td></tr> <tr><td>South Leg Total: 571</td></tr> </table>	Peds Cross: \boxtimes	South Peds: 0	South Entering: 314	South Leg Total: 571																																												
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South Entering: 314																																																											
South Leg Total: 571																																																											
<h2>Comments</h2>																																																											

<h2>Mid-day Peak Diagram</h2>	Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 12:00:00 To: 13:00:00																																																																															
Municipality: Brechin Site #: 2312100002 Intersection: Highway 12 & Gladstone St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																																																
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																																																																															
North Leg Total: 645 North Entering: 330 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>2</td><td>33</td><td>0</td><td>35</td></tr> <tr><td>Cars</td><td>45</td><td>237</td><td>13</td><td>295</td></tr> <tr><td>Totals</td><td>47</td><td>270</td><td>13</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	2	33	0	35	Cars	45	237	13	295	Totals	47	270	13		 <table style="margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>26</td></tr> <tr><td>Cars</td><td>289</td></tr> <tr><td>Totals</td><td>315</td></tr> </table>	Buses	0	Trucks	26	Cars	289	Totals	315	East Leg Total: 51 East Entering: 23 East Peds: 1 Peds Cross: ☒																																																		
Buses	0	0	0	0																																																																													
Trucks	2	33	0	35																																																																													
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<table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>2</td><td>57</td><td>59</td></tr> </table> <table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>5</td><td>5</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>3</td><td>3</td></tr> <tr><td>0</td><td>0</td><td>9</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	2	57	59	Buses	Trucks	Cars	Totals	0	0	5	5	0	0	1	1	0	0	3	3	0	0	9		<table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>13</td><td>0</td><td>0</td><td>13</td></tr> <tr><td>3</td><td>0</td><td>0</td><td>3</td></tr> <tr><td>6</td><td>1</td><td>0</td><td>7</td></tr> <tr><td>22</td><td>1</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	13	0	0	13	3	0	0	3	6	1	0	7	22	1	0		Peds Cross: ☒ West Peds: 5 West Entering: 9 West Leg Total: 68	<table style="margin: auto;"> <tr><td>Cars</td><td>246</td></tr> <tr><td>Trucks</td><td>34</td></tr> <tr><td>Buses</td><td>0</td></tr> <tr><td>Totals</td><td>280</td></tr> </table>	Cars	246	Trucks	34	Buses	0	Totals	280	<table style="margin: auto;"> <tr><td>Cars</td><td>9</td><td>271</td><td>14</td><td>294</td></tr> <tr><td>Trucks</td><td>0</td><td>26</td><td>0</td><td>26</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>9</td><td>297</td><td>14</td><td></td></tr> </table>	Cars	9	271	14	294	Trucks	0	26	0	26	Buses	0	0	0	0	Totals	9	297	14		Peds Cross: ☒ South Peds: 0 South Entering: 320 South Leg Total: 600
Buses	Trucks	Cars	Totals																																																																														
0	2	57	59																																																																														
Buses	Trucks	Cars	Totals																																																																														
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Totals	9	297	14																																																																														
<h3>Comments</h3>																																																																																	

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:45:00 To: 17:45:00																																																
Municipality: Brechin Site #: 2312100002 Intersection: Highway 12 & Gladstone St TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																																																	
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																																																	
North Leg Total: 843 North Entering: 442 North Peds: 2 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>17</td><td>1</td><td>18</td></tr> <tr><td>Cars</td><td>39</td><td>372</td><td>12</td><td>423</td></tr> <tr><td>Totals</td><td>39</td><td>390</td><td>13</td><td></td></tr> </table>	Buses	0	1	0	1	Trucks	0	17	1	18	Cars	39	372	12	423	Totals	39	390	13		<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>16</td></tr> <tr><td>Cars</td><td>385</td></tr> <tr><td>Totals</td><td>401</td></tr> </table>	Buses	0	Trucks	16	Cars	385	Totals	401	East Leg Total: 66 East Entering: 31 East Peds: 4 Peds Cross: ☒																				
Buses	0	1	0	1																																															
Trucks	0	17	1	18																																															
Cars	39	372	12	423																																															
Totals	39	390	13																																																
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Cars	385																																																		
Totals	401																																																		
																																																			
Buses Trucks Cars Totals 0 1 47 48 ← driveway	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>11</td><td>11</td></tr> <tr><td>0</td><td>0</td><td>5</td><td>5</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>2</td></tr> <tr><td>0</td><td>1</td><td>17</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	0	11	11	0	0	5	5	0	1	1	2	0	1	17		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>16</td><td>0</td><td>0</td><td>16</td></tr> <tr><td>2</td><td>0</td><td>0</td><td>2</td></tr> <tr><td>13</td><td>0</td><td>0</td><td>13</td></tr> <tr><td>31</td><td>0</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	16	0	0	16	2	0	0	2	13	0	0	13	31	0	0		Gladstone St → <table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>34</td><td>1</td><td>0</td><td>35</td></tr> </table>	Cars	Trucks	Buses	Totals	34	1	0	35
Buses	Trucks	Cars	Totals																																																
0	0	11	11																																																
0	0	5	5																																																
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Cars	Trucks	Buses	Totals																																																
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2	0	0	2																																																
13	0	0	13																																																
31	0	0																																																	
Cars	Trucks	Buses	Totals																																																
34	1	0	35																																																
Peds Cross: ☒ West Peds: 1 West Entering: 18 West Leg Total: 66	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>386</td></tr> <tr><td>Trucks</td><td>18</td></tr> <tr><td>Buses</td><td>1</td></tr> <tr><td>Totals</td><td>405</td></tr> </table>	Cars	386	Trucks	18	Buses	1	Totals	405	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>6</td><td>358</td><td>17</td><td>381</td></tr> <tr><td>Trucks</td><td>1</td><td>16</td><td>0</td><td>17</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>7</td><td>374</td><td>17</td><td></td></tr> </table>	Cars	6	358	17	381	Trucks	1	16	0	17	Buses	0	0	0	0	Totals	7	374	17		Peds Cross: ☒ South Peds: 2 South Entering: 398 South Leg Total: 803																				
Cars	386																																																		
Trucks	18																																																		
Buses	1																																																		
Totals	405																																																		
Cars	6	358	17	381																																															
Trucks	1	16	0	17																																															
Buses	0	0	0	0																																															
Totals	7	374	17																																																
Comments																																																			

Total Count Diagram

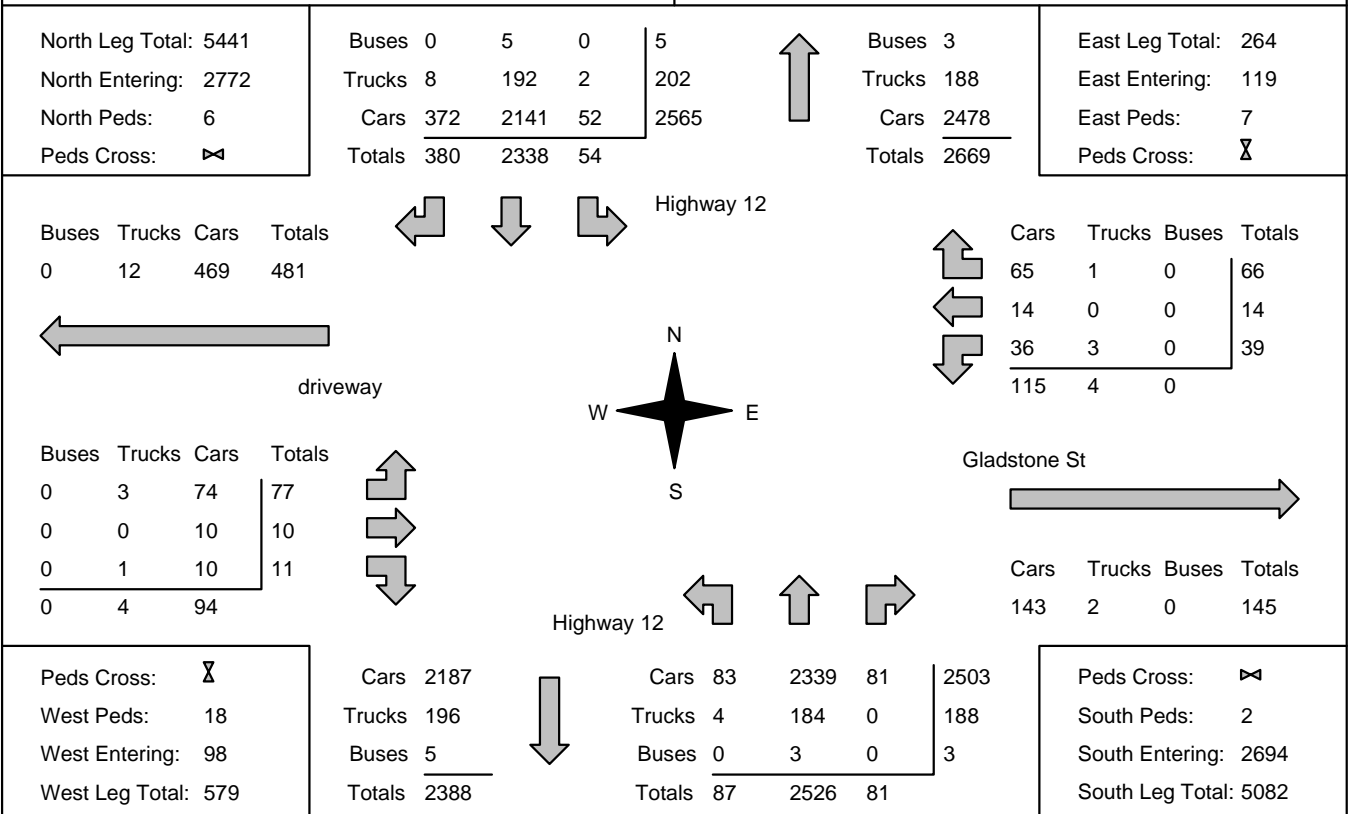
Municipality: Brechin
Site #: 2312100002
Intersection: Highway 12 & Gladstone St
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Highway 12 runs N/S



Comments

Traffic Count Summary

Intersection: Highway 12 & Gladstone St Count Date: 16-May-23 Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	231	49	280	1	610	8:00:00	24	304	2	330	0
9:00:00	1	216	55	272	0	545	9:00:00	12	259	2	273	0
10:00:00	2	257	70	329	2	643	10:00:00	18	290	6	314	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	4	242	44	290	0	628	12:00:00	5	323	10	338	0
13:00:00	13	270	47	330	0	650	13:00:00	9	297	14	320	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	7	354	49	410	1	763	16:00:00	5	334	14	353	0
17:00:00	16	399	32	447	1	834	17:00:00	11	359	17	387	2
18:00:00	11	369	34	414	1	793	18:00:00	3	360	16	379	0
Totals:	54	2338	380	2772	6	5466	S Totals:	87	2526	81	2694	2
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	2	1	0	3	0	12	8:00:00	9	0	0	9	2
9:00:00	0	0	3	3	0	19	9:00:00	13	0	3	16	0
10:00:00	0	4	2	6	1	22	10:00:00	14	2	0	16	4
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	3	1	8	12	0	24	12:00:00	11	1	0	12	1
13:00:00	7	3	13	23	1	32	13:00:00	5	1	3	9	5
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	5	1	11	17	0	24	16:00:00	3	1	3	7	1
17:00:00	11	3	13	27	2	43	17:00:00	14	2	0	16	4
18:00:00	11	1	16	28	3	41	18:00:00	8	3	2	13	1
Totals:	39	14	66	119	7	217	W Totals:	77	10	11	98	18
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	12:00		13:00	16:00	17:00	18:00			
Crossing Values:	13	13	20	15		15	10	31	23			



Count Date: 16-May-23 Site #: 2312100002

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Buses - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	31	31	14	14	0	0	4	4	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	100	69	24	10	0	0	9	5	1	1	0	0	1	1	0	0	0	0
7:45:00	0	0	162	62	31	7	0	0	12	3	1	0	0	0	1	0	0	0	1	1
8:00:00	0	0	210	48	47	16	0	0	19	7	2	1	0	0	2	1	0	0	1	0
8:15:00	0	0	261	51	66	19	0	0	27	8	2	0	0	0	2	0	0	0	1	0
8:30:00	0	0	304	43	81	15	0	0	31	4	2	0	0	0	2	0	0	0	1	0
8:45:00	1	1	343	39	96	15	0	0	36	5	2	0	0	0	2	0	0	0	1	0
9:00:00	1	0	401	58	102	6	0	0	44	8	2	0	0	0	2	0	0	0	1	0
9:15:00	1	0	441	40	118	16	0	0	54	10	2	0	0	0	2	0	0	0	3	2
9:30:00	2	1	500	59	136	18	0	0	62	8	2	0	0	0	2	0	0	0	3	0
9:45:00	2	0	556	56	156	20	0	0	70	8	4	2	0	0	2	0	0	0	3	0
10:00:00	3	1	626	70	170	14	0	0	76	6	4	0	0	0	2	0	0	0	3	0
10:15:00	3	0	626	0	170	0	0	0	76	0	4	0	0	0	2	0	0	0	3	0
11:00:00	3	0	626	0	170	0	0	0	76	0	4	0	0	0	2	0	0	0	3	0
11:15:00	4	1	678	52	180	10	0	0	80	4	5	1	0	0	2	0	0	0	3	0
11:30:00	4	0	734	56	193	13	0	0	86	6	5	0	0	0	2	0	0	0	3	0
11:45:00	6	2	774	40	202	9	0	0	96	10	5	0	0	0	2	0	0	0	3	0
12:00:00	7	1	840	66	212	10	0	0	104	8	6	1	0	0	2	0	0	0	3	0
12:15:00	10	3	888	48	225	13	0	0	114	10	7	1	0	0	2	0	0	0	3	0
12:30:00	14	4	961	73	240	15	0	0	116	2	7	0	0	0	2	0	0	0	3	0
12:45:00	15	1	1017	56	250	10	0	0	127	11	7	0	0	0	2	0	0	0	3	0
13:00:00	20	5	1077	60	257	7	0	0	137	10	8	1	0	0	2	0	0	0	3	0
13:15:00	20	0	1077	0	257	0	0	0	137	0	8	0	0	0	2	0	0	0	3	0
15:00:00	20	0	1077	0	257	0	0	0	137	0	8	0	0	0	2	0	0	0	3	0
15:15:00	24	4	1147	70	272	15	0	0	144	7	8	0	0	0	2	0	0	0	3	0
15:30:00	26	2	1246	99	287	15	0	0	151	7	8	0	0	0	2	0	0	0	3	0
15:45:00	27	1	1321	75	298	11	0	0	153	2	8	0	0	0	2	0	0	0	4	1
16:00:00	27	0	1406	85	306	8	0	0	161	8	8	0	0	0	3	1	0	0	4	0
16:15:00	32	5	1506	100	314	8	0	0	169	8	8	0	0	0	4	1	0	0	4	0
16:30:00	37	5	1603	97	318	4	1	1	172	3	8	0	0	0	4	0	0	0	4	0
16:45:00	39	2	1682	79	325	7	1	0	174	2	8	0	0	0	4	0	0	0	4	0
17:00:00	41	2	1786	104	338	13	2	1	179	5	8	0	0	0	4	0	0	0	5	1
17:15:00	44	3	1866	80	345	7	2	0	181	2	8	0	0	0	4	0	0	0	5	0
17:30:00	48	4	1966	100	353	8	2	0	185	4	8	0	0	0	5	1	0	0	6	1
17:45:00	51	3	2054	88	364	11	2	0	191	6	8	0	0	0	5	0	0	0	6	0
18:00:00	52	1	2141	87	372	8	2	0	192	1	8	0	0	0	5	0	0	0	6	0
18:15:00	52	0	2141	0	372	0	2	0	192	0	8	0	0	0	5	0	0	0	6	0
18:15:15	52	0	2141	0	372	0	2	0	192	0	8	0	0	0	5	0	0	0	6	0













Count Date: 16-May-23 Site #: 2312100002

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Buses - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	67	67	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
7:30:00	10	10	136	69	1	1	2	2	11	8	0	0	0	0	0	0	0	0	0	0
7:45:00	15	5	208	72	2	1	2	0	14	3	0	0	0	0	0	0	0	0	0	0
8:00:00	22	7	284	76	2	0	2	0	19	5	0	0	0	0	1	1	0	0	0	0
8:15:00	27	5	347	63	3	1	2	0	26	7	0	0	0	0	1	0	0	0	0	0
8:30:00	29	2	399	52	3	0	2	0	32	6	0	0	0	0	1	0	0	0	0	0
8:45:00	32	3	459	60	3	0	2	0	38	6	0	0	0	0	1	0	0	0	0	0
9:00:00	34	2	516	57	4	1	2	0	46	8	0	0	0	0	1	0	0	0	0	0
9:15:00	37	3	584	68	5	1	2	0	53	7	0	0	0	0	1	0	0	0	0	0
9:30:00	43	6	654	70	6	1	2	0	60	7	0	0	0	0	1	0	0	0	0	0
9:45:00	47	4	720	66	6	0	3	1	68	8	0	0	0	0	1	0	0	0	0	0
10:00:00	51	4	775	55	10	4	3	0	77	9	0	0	0	0	1	0	0	0	0	0
10:15:00	51	0	775	0	10	0	3	0	77	0	0	0	0	0	1	0	0	0	0	0
11:00:00	51	0	775	0	10	0	3	0	77	0	0	0	0	0	1	0	0	0	0	0
11:15:00	54	3	850	75	14	4	3	0	83	6	0	0	0	0	1	0	0	0	0	0
11:30:00	54	0	921	71	16	2	3	0	91	8	0	0	0	0	1	0	0	0	0	0
11:45:00	55	1	1002	81	19	3	3	0	96	5	0	0	0	0	1	0	0	0	0	0
12:00:00	56	1	1069	67	20	1	3	0	106	10	0	0	0	0	1	0	0	0	0	0
12:15:00	57	1	1120	51	26	6	3	0	118	12	0	0	0	0	1	0	0	0	0	0
12:30:00	59	2	1200	80	29	3	3	0	122	4	0	0	0	0	1	0	0	0	0	0
12:45:00	60	1	1262	62	32	3	3	0	126	4	0	0	0	0	1	0	0	0	0	0
13:00:00	65	5	1340	78	34	2	3	0	132	6	0	0	0	0	1	0	0	0	0	0
13:15:00	65	0	1340	0	34	0	3	0	132	0	0	0	0	0	1	0	0	0	0	0
15:00:00	65	0	1340	0	34	0	3	0	132	0	0	0	0	0	1	0	0	0	0	0
15:15:00	67	2	1414	74	39	5	3	0	136	4	0	0	0	0	1	0	0	0	0	0
15:30:00	68	1	1504	90	43	4	3	0	143	7	0	0	0	0	1	0	0	0	0	0
15:45:00	70	2	1580	76	45	2	3	0	148	5	0	0	0	0	2	1	0	0	0	0
16:00:00	70	0	1654	74	48	3	3	0	151	3	0	0	0	0	2	0	0	0	0	0
16:15:00	71	1	1745	91	55	7	3	0	154	3	0	0	0	0	2	0	0	0	0	0
16:30:00	73	2	1828	83	61	6	3	0	157	3	0	0	0	0	2	0	0	0	0	0
16:45:00	76	3	1911	83	63	2	3	0	161	4	0	0	0	0	3	1	0	0	0	0
17:00:00	80	4	1999	88	65	2	4	1	164	3	0	0	0	0	3	0	0	0	2	2
17:15:00	81	1	2097	98	69	4	4	0	167	3	0	0	0	0	3	0	0	0	2	0
17:30:00	82	1	2185	88	76	7	4	0	172	5	0	0	0	0	3	0	0	0	2	0
17:45:00	82	0	2269	84	80	4	4	0	177	5	0	0	0	0	3	0	0	0	2	0
18:00:00	83	1	2339	70	81	1	4	0	184	7	0	0	0	0	3	0	0	0	2	0
18:15:00	83	0	2339	0	81	0	4	0	184	0	0	0	0	0	3	0	0	0	2	0
18:15:15	83	0	2339	0	81	0	4	0	184	0	0	0	0	0	3	0	0	0	2	0

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00																																																	
Municipality: Brechin Site #: 2312100003 Intersection: Highway 12 & Simcoe Rd 47 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																																																		
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																																																		
North Leg Total: 550 North Entering: 275 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>36</td><td>1</td><td>37</td></tr> <tr><td>Cars</td><td>229</td><td>9</td><td>238</td></tr> <tr><td>Totals</td><td>265</td><td>10</td><td></td></tr> </table>	Buses	0	0	0	Trucks	36	1	37	Cars	229	9	238	Totals	265	10		<table style="margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>34</td></tr> <tr><td>Cars</td><td>241</td></tr> <tr><td>Totals</td><td>275</td></tr> </table>	Buses	0	Trucks	34	Cars	241	Totals	275	East Leg Total: 106 East Entering: 54 East Peds: 0 Peds Cross: ☒																									
Buses	0	0	0																																																	
Trucks	36	1	37																																																	
Cars	229	9	238																																																	
Totals	265	10																																																		
Buses	0																																																			
Trucks	34																																																			
Cars	241																																																			
Totals	275																																																			
<table style="margin: auto;"> <tr><td>Cars</td><td>234</td></tr> <tr><td>Trucks</td><td>74</td></tr> <tr><td>Buses</td><td>0</td></tr> <tr><td>Totals</td><td>308</td></tr> </table>		Cars	234	Trucks	74	Buses	0	Totals	308	<table style="margin: auto;"> <tr><td>Cars</td><td>231</td><td>1</td><td>232</td></tr> <tr><td>Trucks</td><td>33</td><td>41</td><td>74</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>264</td><td>42</td><td></td></tr> </table>	Cars	231	1	232	Trucks	33	41	74	Buses	0	0	0	Totals	264	42		<table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>10</td><td>1</td><td>0</td><td>11</td></tr> <tr><td>5</td><td>38</td><td>0</td><td>43</td></tr> <tr><td>15</td><td>39</td><td>0</td><td></td></tr> </table> <table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>10</td><td>42</td><td>0</td><td>52</td></tr> </table>	Cars	Trucks	Buses	Totals	10	1	0	11	5	38	0	43	15	39	0		Cars	Trucks	Buses	Totals	10	42	0	52	Peds Cross: ☒ South Peds: 0 South Entering: 306 South Leg Total: 614
Cars	234																																																			
Trucks	74																																																			
Buses	0																																																			
Totals	308																																																			
Cars	231	1	232																																																	
Trucks	33	41	74																																																	
Buses	0	0	0																																																	
Totals	264	42																																																		
Cars	Trucks	Buses	Totals																																																	
10	1	0	11																																																	
5	38	0	43																																																	
15	39	0																																																		
Cars	Trucks	Buses	Totals																																																	
10	42	0	52																																																	
Comments																																																				

Mid-day Peak Diagram		Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 12:00:00 To: 13:00:00																																																	
Municipality: Brechin Site #: 2312100003 Intersection: Highway 12 & Simcoe Rd 47 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																																																		
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																																																		
North Leg Total: 576 North Entering: 291 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr><td>Buses</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Trucks</td><td>32</td><td>2</td><td>34</td></tr> <tr><td>Cars</td><td>237</td><td>19</td><td>256</td></tr> <tr><td>Totals</td><td>270</td><td>21</td><td></td></tr> </table>	Buses	1	0	1	Trucks	32	2	34	Cars	237	19	256	Totals	270	21		<table style="margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>26</td></tr> <tr><td>Cars</td><td>259</td></tr> <tr><td>Totals</td><td>285</td></tr> </table>	Buses	0	Trucks	26	Cars	259	Totals	285	East Leg Total: 107 East Entering: 50 East Peds: 0 Peds Cross: ☒																									
Buses	1	0	1																																																	
Trucks	32	2	34																																																	
Cars	237	19	256																																																	
Totals	270	21																																																		
Buses	0																																																			
Trucks	26																																																			
Cars	259																																																			
Totals	285																																																			
<table style="margin: auto;"> <tr><td>Cars</td><td>246</td></tr> <tr><td>Trucks</td><td>51</td></tr> <tr><td>Buses</td><td>1</td></tr> <tr><td>Totals</td><td>298</td></tr> </table>		Cars	246	Trucks	51	Buses	1	Totals	298	<table style="margin: auto;"> <tr><td>Cars</td><td>238</td><td>7</td><td>245</td></tr> <tr><td>Trucks</td><td>25</td><td>29</td><td>54</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>263</td><td>36</td><td></td></tr> </table>	Cars	238	7	245	Trucks	25	29	54	Buses	0	0	0	Totals	263	36		<table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>21</td><td>1</td><td>0</td><td>22</td></tr> <tr><td>9</td><td>19</td><td>0</td><td>28</td></tr> <tr><td>30</td><td>20</td><td>0</td><td></td></tr> </table> <table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>26</td><td>31</td><td>0</td><td>57</td></tr> </table>	Cars	Trucks	Buses	Totals	21	1	0	22	9	19	0	28	30	20	0		Cars	Trucks	Buses	Totals	26	31	0	57	Peds Cross: ☒ South Peds: 0 South Entering: 299 South Leg Total: 597
Cars	246																																																			
Trucks	51																																																			
Buses	1																																																			
Totals	298																																																			
Cars	238	7	245																																																	
Trucks	25	29	54																																																	
Buses	0	0	0																																																	
Totals	263	36																																																		
Cars	Trucks	Buses	Totals																																																	
21	1	0	22																																																	
9	19	0	28																																																	
30	20	0																																																		
Cars	Trucks	Buses	Totals																																																	
26	31	0	57																																																	
Comments																																																				

<h2>Afternoon Peak Diagram</h2>	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:45:00 To: 17:45:00																																																																																												
Municipality: Brechin Site #: 2312100003 Intersection: Highway 12 & Simcoe Rd 47 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																																																													
** Non-Signalized Intersection **	Major Road: Highway 12 runs N/S																																																																																													
North Leg Total: 794 North Entering: 413 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr> <td style="text-align: right;">Buses</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">1</td><td style="width: 20px;"></td><td style="text-align: left;">Buses</td><td style="text-align: center;">0</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">17</td><td style="text-align: center;">1</td><td style="border-left: 1px solid black; text-align: center;">18</td><td></td><td style="text-align: left;">Trucks</td><td style="text-align: center;">18</td></tr> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">384</td><td style="text-align: center;">10</td><td style="border-left: 1px solid black; text-align: center;">394</td><td></td><td style="text-align: left;">Cars</td><td style="text-align: center;">363</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">402</td><td style="text-align: center;">11</td><td style="border-left: 1px solid black;"></td><td></td><td style="text-align: left;">Totals</td><td style="text-align: center;">381</td></tr> </table> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   </div> <div style="text-align: center;"> <p>Highway 12</p>  <p>W E</p> <p> N</p> <p> S</p> </div> <div style="text-align: center;">   </div> </div> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">12</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">13</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">12</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">12</td></tr> <tr> <td style="text-align: right;">Buses</td><td style="text-align: center;">24</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">24</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td></tr> </table> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Highway 12</p>  </div> <div style="text-align: center;">   </div> </div> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">396</td><td style="text-align: center;">5</td><td style="border-left: 1px solid black; text-align: center;">356</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">17</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">17</td></tr> <tr> <td style="text-align: right;">Buses</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">0</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">414</td><td style="text-align: center;">5</td><td style="border-left: 1px solid black;"></td></tr> </table> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Highway 12</p>  </div> <div style="text-align: center;"> <p>Simcoe Rd 47</p>  </div> </div> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">15</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">16</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">15</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">16</td></tr> <tr> <td style="text-align: right;">Buses</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">15</td><td style="text-align: center;">1</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td></tr> </table> <table style="margin: auto;"> <tr> <td style="text-align: right;">Peds Cross:</td><td style="text-align: center;">☒</td></tr> <tr> <td style="text-align: right;">South Peds:</td><td style="text-align: center;">0</td></tr> <tr> <td style="text-align: right;">South Entering:</td><td style="text-align: center;">373</td></tr> <tr> <td style="text-align: right;">South Leg Total:</td><td style="text-align: center;">787</td></tr> </table>		Buses	1	0	1		Buses	0	Trucks	17	1	18		Trucks	18	Cars	384	10	394		Cars	363	Totals	402	11			Totals	381	Cars	12	1	0	13	Trucks	12	0	0	12	Buses	24	1	0		Totals	24	1	0		Cars	396	5	356	Trucks	17	0	17	Buses	1	0	0	Totals	414	5		Cars	15	1	0	16	Trucks	15	1	0	16	Buses	0	0	0		Totals	15	1	0		Peds Cross:	☒	South Peds:	0	South Entering:	373	South Leg Total:	787
Buses	1	0	1		Buses	0																																																																																								
Trucks	17	1	18		Trucks	18																																																																																								
Cars	384	10	394		Cars	363																																																																																								
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<h3>Comments</h3>																																																																																														

Total Count Diagram

Municipality: Brechin
Site #: 2312100003
Intersection: Highway 12 & Simcoe Rd 47
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Highway 12 runs N/S

North Leg Total: 4936
 North Entering: 2447
 North Peds: 0
 Peds Cross:

Buses	6	0	6
Trucks	194	11	205
Cars	2141	95	2236
Totals	2341	106	

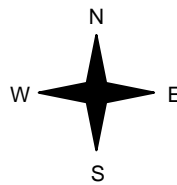


Buses	3
Trucks	191
Cars	2295
Totals	2489

East Leg Total: 589
 East Entering: 296
 East Peds: 2
 Peds Cross:



Highway 12



Cars	Trucks	Buses	Totals
95	11	0	106



Cars	Trucks	Buses	Totals
55	135	0	190
150	146	0	

Simcoe Rd 47



Highway 12



Cars	2196
Trucks	329
Buses	6
Totals	2531



Cars	2200	43	2243
Trucks	180	144	324
Buses	3	0	3
Totals	2383	187	

Cars	Trucks	Buses	Totals
138	155	0	293

Peds Cross:
 South Peds: 0
 South Entering: 2570
 South Leg Total: 5101

Comments

Traffic Count Summary

Intersection: Highway 12 & Simcoe Rd 47

Count Date: 16-May-23

Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	19	225	0	244	0	561	8:00:00	0	294	23	317	0
9:00:00	12	216	0	228	0	517	9:00:00	0	254	35	289	0
10:00:00	10	265	0	275	0	581	10:00:00	0	264	42	306	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	11	227	0	238	0	558	12:00:00	0	297	23	320	0
13:00:00	21	270	0	291	0	590	13:00:00	0	263	36	299	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	12	349	0	361	0	683	16:00:00	0	314	8	322	0
17:00:00	15	407	0	422	0	775	17:00:00	0	341	12	353	0
18:00:00	6	382	0	388	0	752	18:00:00	0	356	8	364	0
Totals:	106	2341	0	2447	0	5017	S Totals:	0	2383	187	2570	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	18	0	13	31	0	31	8:00:00	0	0	0	0	0
9:00:00	39	0	5	44	0	44	9:00:00	0	0	0	0	0
10:00:00	43	0	11	54	0	54	10:00:00	0	0	0	0	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	24	0	14	38	2	38	12:00:00	0	0	0	0	0
13:00:00	28	0	22	50	0	50	13:00:00	0	0	0	0	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	21	0	10	31	0	31	16:00:00	0	0	0	0	0
17:00:00	5	0	23	28	0	28	17:00:00	0	0	0	0	0
18:00:00	12	0	8	20	0	20	18:00:00	0	0	0	0	0
Totals:	190	0	106	296	2	296	W Totals:	0	0	0	0	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	12:00			13:00	16:00	17:00	18:00		
Crossing Values:	18	39	43	24			28	21	5	12		




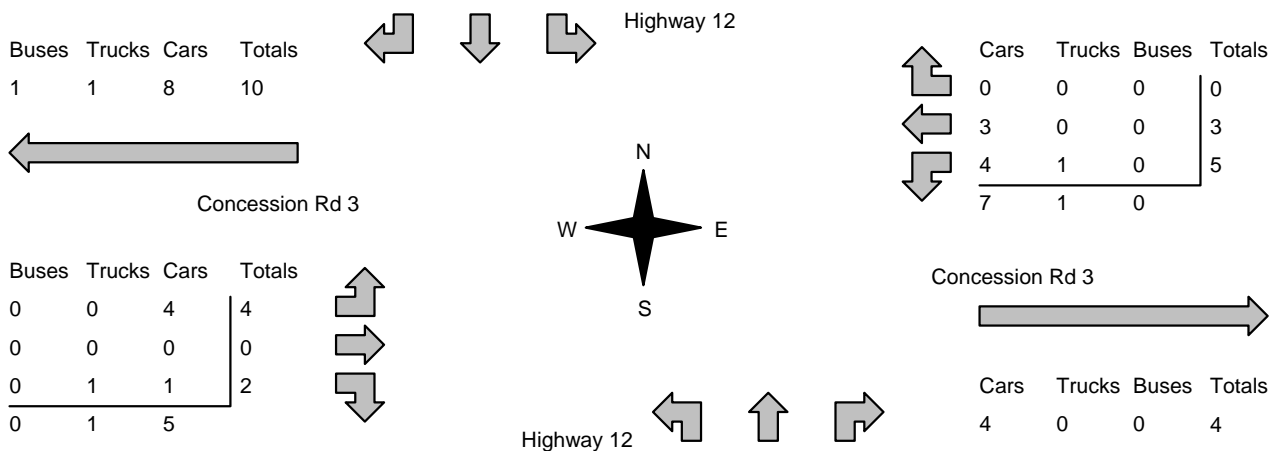

Count Date: 16-May-23 Site #: 2312100003

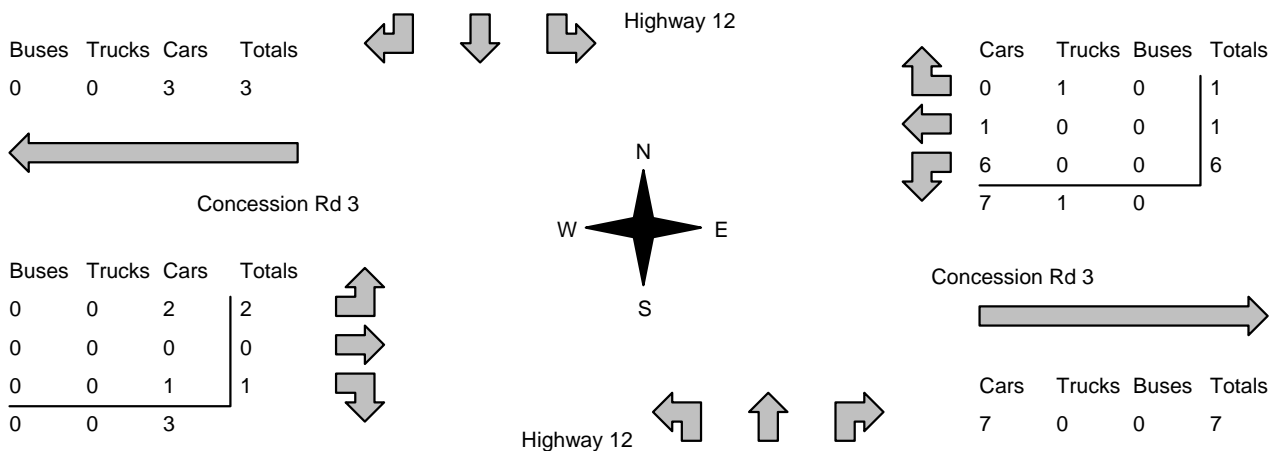
Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Buses - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	1	1	30	30	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0
7:30:00	7	6	98	68	0	0	1	0	9	6	0	0	0	0	1	1	0	0	0	0
7:45:00	13	6	156	58	0	0	1	0	13	4	0	0	0	0	1	0	0	0	0	0
8:00:00	17	4	204	48	0	0	2	1	19	6	0	0	0	0	2	1	0	0	0	0
8:15:00	20	3	256	52	0	0	2	0	25	6	0	0	0	0	2	0	0	0	0	0
8:30:00	22	2	304	48	0	0	3	1	29	4	0	0	0	0	2	0	0	0	0	0
8:45:00	25	3	343	39	0	0	4	1	33	4	0	0	0	0	2	0	0	0	0	0
9:00:00	27	2	398	55	0	0	4	0	41	8	0	0	0	0	2	0	0	0	0	0
9:15:00	29	2	438	40	0	0	4	0	54	13	0	0	0	0	2	0	0	0	0	0
9:30:00	30	1	497	59	0	0	4	0	64	10	0	0	0	0	2	0	0	0	0	0
9:45:00	33	3	559	62	0	0	4	0	72	8	0	0	0	0	2	0	0	0	0	0
10:00:00	36	3	627	68	0	0	5	1	77	5	0	0	0	0	2	0	0	0	0	0
10:15:00	36	0	627	0	0	0	5	0	77	0	0	0	0	0	2	0	0	0	0	0
11:00:00	36	0	627	0	0	0	5	0	77	0	0	0	0	0	2	0	0	0	0	0
11:15:00	42	6	681	54	0	0	5	0	81	4	0	0	0	0	2	0	0	0	0	0
11:30:00	43	1	734	53	0	0	5	0	88	7	0	0	0	0	2	0	0	0	0	0
11:45:00	43	0	770	36	0	0	5	0	98	10	0	0	0	0	2	0	0	0	0	0
12:00:00	47	4	825	55	0	0	5	0	106	8	0	0	0	0	2	0	0	0	0	0
12:15:00	50	3	876	51	0	0	5	0	114	8	0	0	0	0	2	0	0	0	0	0
12:30:00	54	4	945	69	0	0	5	0	119	5	0	0	0	0	3	1	0	0	0	0
12:45:00	60	6	1004	59	0	0	5	0	130	11	0	0	0	0	3	0	0	0	0	0
13:00:00	66	6	1062	58	0	0	7	2	138	8	0	0	0	0	3	0	0	0	0	0
13:15:00	66	0	1062	0	0	0	7	0	138	0	0	0	0	0	3	0	0	0	0	0
15:00:00	66	0	1062	0	0	0	7	0	138	0	0	0	0	0	3	0	0	0	0	0
15:15:00	68	2	1136	74	0	0	7	0	145	7	0	0	0	0	3	0	0	0	0	0
15:30:00	72	4	1232	96	0	0	7	0	152	7	0	0	0	0	3	0	0	0	0	0
15:45:00	73	1	1307	75	0	0	8	1	154	2	0	0	0	0	3	0	0	0	0	0
16:00:00	76	3	1387	80	0	0	9	1	161	7	0	0	0	0	4	1	0	0	0	0
16:15:00	78	2	1488	101	0	0	9	0	170	9	0	0	0	0	5	1	0	0	0	0
16:30:00	81	3	1586	98	0	0	9	0	174	4	0	0	0	0	5	0	0	0	0	0
16:45:00	84	3	1671	85	0	0	10	1	176	2	0	0	0	0	5	0	0	0	0	0
17:00:00	90	6	1773	102	0	0	10	0	181	5	0	0	0	0	5	0	0	0	0	0
17:15:00	93	3	1859	86	0	0	11	1	183	2	0	0	0	0	5	0	0	0	0	0
17:30:00	94	1	1959	100	0	0	11	0	187	4	0	0	0	0	6	1	0	0	0	0
17:45:00	94	0	2055	96	0	0	11	0	193	6	0	0	0	0	6	0	0	0	0	0
18:00:00	95	1	2141	86	0	0	11	0	194	1	0	0	0	0	6	0	0	0	0	0
18:15:00	95	0	2141	0	0	0	11	0	194	0	0	0	0	0	6	0	0	0	0	0
18:15:15	95	0	2141	0	0	0	11	0	194	0	0	0	0	0	6	0	0	0	0	0





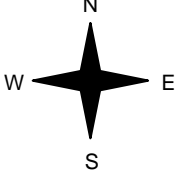

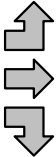




Count Date: 16-May-23 Site #: 2312100003

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Buses - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	65	65	0	0	0	0	3	3	1	1	0	0	0	0	0	0	0	0
7:30:00	0	0	134	69	1	1	0	0	12	9	5	4	0	0	0	0	0	0	0	0
7:45:00	0	0	210	76	3	2	0	0	14	2	10	5	0	0	0	0	0	0	0	0
8:00:00	0	0	276	66	4	1	0	0	17	3	19	9	0	0	1	1	0	0	0	0
8:15:00	0	0	336	60	4	0	0	0	24	7	28	9	0	0	1	0	0	0	0	0
8:30:00	0	0	384	48	4	0	0	0	29	5	35	7	0	0	1	0	0	0	0	0
8:45:00	0	0	444	60	5	1	0	0	35	6	49	14	0	0	1	0	0	0	0	0
9:00:00	0	0	503	59	5	0	0	0	44	9	53	4	0	0	1	0	0	0	0	0
9:15:00	0	0	565	62	6	1	0	0	53	9	66	13	0	0	1	0	0	0	0	0
9:30:00	0	0	638	73	6	0	0	0	61	8	78	12	0	0	1	0	0	0	0	0
9:45:00	0	0	691	53	6	0	0	0	69	8	85	7	0	0	1	0	0	0	0	0
10:00:00	0	0	734	43	6	0	0	0	77	8	94	9	0	0	1	0	0	0	0	0
10:15:00	0	0	734	0	6	0	0	0	77	0	94	0	0	0	1	0	0	0	0	0
11:00:00	0	0	734	0	6	0	0	0	77	0	94	0	0	0	1	0	0	0	0	0
11:15:00	0	0	804	70	10	4	0	0	83	6	97	3	0	0	1	0	0	0	0	0
11:30:00	0	0	873	69	10	0	0	0	91	8	102	5	0	0	1	0	0	0	0	0
11:45:00	0	0	940	67	11	1	0	0	96	5	106	4	0	0	1	0	0	0	0	0
12:00:00	0	0	1002	62	11	0	0	0	106	10	112	6	0	0	1	0	0	0	0	0
12:15:00	0	0	1051	49	17	6	0	0	118	12	115	3	0	0	1	0	0	0	0	0
12:30:00	0	0	1122	71	17	0	0	0	122	4	118	3	0	0	1	0	0	0	0	0
12:45:00	0	0	1177	55	18	1	0	0	125	3	128	10	0	0	1	0	0	0	0	0
13:00:00	0	0	1240	63	18	0	0	0	131	6	141	13	0	0	1	0	0	0	0	0
13:15:00	0	0	1240	0	18	0	0	0	131	0	141	0	0	0	1	0	0	0	0	0
15:00:00	0	0	1240	0	18	0	0	0	131	0	141	0	0	0	1	0	0	0	0	0
15:15:00	0	0	1320	80	18	0	0	0	134	3	142	1	0	0	1	0	0	0	0	0
15:30:00	0	0	1395	75	19	1	0	0	139	5	142	0	0	0	1	0	0	0	0	0
15:45:00	0	0	1461	66	20	1	0	0	143	4	142	0	0	0	2	1	0	0	0	0
16:00:00	0	0	1538	77	24	4	0	0	146	3	143	1	0	0	2	0	0	0	0	0
16:15:00	0	0	1625	87	25	1	0	0	149	3	144	1	0	0	2	0	0	0	0	0
16:30:00	0	0	1709	84	30	5	0	0	152	3	144	0	0	0	2	0	0	0	0	0
16:45:00	0	0	1780	71	34	4	0	0	156	4	144	0	0	0	3	1	0	0	0	0
17:00:00	0	0	1864	84	35	1	0	0	160	4	144	0	0	0	3	0	0	0	0	0
17:15:00	0	0	1960	96	35	0	0	0	163	3	144	0	0	0	3	0	0	0	0	0
17:30:00	0	0	2042	82	37	2	0	0	168	5	144	0	0	0	3	0	0	0	0	0
17:45:00	0	0	2131	89	39	2	0	0	173	5	144	0	0	0	3	0	0	0	0	0
18:00:00	0	0	2200	69	43	4	0	0	180	7	144	0	0	0	3	0	0	0	0	0
18:15:00	0	0	2200	0	43	0	0	0	180	0	144	0	0	0	3	0	0	0	0	0
18:15:15	0	0	2200	0	43	0	0	0	180	0	144	0	0	0	3	0	0	0	0	0

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 8:45:00 To: 9:45:00																													
Municipality: Brechin Site #: 2312100004 Intersection: Highway 12 & Concession Rd 3 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																														
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																														
North Leg Total: 603 North Entering: 290 North Peds: 0 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td><td>76</td><td>0</td><td>77</td></tr> <tr><td>Cars</td><td>5</td><td>207</td><td>1</td><td>213</td></tr> <tr><td>Totals</td><td>6</td><td>283</td><td>1</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	1	76	0	77	Cars	5	207	1	213	Totals	6	283	1			<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>72</td></tr> <tr><td>Cars</td><td>241</td></tr> <tr><td>Totals</td><td>313</td></tr> </table>	Buses	0	Trucks	72	Cars	241	Totals	313	East Leg Total: 12 East Entering: 8 East Peds: 0 Peds Cross: ☒
Buses	0	0	0	0																												
Trucks	1	76	0	77																												
Cars	5	207	1	213																												
Totals	6	283	1																													
Buses	0																															
Trucks	72																															
Cars	241																															
Totals	313																															
																																
<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>1</td><td>1</td><td>8</td><td>10</td></tr> </table>	Buses	Trucks	Cars	Totals	1	1	8	10			<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>3</td><td>0</td><td>0</td><td>3</td></tr> <tr><td>4</td><td>1</td><td>0</td><td>5</td></tr> <tr><td>7</td><td>1</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	0	0	0	3	0	0	3	4	1	0	5	7	1	0		
Buses	Trucks	Cars	Totals																													
1	1	8	10																													
Cars	Trucks	Buses	Totals																													
0	0	0	0																													
3	0	0	3																													
4	1	0	5																													
7	1	0																														
<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>4</td><td>4</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>2</td></tr> <tr><td>0</td><td>1</td><td>5</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	0	4	4	0	0	0	0	0	1	1	2	0	1	5				<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>4</td></tr> </table>	Cars	Trucks	Buses	Totals	4	0	0	4	
Buses	Trucks	Cars	Totals																													
0	0	4	4																													
0	0	0	0																													
0	1	1	2																													
0	1	5																														
Cars	Trucks	Buses	Totals																													
4	0	0	4																													
Peds Cross: ☒ West Peds: 0 West Entering: 6 West Leg Total: 16	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>212</td></tr> <tr><td>Trucks</td><td>78</td></tr> <tr><td>Buses</td><td>0</td></tr> <tr><td>Totals</td><td>290</td></tr> </table>	Cars	212	Trucks	78	Buses	0	Totals	290		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>0</td><td>237</td><td>3</td><td>240</td></tr> <tr><td>Trucks</td><td>0</td><td>72</td><td>0</td><td>72</td></tr> <tr><td>Buses</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>Totals</td><td>1</td><td>309</td><td>3</td><td></td></tr> </table>	Cars	0	237	3	240	Trucks	0	72	0	72	Buses	1	0	0	1	Totals	1	309	3		Peds Cross: ☒ South Peds: 0 South Entering: 313 South Leg Total: 603
Cars	212																															
Trucks	78																															
Buses	0																															
Totals	290																															
Cars	0	237	3	240																												
Trucks	0	72	0	72																												
Buses	1	0	0	1																												
Totals	1	309	3																													
Comments																																

<h2>Mid-day Peak Diagram</h2>	Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 12:00:00 To: 13:00:00																													
Municipality: Brechin Site #: 2312100004 Intersection: Highway 12 & Concession Rd 3 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																														
** Non-Signalized Intersection **	Major Road: Highway 12 runs N/S																														
North Leg Total: 599 North Entering: 301 North Peds: 0 Peds Cross: ☒	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td style="border-left: 1px solid black;">1</td></tr> <tr><td>Trucks</td><td>0</td><td>49</td><td>0</td><td style="border-left: 1px solid black;">49</td></tr> <tr><td>Cars</td><td>1</td><td>248</td><td>2</td><td style="border-left: 1px solid black;">251</td></tr> <tr><td>Totals</td><td>1</td><td>298</td><td>2</td><td style="border-left: 1px solid black;"></td></tr> </table>	Buses	0	1	0	1	Trucks	0	49	0	49	Cars	1	248	2	251	Totals	1	298	2		<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>55</td></tr> <tr><td>Cars</td><td>243</td></tr> <tr><td>Totals</td><td>298</td></tr> </table>	Buses	0	Trucks	55	Cars	243	Totals	298	East Leg Total: 15 East Entering: 8 East Peds: 0 Peds Cross: ☒
Buses	0	1	0	1																											
Trucks	0	49	0	49																											
Cars	1	248	2	251																											
Totals	1	298	2																												
Buses	0																														
Trucks	55																														
Cars	243																														
Totals	298																														
<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>3</td><td>3</td></tr> </table>	Buses	Trucks	Cars	Totals	0	0	3	3	 <p style="text-align: center;">Highway 12</p> <p style="text-align: center;">Concession Rd 3</p>	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>0</td><td>6</td></tr> <tr><td>7</td><td>1</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	1	0	1	1	0	0	1	6	0	0	6	7	1	0		
Buses	Trucks	Cars	Totals																												
0	0	3	3																												
Cars	Trucks	Buses	Totals																												
0	1	0	1																												
1	0	0	1																												
6	0	0	6																												
7	1	0																													
Peds Cross: ☒ West Peds: 0 West Entering: 3 West Leg Total: 6	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>255</td></tr> <tr><td>Trucks</td><td>49</td></tr> <tr><td>Buses</td><td>1</td></tr> <tr><td>Totals</td><td>305</td></tr> </table>	Cars	255	Trucks	49	Buses	1	Totals	305	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>1</td><td>241</td><td>5</td><td style="border-left: 1px solid black;">247</td></tr> <tr><td>Trucks</td><td>0</td><td>54</td><td>0</td><td style="border-left: 1px solid black;">54</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">0</td></tr> <tr><td>Totals</td><td>1</td><td>295</td><td>5</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	1	241	5	247	Trucks	0	54	0	54	Buses	0	0	0	0	Totals	1	295	5		Peds Cross: ☒ South Peds: 0 South Entering: 301 South Leg Total: 606
Cars	255																														
Trucks	49																														
Buses	1																														
Totals	305																														
Cars	1	241	5	247																											
Trucks	0	54	0	54																											
Buses	0	0	0	0																											
Totals	1	295	5																												
<h3>Comments</h3>																															

<h2 style="margin: 0;">Afternoon Peak Diagram</h2>	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:00:00 To: 17:00:00																													
Municipality: Brechin Site #: 2312100004 Intersection: Highway 12 & Concession Rd 3 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																														
** Non-Signalized Intersection **		Major Road: Highway 12 runs N/S																													
North Leg Total: 766 North Entering: 410 North Peds: 0 Peds Cross: \boxtimes	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>19</td><td>1</td><td>20</td></tr> <tr><td>Cars</td><td>9</td><td>380</td><td>0</td><td>389</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>9</td><td>400</td><td>1</td><td></td></tr> </table>	Buses	0	1	0	1	Trucks	0	19	1	20	Cars	9	380	0	389	Totals	9	400	1		 <table style="margin: auto;"> <tr><td>Buses</td><td>1</td></tr> <tr><td>Trucks</td><td>14</td></tr> <tr><td>Cars</td><td>341</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>356</td></tr> </table>	Buses	1	Trucks	14	Cars	341	Totals	356	East Leg Total: 14 East Entering: 9 East Peds: 0 Peds Cross: \boxtimes
Buses	0	1	0	1																											
Trucks	0	19	1	20																											
Cars	9	380	0	389																											
Totals	9	400	1																												
Buses	1																														
Trucks	14																														
Cars	341																														
Totals	356																														
<table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>1</td><td>13</td><td>14</td></tr> </table>	Buses	Trucks	Cars	Totals	0	1	13	14	 <p style="text-align: center;">Highway 12</p>	 <table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>2</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>6</td></tr> <tr style="border-top: 1px solid black;"><td>6</td><td>3</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	1	0	1	1	1	0	2	5	1	0	6	6	3	0		
Buses	Trucks	Cars	Totals																												
0	1	13	14																												
Cars	Trucks	Buses	Totals																												
0	1	0	1																												
1	1	0	2																												
5	1	0	6																												
6	3	0																													
 <p style="text-align: center;">Concession Rd 3</p>		 <p style="text-align: center;">Concession Rd 3</p>																													
<table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>1</td><td>6</td><td>7</td></tr> <tr><td>0</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>2</td></tr> <tr style="border-top: 1px solid black;"><td>1</td><td>1</td><td>9</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	1	6	7	0	0	2	2	1	0	1	2	1	1	9			 <p style="text-align: center;">Highway 12</p>	<table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>4</td><td>1</td><td>0</td><td>5</td></tr> </table>	Cars	Trucks	Buses	Totals	4	1	0	5
Buses	Trucks	Cars	Totals																												
0	1	6	7																												
0	0	2	2																												
1	0	1	2																												
1	1	9																													
Cars	Trucks	Buses	Totals																												
4	1	0	5																												
Peds Cross: \boxtimes West Peds: 0 West Entering: 11 West Leg Total: 25	 <table style="margin: auto;"> <tr><td>Cars</td><td>386</td></tr> <tr><td>Trucks</td><td>20</td></tr> <tr><td>Buses</td><td>2</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>408</td></tr> </table>	Cars	386	Trucks	20	Buses	2	Totals	408	<table style="margin: auto;"> <tr><td>Cars</td><td>3</td><td>335</td><td>2</td><td>340</td></tr> <tr><td>Trucks</td><td>0</td><td>12</td><td>0</td><td>12</td></tr> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>3</td><td>348</td><td>2</td><td></td></tr> </table>	Cars	3	335	2	340	Trucks	0	12	0	12	Buses	0	1	0	1	Totals	3	348	2		Peds Cross: \boxtimes South Peds: 0 South Entering: 353 South Leg Total: 761
Cars	386																														
Trucks	20																														
Buses	2																														
Totals	408																														
Cars	3	335	2	340																											
Trucks	0	12	0	12																											
Buses	0	1	0	1																											
Totals	3	348	2																												
<h3 style="margin: 0;">Comments</h3>																															

Total Count Diagram

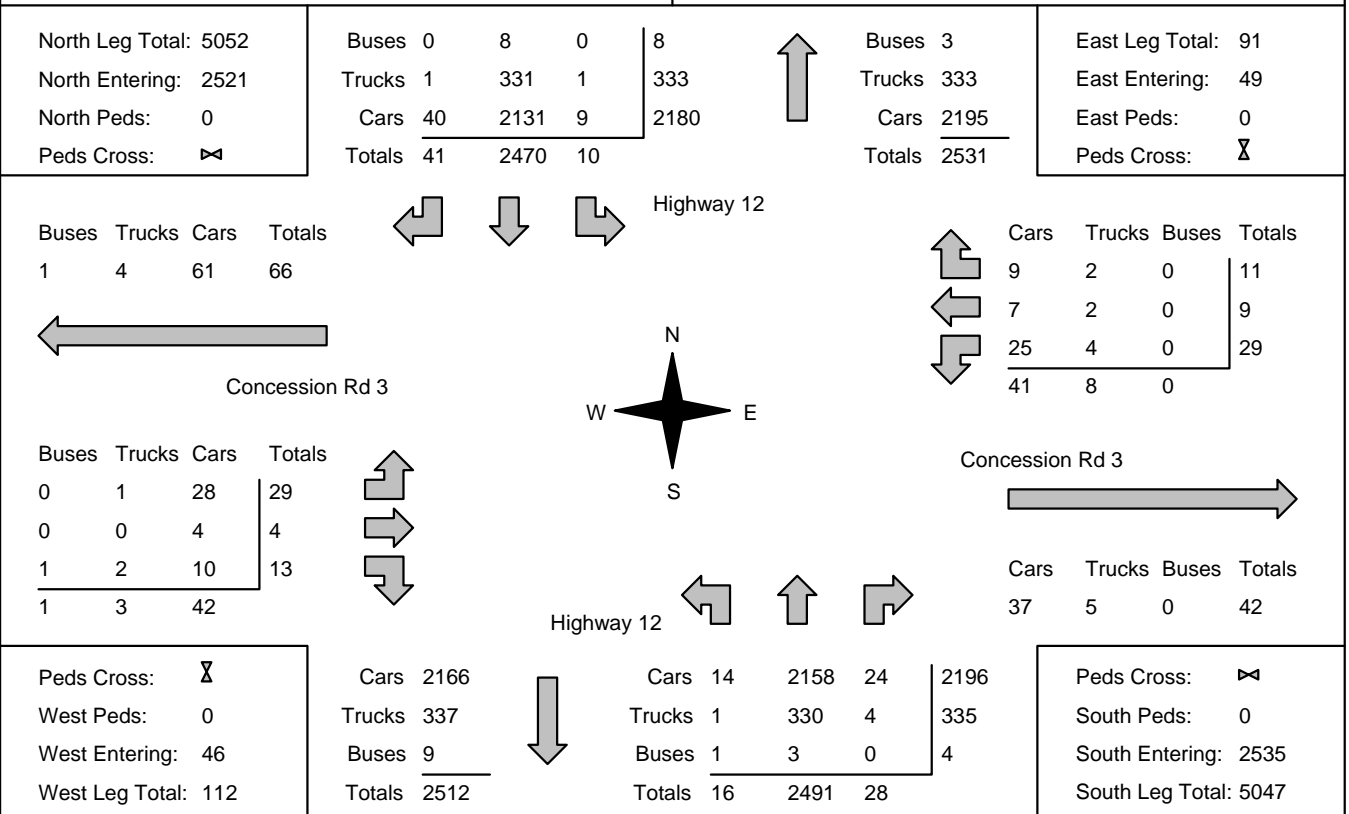
Municipality: Brechin
Site #: 2312100004
Intersection: Highway 12 & Concession Rd 3
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Highway 12 runs N/S



Comments

Traffic Count Summary

Intersection: Highway 12 & Concession Rd 3 Count Date: 16-May-23 Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	0	244	3	247	0	565	8:00:00	0	313	5	318	0	
9:00:00	2	254	3	259	0	541	9:00:00	2	276	4	282	0	
10:00:00	1	290	9	300	0	595	10:00:00	2	291	2	295	0	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	2	250	2	254	0	565	12:00:00	1	306	4	311	0	
13:00:00	2	298	1	301	0	602	13:00:00	1	295	5	301	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	2	356	5	363	0	685	16:00:00	3	317	2	322	0	
17:00:00	1	400	9	410	0	763	17:00:00	3	348	2	353	0	
18:00:00	0	378	9	387	0	740	18:00:00	4	345	4	353	0	
Totals:						5056	S Totals:						0
East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	3	0	2	5	0	10	8:00:00	3	1	1	5	0	
9:00:00	1	3	3	7	0	10	9:00:00	3	0	0	3	0	
10:00:00	5	2	2	9	0	16	10:00:00	5	0	2	7	0	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	3	1	1	5	0	11	12:00:00	5	0	1	6	0	
13:00:00	6	1	1	8	0	11	13:00:00	2	0	1	3	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	0	1	1	0	5	16:00:00	2	1	1	4	0	
17:00:00	6	2	1	9	0	20	17:00:00	7	2	2	11	0	
18:00:00	5	0	0	5	0	12	18:00:00	2	0	5	7	0	
Totals:						95	W Totals:						0
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	8:00	9:00	10:00	12:00				13:00	16:00	17:00	18:00		
Crossing Values:	7	7	12	9				9	3	15	7		



Count Date: 16-May-23 Site #: 2312100004

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Buses - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	30	30	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	102	72	0	0	0	0	16	10	0	0	0	0	1	1	0	0	0	0
7:45:00	0	0	160	58	2	2	0	0	24	8	0	0	0	0	1	0	0	0	0	0
8:00:00	0	0	209	49	3	1	0	0	33	9	0	0	0	0	2	1	0	0	0	0
8:15:00	0	0	261	52	5	2	0	0	43	10	0	0	0	0	2	0	0	0	0	0
8:30:00	0	0	313	52	5	0	0	0	52	9	0	0	0	0	2	0	0	0	0	0
8:45:00	1	1	351	38	6	1	0	0	68	16	0	0	0	0	2	0	0	0	0	0
9:00:00	2	1	409	58	6	0	0	0	87	19	0	0	0	0	2	0	0	0	0	0
9:15:00	2	0	444	35	8	2	0	0	109	22	1	1	0	0	2	0	0	0	0	0
9:30:00	2	0	500	56	9	1	0	0	126	17	1	0	0	0	2	0	0	0	0	0
9:45:00	2	0	558	58	11	2	0	0	144	18	1	0	0	0	2	0	0	0	0	0
10:00:00	3	1	622	64	14	3	0	0	164	20	1	0	0	0	2	0	0	0	0	0
10:15:00	3	0	622	0	14	0	0	0	164	0	1	0	0	0	2	0	0	0	0	0
11:00:00	3	0	622	0	14	0	0	0	164	0	1	0	0	0	2	0	0	0	0	0
11:15:00	3	0	677	55	14	0	0	0	176	12	1	0	0	0	2	0	0	0	0	0
11:30:00	4	1	730	53	15	1	0	0	188	12	1	0	0	0	2	0	0	0	0	0
11:45:00	4	0	770	40	16	1	0	0	200	12	1	0	0	0	2	0	0	0	0	0
12:00:00	5	1	822	52	16	0	0	0	213	13	1	0	0	0	3	1	0	0	0	0
12:15:00	5	0	875	53	16	0	0	0	228	15	1	0	0	0	3	0	0	0	0	0
12:30:00	6	1	950	75	16	0	0	0	238	10	1	0	0	0	3	0	0	0	0	0
12:45:00	6	0	1008	58	17	1	0	0	252	14	1	0	0	0	4	1	0	0	0	0
13:00:00	7	1	1070	62	17	0	0	0	262	10	1	0	0	0	4	0	0	0	0	0
13:15:00	7	0	1070	0	17	0	0	0	262	0	1	0	0	0	4	0	0	0	0	0
15:00:00	7	0	1070	0	17	0	0	0	262	0	1	0	0	0	4	0	0	0	0	0
15:15:00	9	2	1139	69	18	1	0	0	274	12	1	0	0	0	4	0	0	0	0	0
15:30:00	9	0	1226	87	21	3	0	0	284	10	1	0	0	0	5	1	0	0	0	0
15:45:00	9	0	1307	81	21	0	0	0	289	5	1	0	0	0	5	0	0	0	0	0
16:00:00	9	0	1389	82	22	1	0	0	297	8	1	0	0	0	6	1	0	0	0	0
16:15:00	9	0	1483	94	23	1	1	1	304	7	1	0	0	0	7	1	0	0	0	0
16:30:00	9	0	1587	104	25	2	1	0	309	5	1	0	0	0	7	0	0	0	0	0
16:45:00	9	0	1676	89	28	3	1	0	311	2	1	0	0	0	7	0	0	0	0	0
17:00:00	9	0	1769	93	31	3	1	0	316	5	1	0	0	0	7	0	0	0	0	0
17:15:00	9	0	1854	85	35	4	1	0	319	3	1	0	0	0	7	0	0	0	0	0
17:30:00	9	0	1951	97	37	2	1	0	323	4	1	0	0	0	8	1	0	0	0	0
17:45:00	9	0	2041	90	38	1	1	0	329	6	1	0	0	0	8	0	0	0	0	0
18:00:00	9	0	2131	90	40	2	1	0	331	2	1	0	0	0	8	0	0	0	0	0
18:15:00	9	0	2131	0	40	0	1	0	331	0	1	0	0	0	8	0	0	0	0	0
18:15:15	9	0	2131	0	40	0	1	0	331	0	1	0	0	0	8	0	0	0	0	0



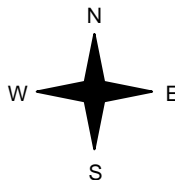
Count Date: 16-May-23 Site #: 2312100004


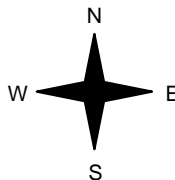



Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Buses - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	66	66	1	1	0	0	10	10	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	131	65	4	3	0	0	20	10	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	206	75	5	1	0	0	28	8	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	270	64	5	0	0	0	42	14	0	0	0	0	1	1	0	0	0	0
8:15:00	1	1	327	57	6	1	0	0	58	16	0	0	0	0	1	0	0	0	0	0
8:30:00	1	0	372	45	8	2	1	1	72	14	0	0	0	0	1	0	0	0	0	0
8:45:00	1	0	423	51	8	0	1	0	89	17	0	0	0	0	1	0	0	0	0	0
9:00:00	1	0	484	61	9	1	1	0	104	15	0	0	0	0	1	0	0	0	0	0
9:15:00	1	0	542	58	9	0	1	0	126	22	0	0	1	1	1	0	0	0	0	0
9:30:00	1	0	611	69	10	1	1	0	146	20	0	0	1	0	1	0	0	0	0	0
9:45:00	1	0	660	49	11	1	1	0	161	15	0	0	1	0	1	0	0	0	0	0
10:00:00	2	1	700	40	11	0	1	0	179	18	0	0	1	0	1	0	0	0	0	0
10:15:00	2	0	700	0	11	0	1	0	179	0	0	0	1	0	1	0	0	0	0	0
11:00:00	2	0	700	0	11	0	1	0	179	0	0	0	1	0	1	0	0	0	0	0
11:15:00	2	0	768	68	12	1	1	0	189	10	0	0	1	0	1	0	0	0	0	0
11:30:00	3	1	835	67	12	0	1	0	201	12	0	0	1	0	1	0	0	0	0	0
11:45:00	3	0	901	66	15	3	1	0	210	9	0	0	1	0	1	0	0	0	0	0
12:00:00	3	0	959	58	15	0	1	0	226	16	0	0	1	0	1	0	0	0	0	0
12:15:00	3	0	1018	59	15	0	1	0	242	16	0	0	1	0	1	0	0	0	0	0
12:30:00	4	1	1082	64	17	2	1	0	250	8	0	0	1	0	1	0	0	0	0	0
12:45:00	4	0	1143	61	17	0	1	0	263	13	0	0	1	0	1	0	0	0	0	0
13:00:00	4	0	1200	57	20	3	1	0	280	17	0	0	1	0	1	0	0	0	0	0
13:15:00	4	0	1200	0	20	0	1	0	280	0	0	0	1	0	1	0	0	0	0	0
15:00:00	4	0	1200	0	20	0	1	0	280	0	0	0	1	0	1	0	0	0	0	0
15:15:00	4	0	1286	86	20	0	1	0	286	6	0	0	1	0	1	0	0	0	0	0
15:30:00	6	2	1356	70	20	0	1	0	291	5	0	0	1	0	1	0	0	0	0	0
15:45:00	7	1	1420	64	20	0	1	0	295	4	1	1	1	0	2	1	0	0	0	0
16:00:00	7	0	1497	77	21	1	1	0	299	4	1	0	1	0	2	0	0	0	0	0
16:15:00	7	0	1586	89	22	1	1	0	301	2	1	0	1	0	2	0	0	0	0	0
16:30:00	7	0	1668	82	23	1	1	0	304	3	1	0	1	0	2	0	0	0	0	0
16:45:00	8	1	1746	78	23	0	1	0	307	3	1	0	1	0	3	1	0	0	0	0
17:00:00	10	2	1832	86	23	0	1	0	311	4	1	0	1	0	3	0	0	0	0	0
17:15:00	11	1	1923	91	24	1	1	0	314	3	1	0	1	0	3	0	0	0	0	0
17:30:00	13	2	2001	78	24	0	1	0	318	4	2	1	1	0	3	0	0	0	0	0
17:45:00	13	0	2086	85	24	0	1	0	323	5	4	2	1	0	3	0	0	0	0	0
18:00:00	14	1	2158	72	24	0	1	0	330	7	4	0	1	0	3	0	0	0	0	0
18:15:00	14	0	2158	0	24	0	1	0	330	0	4	0	1	0	3	0	0	0	0	0
18:15:15	14	0	2158	0	24	0	1	0	330	0	4	0	1	0	3	0	0	0	0	0



Count Date: 16-May-23 Site #: 2312100004

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Buses - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	3	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	6	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	6	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	7	1	1	0	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
9:30:00	8	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
9:45:00	10	2	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
10:00:00	11	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
10:15:00	11	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
11:00:00	11	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
11:15:00	12	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
11:30:00	14	2	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
11:45:00	14	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00:00	16	2	1	0	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
12:15:00	16	0	1	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30:00	18	2	1	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
12:45:00	18	0	1	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
13:00:00	18	0	1	0	3	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
13:15:00	18	0	1	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
15:00:00	18	0	1	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
15:15:00	18	0	1	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
15:30:00	18	0	1	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
15:45:00	18	0	2	1	4	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
16:00:00	20	2	2	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
16:15:00	22	2	3	1	4	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0
16:30:00	24	2	3	0	4	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
16:45:00	24	0	4	1	4	0	1	1	0	0	2	0	0	0	0	1	0	0	0	0
17:00:00	26	2	4	0	5	1	1	0	0	0	2	0	0	0	0	1	0	0	0	0
17:15:00	26	0	4	0	7	2	1	0	0	0	2	0	0	0	0	1	0	0	0	0
17:30:00	26	0	4	0	9	2	1	0	0	0	2	0	0	0	0	1	0	0	0	0
17:45:00	27	1	4	0	10	1	1	0	0	0	2	0	0	0	0	1	0	0	0	0
18:00:00	28	1	4	0	10	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0
18:15:00	28	0	4	0	10	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0
18:15:15	28	0	4	0	10	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0

<h2>Morning Peak Diagram</h2>	Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00																								
Municipality: Brechin Site #: 2312100005 Intersection: Ramara Rd 47 & Simcoe St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																									
** Non-Signalized Intersection **	Major Road: Ramara Rd 47 runs W/E																									
		East Leg Total: 197 East Entering: 75 East Peds: 0 Peds Cross: 8																								
<table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Buses</th> <th>Trucks</th> <th>Cars</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">2</td> <td style="text-align: center;">64</td> <td style="text-align: center;">66</td> </tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;"> <p>Simcoe St</p> </div>	Buses	Trucks	Cars	Totals	0	2	64	66		<table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Cars</th> <th>Trucks</th> <th>Buses</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">60</td> <td style="text-align: center;">2</td> <td style="text-align: center;">0</td> <td style="text-align: center;">62</td> </tr> <tr> <td style="text-align: center;">13</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">13</td> </tr> <tr> <td style="text-align: center;">73</td> <td style="text-align: center;">2</td> <td style="text-align: center;">0</td> <td></td> </tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;"> <p>Ramara Rd 47</p> </div>	Cars	Trucks	Buses	Totals	60	2	0	62	13	0	0	13	73	2	0	
Buses	Trucks	Cars	Totals																							
0	2	64	66																							
Cars	Trucks	Buses	Totals																							
60	2	0	62																							
13	0	0	13																							
73	2	0																								
<table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Buses</th> <th>Trucks</th> <th>Cars</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">2</td> <td style="text-align: center;">93</td> <td style="text-align: center;">95</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">5</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">2</td> <td style="text-align: center;">98</td> <td></td> </tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;"> </div>	Buses	Trucks	Cars	Totals	0	2	93	95	0	0	5	5	0	2	98		<table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Cars</th> <th>Trucks</th> <th>Buses</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">117</td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> <td style="text-align: center;">122</td> </tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;"> <p>Ramara Rd 47</p> </div>	Cars	Trucks	Buses	Totals	117	3	2	122	
Buses	Trucks	Cars	Totals																							
0	2	93	95																							
0	0	5	5																							
0	2	98																								
Cars	Trucks	Buses	Totals																							
117	3	2	122																							
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<h3>Comments</h3>																										

Total Count Diagram

Municipality: Brechin
Site #: 2312100005
Intersection: Ramara Rd 47 & Simcoe St
TFR File #: 1
Count date: 16-May-23

Weather conditions:

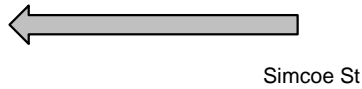
Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

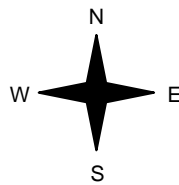
Major Road: Ramara Rd 47 runs W/E

East Leg Total: 1548
 East Entering: 742
 East Peds: 2
 Peds Cross: 8

Buses	Trucks	Cars	Totals
7	27	670	704



Buses	Trucks	Cars	Totals
4	20	673	697
1	1	38	40
5	21	711	



Ramara Rd 47



Cars	114
Trucks	5
Buses	2
Totals	121

Cars	42	100	142
Trucks	0	4	4
Buses	1	5	6
Totals	43	109	

Cars	Trucks	Buses	Totals
628	27	6	661
76	4	1	81
704	31	7	



Ramara Rd 47



Cars	Trucks	Buses	Totals
773	24	9	806

Peds Cross: 8
 West Peds: 0
 West Entering: 737
 West Leg Total: 1441

Peds Cross: 8
 South Peds: 9
 South Entering: 152
 South Leg Total: 273

Comments

Traffic Count Summary

Intersection: Ramara Rd 47 & Simcoe St Count Date: 16-May-23 Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	13	8:00:00	3	0	10	13	0
9:00:00	0	0	0	0	0	16	9:00:00	4	0	12	16	2
10:00:00	0	0	0	0	0	31	10:00:00	4	0	27	31	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	0	0	0	0	16	12:00:00	5	0	11	16	3
13:00:00	0	0	0	0	0	29	13:00:00	15	0	14	29	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	17	16:00:00	5	0	12	17	0
17:00:00	0	0	0	0	0	17	17:00:00	2	0	15	17	1
18:00:00	0	0	0	0	0	13	18:00:00	5	0	8	13	1
Totals:	0	0	0	0	0	152	S Totals:	43	0	109	152	9
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	9	33	0	42	0	98	8:00:00	0	54	2	56	0
9:00:00	7	45	0	52	2	152	9:00:00	0	97	3	100	0
10:00:00	13	62	0	75	0	175	10:00:00	0	95	5	100	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	10	92	0	102	0	203	12:00:00	0	96	5	101	0
13:00:00	8	132	0	140	0	254	13:00:00	0	105	9	114	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	12	120	0	132	0	241	16:00:00	0	104	5	109	0
17:00:00	16	81	0	97	0	191	17:00:00	0	89	5	94	0
18:00:00	6	96	0	102	0	165	18:00:00	0	57	6	63	0
Totals:	81	661	0	742	2	1479	W Totals:	0	697	40	737	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	12:00			13:00	16:00	17:00	18:00		
Crossing Values:	3	6	4	5			15	5	2	5		

Count Date: 16-May-23 Site #: 2312100005

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Buses - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	4	4	5	5	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
7:30:00	4	0	10	5	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0
7:45:00	7	3	16	6	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0
8:00:00	9	2	27	11	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	0
8:15:00	12	3	39	12	0	0	2	2	7	1	0	0	0	0	0	0	0	0	0	0
8:30:00	12	0	46	7	0	0	2	0	8	1	0	0	0	0	0	0	0	0	0	0
8:45:00	12	0	52	6	0	0	2	0	8	0	0	0	0	0	0	0	0	0	2	2
9:00:00	14	2	67	15	0	0	2	0	10	2	0	0	0	0	1	1	0	0	2	0
9:15:00	16	2	80	13	0	0	2	0	10	0	0	0	0	0	1	0	0	0	2	0
9:30:00	20	4	96	16	0	0	2	0	11	1	0	0	0	0	1	0	0	0	2	0
9:45:00	25	5	103	7	0	0	2	0	12	1	0	0	0	0	1	0	0	0	2	0
10:00:00	27	2	127	24	0	0	2	0	12	0	0	0	0	0	1	0	0	0	2	0
10:15:00	27	0	127	0	0	0	2	0	12	0	0	0	0	0	1	0	0	0	2	0
11:00:00	27	0	127	0	0	0	2	0	12	0	0	0	0	0	1	0	0	0	2	0
11:15:00	27	0	145	18	0	0	2	0	13	1	0	0	0	0	1	0	0	0	2	0
11:30:00	30	3	171	26	0	0	3	1	16	3	0	0	0	0	2	1	0	0	2	0
11:45:00	32	2	191	20	0	0	3	0	16	0	0	0	0	0	2	0	0	0	2	0
12:00:00	36	4	213	22	0	0	3	0	17	1	0	0	0	0	2	0	0	0	2	0
12:15:00	39	3	239	26	0	0	3	0	18	1	0	0	0	0	2	0	0	0	2	0
12:30:00	40	1	270	31	0	0	3	0	19	1	0	0	0	0	2	0	0	0	2	0
12:45:00	40	0	303	33	0	0	4	1	20	1	0	0	0	0	2	0	0	0	2	0
13:00:00	43	3	341	38	0	0	4	0	21	1	0	0	0	0	2	0	0	0	2	0
13:15:00	43	0	341	0	0	0	4	0	21	0	0	0	0	0	2	0	0	0	2	0
15:00:00	43	0	341	0	0	0	4	0	21	0	0	0	0	0	2	0	0	0	2	0
15:15:00	45	2	372	31	0	0	4	0	21	0	0	0	0	0	3	1	0	0	2	0
15:30:00	48	3	402	30	0	0	4	0	23	2	0	0	0	0	3	0	0	0	2	0
15:45:00	51	3	432	30	0	0	4	0	23	0	0	0	0	0	3	0	0	0	2	0
16:00:00	55	4	455	23	0	0	4	0	25	2	0	0	0	0	4	1	0	0	2	0
16:15:00	59	4	478	23	0	0	4	0	26	1	0	0	1	1	5	1	0	0	2	0
16:30:00	62	3	497	19	0	0	4	0	26	0	0	0	1	0	6	1	0	0	2	0
16:45:00	65	3	512	15	0	0	4	0	27	1	0	0	1	0	6	0	0	0	2	0
17:00:00	70	5	532	20	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
17:15:00	71	1	561	29	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
17:30:00	74	3	588	27	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
17:45:00	74	0	612	24	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
18:00:00	76	2	628	16	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
18:15:00	76	0	628	0	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0
18:15:15	76	0	628	0	0	0	4	0	27	0	0	0	1	0	6	0	0	0	2	0

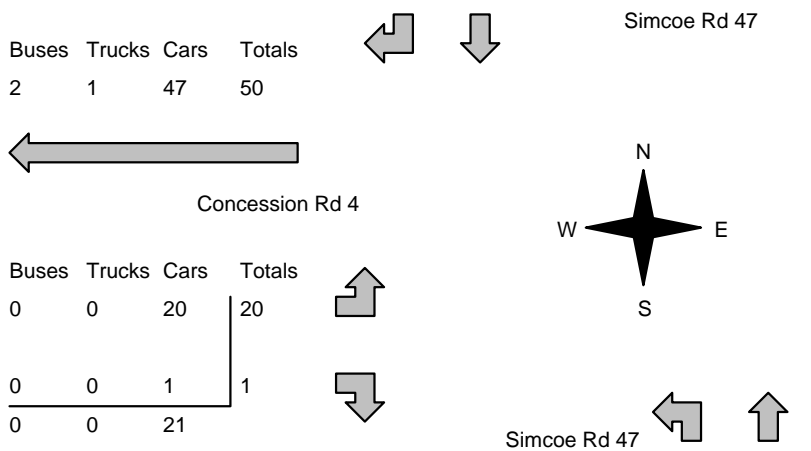
Count Date: 16-May-23 Site #: 2312100005

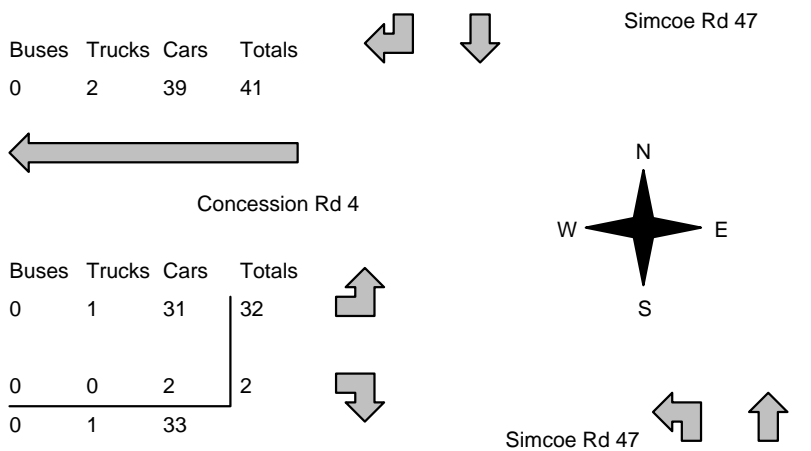
Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Buses - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	2	1	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	2	0	0	0	9	5	0	0	0	0	1	1	1	1	0	0	0	0	0	0
8:15:00	2	0	0	0	12	3	0	0	0	0	1	0	1	0	0	0	0	0	0	0
8:30:00	2	0	0	0	15	3	0	0	0	0	1	0	1	0	0	0	0	0	1	1
8:45:00	5	3	0	0	16	1	0	0	0	0	2	1	1	0	0	0	0	0	2	1
9:00:00	6	1	0	0	20	4	0	0	0	0	2	0	1	0	0	0	0	0	2	0
9:15:00	8	2	0	0	28	8	0	0	0	0	2	0	1	0	0	0	1	1	2	0
9:30:00	10	2	0	0	32	4	0	0	0	0	2	0	1	0	0	0	2	1	2	0
9:45:00	10	0	0	0	39	7	0	0	0	0	3	1	1	0	0	0	2	0	2	0
10:00:00	10	0	0	0	44	5	0	0	0	0	3	0	1	0	0	0	2	0	2	0
10:15:00	10	0	0	0	44	0	0	0	0	0	3	0	1	0	0	0	2	0	2	0
11:00:00	10	0	0	0	44	0	0	0	0	0	3	0	1	0	0	0	2	0	2	0
11:15:00	12	2	0	0	48	4	0	0	0	0	3	0	1	0	0	0	2	0	4	2
11:30:00	12	0	0	0	51	3	0	0	0	0	3	0	1	0	0	0	2	0	4	0
11:45:00	14	2	0	0	53	2	0	0	0	0	3	0	1	0	0	0	2	0	5	1
12:00:00	15	1	0	0	55	2	0	0	0	0	3	0	1	0	0	0	2	0	5	0
12:15:00	19	4	0	0	56	1	0	0	0	0	3	0	1	0	0	0	2	0	6	1
12:30:00	21	2	0	0	63	7	0	0	0	0	3	0	1	0	0	0	2	0	6	0
12:45:00	24	3	0	0	64	1	0	0	0	0	3	0	1	0	0	0	2	0	6	0
13:00:00	30	6	0	0	69	5	0	0	0	0	3	0	1	0	0	0	2	0	7	1
13:15:00	30	0	0	0	69	0	0	0	0	0	3	0	1	0	0	0	2	0	7	0
15:00:00	30	0	0	0	69	0	0	0	0	0	3	0	1	0	0	0	2	0	7	0
15:15:00	33	3	0	0	72	3	0	0	0	0	3	0	1	0	0	0	2	0	7	0
15:30:00	33	0	0	0	75	3	0	0	0	0	3	0	1	0	0	0	2	0	7	0
15:45:00	33	0	0	0	76	1	0	0	0	0	3	0	1	0	0	0	2	0	7	0
16:00:00	35	2	0	0	80	4	0	0	0	0	3	0	1	0	0	0	3	1	7	0
16:15:00	35	0	0	0	85	5	0	0	0	0	4	1	1	0	0	0	3	0	8	1
16:30:00	36	1	0	0	87	2	0	0	0	0	4	0	1	0	0	0	3	0	8	0
16:45:00	36	0	0	0	91	4	0	0	0	0	4	0	1	0	0	0	4	1	8	0
17:00:00	37	1	0	0	93	2	0	0	0	0	4	0	1	0	0	0	4	0	8	0
17:15:00	38	1	0	0	95	2	0	0	0	0	4	0	1	0	0	0	5	1	8	0
17:30:00	40	2	0	0	96	1	0	0	0	0	4	0	1	0	0	0	5	0	8	0
17:45:00	41	1	0	0	98	2	0	0	0	0	4	0	1	0	0	0	5	0	9	1
18:00:00	42	1	0	0	100	2	0	0	0	0	4	0	1	0	0	0	5	0	9	0
18:15:00	42	0	0	0	100	0	0	0	0	0	4	0	1	0	0	0	5	0	9	0
18:15:15	42	0	0	0	100	0	0	0	0	0	4	0	1	0	0	0	5	0	9	0

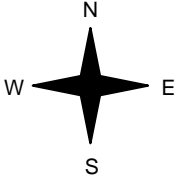


Count Date: 16-May-23 Site #: 2312100005

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Buses - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	8	8	2	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:30:00	0	0	24	16	2	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
7:45:00	0	0	41	17	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8:00:00	0	0	52	11	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8:15:00	0	0	78	26	2	0	0	0	1	1	0	0	0	0	3	1	0	0	0	0
8:30:00	0	0	103	25	3	1	0	0	2	1	0	0	0	0	3	0	0	0	0	0
8:45:00	0	0	129	26	4	1	0	0	2	0	0	0	0	0	3	0	0	0	0	0
9:00:00	0	0	145	16	5	1	0	0	3	1	0	0	0	0	3	0	0	0	0	0
9:15:00	0	0	163	18	6	1	0	0	3	0	0	0	0	0	3	0	0	0	0	0
9:30:00	0	0	198	35	8	2	0	0	3	0	0	0	0	0	3	0	0	0	0	0
9:45:00	0	0	223	25	10	2	0	0	5	2	0	0	0	0	3	0	0	0	0	0
10:00:00	0	0	238	15	10	0	0	0	5	0	0	0	0	0	3	0	0	0	0	0
10:15:00	0	0	238	0	10	0	0	0	5	0	0	0	0	0	3	0	0	0	0	0
11:00:00	0	0	238	0	10	0	0	0	5	0	0	0	0	0	3	0	0	0	0	0
11:15:00	0	0	266	28	12	2	0	0	8	3	0	0	0	0	3	0	0	0	0	0
11:30:00	0	0	283	17	12	0	0	0	8	0	0	0	0	0	3	0	0	0	0	0
11:45:00	0	0	300	17	14	2	0	0	8	0	0	0	0	0	3	0	0	0	0	0
12:00:00	0	0	329	29	15	1	0	0	10	2	0	0	0	0	3	0	0	0	0	0
12:15:00	0	0	353	24	16	1	0	0	13	3	0	0	0	0	3	0	0	0	0	0
12:30:00	0	0	381	28	19	3	0	0	14	1	0	0	0	0	3	0	0	0	0	0
12:45:00	0	0	407	26	24	5	0	0	14	0	0	0	0	0	3	0	0	0	0	0
13:00:00	0	0	429	22	24	0	0	0	15	1	0	0	0	0	3	0	0	0	0	0
13:15:00	0	0	429	0	24	0	0	0	15	0	0	0	0	0	3	0	0	0	0	0
15:00:00	0	0	429	0	24	0	0	0	15	0	0	0	0	0	3	0	0	0	0	0
15:15:00	0	0	455	26	25	1	0	0	16	1	0	0	0	0	3	0	0	0	0	0
15:30:00	0	0	476	21	26	1	0	0	16	0	0	0	0	0	3	0	0	0	0	0
15:45:00	0	0	497	21	27	1	0	0	16	0	0	0	0	0	3	0	0	0	0	0
16:00:00	0	0	530	33	29	2	0	0	17	1	0	0	0	0	4	1	0	0	0	0
16:15:00	0	0	553	23	30	1	0	0	17	0	0	0	0	0	4	0	1	1	0	0
16:30:00	0	0	580	27	31	1	0	0	18	1	0	0	0	0	4	0	1	0	0	0
16:45:00	0	0	598	18	32	1	0	0	19	1	1	1	0	0	4	0	1	0	0	0
17:00:00	0	0	616	18	32	0	0	0	20	1	1	0	0	0	4	0	1	0	0	0
17:15:00	0	0	628	12	34	2	0	0	20	0	1	0	0	0	4	0	1	0	0	0
17:30:00	0	0	646	18	35	1	0	0	20	0	1	0	0	0	4	0	1	0	0	0
17:45:00	0	0	663	17	37	2	0	0	20	0	1	0	0	0	4	0	1	0	0	0
18:00:00	0	0	673	10	38	1	0	0	20	0	1	0	0	0	4	0	1	0	0	0
18:15:00	0	0	673	0	38	0	0	0	20	0	1	0	0	0	4	0	1	0	0	0
18:15:15	0	0	673	0	38	0	0	0	20	0	1	0	0	0	4	0	1	0	0	0

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00																								
Municipality: Brechin Site #: 2312100006 Intersection: Simcoe Rd 47 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																									
** Non-Signalized Intersection **		Major Road: Simcoe Rd 47 runs N/S																									
North Leg Total: 163 North Entering: 99 North Peds: 0 Peds Cross: ☒	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>2</td><td>0</td><td style="border-left: 1px solid black;">2</td> </tr> <tr> <td>Trucks</td><td>1</td><td>42</td><td style="border-left: 1px solid black;">43</td> </tr> <tr> <td>Cars</td><td>47</td><td>7</td><td style="border-left: 1px solid black;">54</td> </tr> <tr> <td>Totals</td><td>50</td><td>49</td><td style="border-left: 1px solid black;"></td> </tr> </table>	Buses	2	0	2	Trucks	1	42	43	Cars	47	7	54	Totals	50	49		<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>0</td> </tr> <tr> <td>Trucks</td><td>41</td> </tr> <tr> <td>Cars</td><td>23</td> </tr> <tr> <td>Totals</td><td style="border-top: 1px solid black;">64</td> </tr> </table>	Buses	0	Trucks	41	Cars	23	Totals	64	
Buses	2	0	2																								
Trucks	1	42	43																								
Cars	47	7	54																								
Totals	50	49																									
Buses	0																										
Trucks	41																										
Cars	23																										
Totals	64																										
 <p style="text-align: center;">Simcoe Rd 47</p> <p style="text-align: center;">Concession Rd 4</p> <p style="text-align: center;">Simcoe Rd 47</p>																											
Buses Trucks Cars Totals 2 1 47 50	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td> </tr> <tr> <td>0</td><td>0</td><td>20</td><td style="border-left: 1px solid black;">20</td> </tr> <tr> <td>0</td><td>0</td><td>1</td><td style="border-left: 1px solid black;">1</td> </tr> <tr> <td>0</td><td>0</td><td>21</td><td style="border-left: 1px solid black;"></td> </tr> </table>	Buses	Trucks	Cars	Totals	0	0	20	20	0	0	1	1	0	0	21											
Buses	Trucks	Cars	Totals																								
0	0	20	20																								
0	0	1	1																								
0	0	21																									
Peds Cross: ☒ West Peds: 0 West Entering: 21 West Leg Total: 71	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Cars</td><td>8</td> </tr> <tr> <td>Trucks</td><td>42</td> </tr> <tr> <td>Buses</td><td>0</td> </tr> <tr> <td>Totals</td><td style="border-top: 1px solid black;">50</td> </tr> </table>	Cars	8	Trucks	42	Buses	0	Totals	50	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Cars</td><td>0</td><td>3</td><td style="border-left: 1px solid black;">3</td> </tr> <tr> <td>Trucks</td><td>0</td><td>41</td><td style="border-left: 1px solid black;">41</td> </tr> <tr> <td>Buses</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">0</td> </tr> <tr> <td>Totals</td><td>0</td><td>44</td><td style="border-left: 1px solid black;"></td> </tr> </table>	Cars	0	3	3	Trucks	0	41	41	Buses	0	0	0	Totals	0	44		Peds Cross: ☒ South Peds: 0 South Entering: 44 South Leg Total: 94
Cars	8																										
Trucks	42																										
Buses	0																										
Totals	50																										
Cars	0	3	3																								
Trucks	0	41	41																								
Buses	0	0	0																								
Totals	0	44																									
Comments																											

Mid-day Peak Diagram		Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 11:30:00 To: 12:30:00																																
Municipality: Brechin Site #: 2312100006 Intersection: Simcoe Rd 47 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23		Weather conditions: Person counted: Person prepared: Person checked:																																	
** Non-Signalized Intersection **		Major Road: Simcoe Rd 47 runs N/S																																	
North Leg Total: 122 North Entering: 67 North Peds: 0 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>2</td><td>20</td><td>22</td></tr> <tr><td>Cars</td><td>38</td><td>7</td><td>45</td></tr> <tr><td>Totals</td><td>40</td><td>27</td><td></td></tr> </table>	Buses	0	0	0	Trucks	2	20	22	Cars	38	7	45	Totals	40	27		<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>18</td></tr> <tr><td>Cars</td><td>37</td></tr> <tr><td>Totals</td><td>55</td></tr> </table>	Buses	0	Trucks	18	Cars	37	Totals	55									
Buses	0	0	0																																
Trucks	2	20	22																																
Cars	38	7	45																																
Totals	40	27																																	
Buses	0																																		
Trucks	18																																		
Cars	37																																		
Totals	55																																		
 <p style="text-align: center;">Simcoe Rd 47</p> <p style="text-align: center;">Concession Rd 4</p> <p style="text-align: center;">Simcoe Rd 47</p>																																			
Buses Trucks Cars Totals 0 2 39 41 ←	<table style="width:100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td><td>31</td><td>32</td></tr> <tr><td>Cars</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>Totals</td><td>0</td><td>33</td><td></td></tr> </table>	Buses	0	0	0	Trucks	1	31	32	Cars	0	2	2	Totals	0	33		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>9</td><td>6</td><td>7</td></tr> <tr><td>Trucks</td><td>20</td><td>0</td><td>17</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>29</td><td>1</td><td>23</td></tr> </table>	Cars	9	6	7	Trucks	20	0	17	Buses	0	0	0	Totals	29	1	23	Peds Cross: ☒ South Peds: 1 South Entering: 24 South Leg Total: 53
Buses	0	0	0																																
Trucks	1	31	32																																
Cars	0	2	2																																
Totals	0	33																																	
Cars	9	6	7																																
Trucks	20	0	17																																
Buses	0	0	0																																
Totals	29	1	23																																
Comments																																			

<h2 style="margin: 0;">Afternoon Peak Diagram</h2>	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:00:00 To: 16:00:00																																																
Municipality: Brechin Site #: 2312100006 Intersection: Simcoe Rd 47 & Concession Rd 4 TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																	
** Non-Signalized Intersection **		Major Road: Simcoe Rd 47 runs N/S																																																
North Leg Total: 104 North Entering: 53 North Peds: 0 Peds Cross: <input checked="" type="checkbox"/>	<table style="margin: auto;"> <tr><td>Buses</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Trucks</td><td>1</td><td>16</td><td>17</td></tr> <tr><td>Cars</td><td>27</td><td>7</td><td>34</td></tr> <tr><td>Totals</td><td>30</td><td>23</td><td></td></tr> </table>	Buses	2	0	2	Trucks	1	16	17	Cars	27	7	34	Totals	30	23		<table style="margin: auto;"> <tr><td>Buses</td><td>4</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cars</td><td>44</td></tr> <tr><td>Totals</td><td>51</td></tr> </table>	Buses	4	Trucks	3	Cars	44	Totals	51																								
Buses	2	0	2																																															
Trucks	1	16	17																																															
Cars	27	7	34																																															
Totals	30	23																																																
Buses	4																																																	
Trucks	3																																																	
Cars	44																																																	
Totals	51																																																	
<table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>2</td><td>1</td><td>27</td><td>30</td></tr> </table> <p style="text-align: center;">←</p> <p style="text-align: center;">Concession Rd 4</p> <table style="margin: auto;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>4</td><td>0</td><td>35</td><td>39</td></tr> <tr><td>0</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>4</td><td>0</td><td>37</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	2	1	27	30	Buses	Trucks	Cars	Totals	4	0	35	39	0	0	2	2	4	0	37		 <p style="text-align: center;">Simcoe Rd 47</p>	<table style="margin: auto;"> <tr><td>Cars</td><td>9</td><td>Cars</td><td>0</td><td>9</td><td>9</td></tr> <tr><td>Trucks</td><td>16</td><td>Trucks</td><td>0</td><td>3</td><td>3</td></tr> <tr><td>Buses</td><td>0</td><td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>25</td><td>Totals</td><td>0</td><td>12</td><td></td></tr> </table>	Cars	9	Cars	0	9	9	Trucks	16	Trucks	0	3	3	Buses	0	Buses	0	0	0	Totals	25	Totals	0	12	
Buses	Trucks	Cars	Totals																																															
2	1	27	30																																															
Buses	Trucks	Cars	Totals																																															
4	0	35	39																																															
0	0	2	2																																															
4	0	37																																																
Cars	9	Cars	0	9	9																																													
Trucks	16	Trucks	0	3	3																																													
Buses	0	Buses	0	0	0																																													
Totals	25	Totals	0	12																																														
Peds Cross: <input checked="" type="checkbox"/> West Peds: 0 West Entering: 41 West Leg Total: 71	Peds Cross: <input checked="" type="checkbox"/> South Peds: 0 South Entering: 12 South Leg Total: 37																																																	
<h3 style="margin: 0;">Comments</h3>																																																		

Total Count Diagram

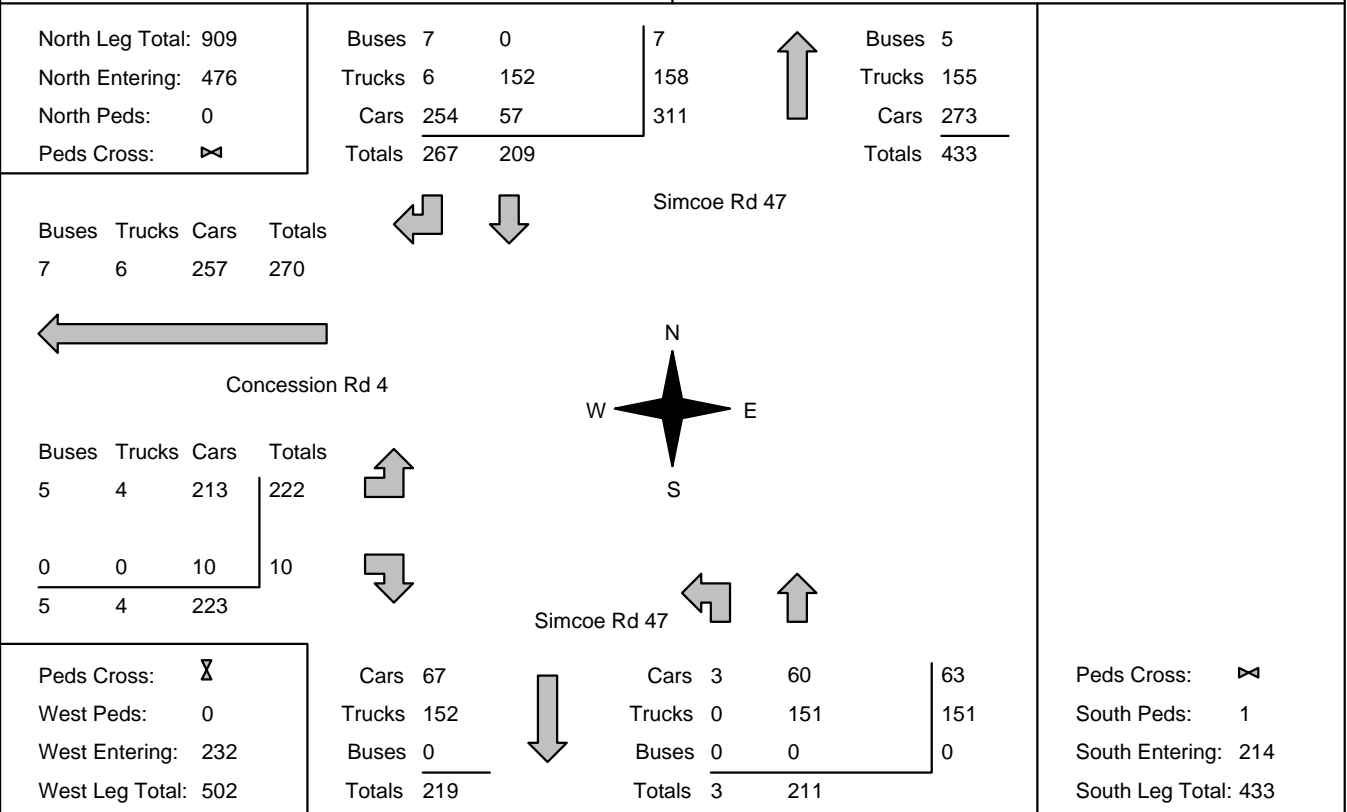
Municipality: Brechin
Site #: 2312100006
Intersection: Simcoe Rd 47 & Concession Rd 4
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Simcoe Rd 47 runs N/S



Comments

Traffic Count Summary

Intersection: Simcoe Rd 47 & Concession Rd 4 Count Date: 16-May-23 Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	0	23	36	59	0	86	8:00:00	0	27	0	27	0	
9:00:00	0	46	34	80	0	117	9:00:00	0	37	0	37	0	
10:00:00	0	49	50	99	0	143	10:00:00	0	44	0	44	0	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	0	27	45	72	0	97	12:00:00	0	25	0	25	0	
13:00:00	0	28	28	56	0	94	13:00:00	2	36	0	38	1	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	23	30	53	0	65	16:00:00	0	12	0	12	0	
17:00:00	0	8	30	38	0	55	17:00:00	0	17	0	17	0	
18:00:00	0	5	14	19	0	33	18:00:00	1	13	0	14	0	
Totals:						690	S Totals:						1
East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	0	0	0	0	0	9	8:00:00	9	0	0	9	0	
9:00:00	0	0	0	0	0	20	9:00:00	20	0	0	20	0	
10:00:00	0	0	0	0	0	21	10:00:00	20	0	1	21	0	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	0	0	0	0	0	22	12:00:00	18	0	4	22	0	
13:00:00	0	0	0	0	0	30	13:00:00	29	0	1	30	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	0	0	0	0	41	16:00:00	39	0	2	41	0	
17:00:00	0	0	0	0	0	41	17:00:00	41	0	0	41	0	
18:00:00	0	0	0	0	0	48	18:00:00	46	0	2	48	0	
Totals:						232	W Totals:						0
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	8:00	9:00	10:00	12:00		13:00	16:00	17:00	18:00				
Crossing Values:	9	20	20	18		30	39	41	46				




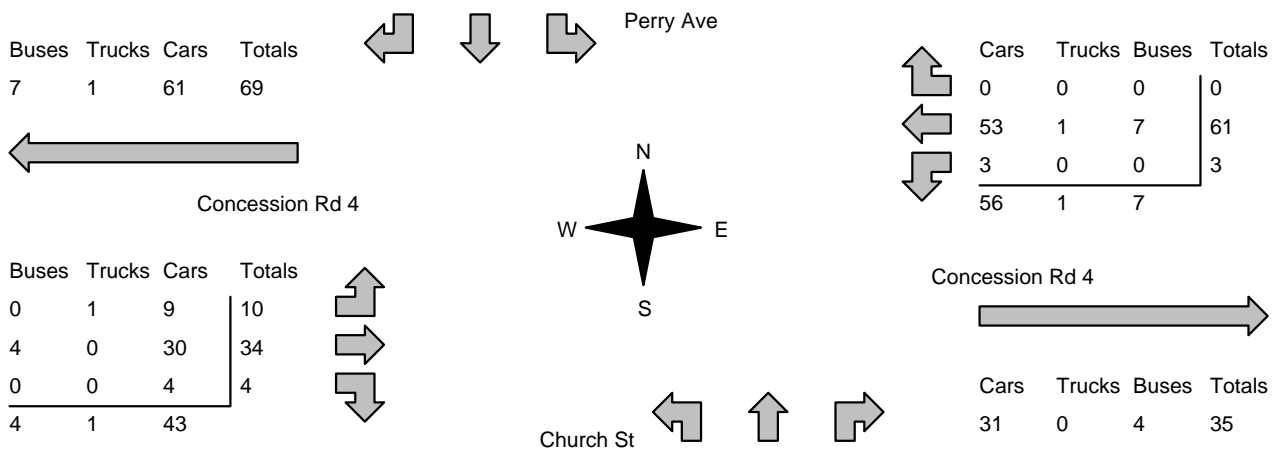
Count Date: 16-May-23 Site #: 2312100006
















Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Buses - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	2	2	10	10	0	0	4	4	0	0	0	0	0	0	1	1	0	0
7:30:00	0	0	5	3	17	7	0	0	6	2	0	0	0	0	0	0	1	0	0	0
7:45:00	0	0	7	2	29	12	0	0	11	5	0	0	0	0	0	0	1	0	0	0
8:00:00	0	0	9	2	34	5	0	0	14	3	0	0	0	0	0	0	2	1	0	0
8:15:00	0	0	13	4	49	15	0	0	18	4	0	0	0	0	0	0	2	0	0	0
8:30:00	0	0	16	3	53	4	0	0	25	7	0	0	0	0	0	0	2	0	0	0
8:45:00	0	0	18	2	58	5	0	0	37	12	0	0	0	0	0	0	3	1	0	0
9:00:00	0	0	20	2	67	9	0	0	49	12	0	0	0	0	0	0	3	0	0	0
9:15:00	0	0	22	2	81	14	0	0	59	10	0	0	0	0	0	0	4	1	0	0
9:30:00	0	0	23	1	95	14	0	0	66	7	0	0	0	0	0	0	5	1	0	0
9:45:00	0	0	26	3	107	12	0	0	76	10	1	1	0	0	0	0	5	0	0	0
10:00:00	0	0	27	1	114	7	0	0	91	15	1	0	0	0	0	0	5	0	0	0
10:15:00	0	0	27	0	114	0	0	0	91	0	1	0	0	0	0	0	5	0	0	0
11:00:00	0	0	27	0	114	0	0	0	91	0	1	0	0	0	0	0	5	0	0	0
11:15:00	0	0	28	1	123	9	0	0	99	8	1	0	0	0	0	0	5	0	0	0
11:30:00	0	0	28	0	133	10	0	0	106	7	2	1	0	0	0	0	5	0	0	0
11:45:00	0	0	30	2	146	13	0	0	108	2	3	1	0	0	0	0	5	0	0	0
12:00:00	0	0	32	2	156	10	0	0	113	5	4	1	0	0	0	0	5	0	0	0
12:15:00	0	0	33	1	163	7	0	0	120	7	4	0	0	0	0	0	5	0	0	0
12:30:00	0	0	35	2	171	8	0	0	126	6	4	0	0	0	0	0	5	0	0	0
12:45:00	0	0	37	2	175	4	0	0	130	4	4	0	0	0	0	0	5	0	0	0
13:00:00	0	0	38	1	184	9	0	0	135	5	4	0	0	0	0	0	5	0	0	0
13:15:00	0	0	38	0	184	0	0	0	135	0	4	0	0	0	0	0	5	0	0	0
15:00:00	0	0	38	0	184	0	0	0	135	0	4	0	0	0	0	0	5	0	0	0
15:15:00	0	0	41	3	194	10	0	0	143	8	4	0	0	0	0	0	5	0	0	0
15:30:00	0	0	41	0	198	4	0	0	147	4	4	0	0	0	0	0	5	0	0	0
15:45:00	0	0	44	3	205	7	0	0	150	3	4	0	0	0	0	0	7	2	0	0
16:00:00	0	0	45	1	211	6	0	0	151	1	5	1	0	0	0	0	7	0	0	0
16:15:00	0	0	47	2	217	6	0	0	151	0	5	0	0	0	0	0	7	0	0	0
16:30:00	0	0	48	1	230	13	0	0	151	0	5	0	0	0	0	0	7	0	0	0
16:45:00	0	0	49	1	233	3	0	0	152	1	6	1	0	0	0	0	7	0	0	0
17:00:00	0	0	52	3	240	7	0	0	152	0	6	0	0	0	0	0	7	0	0	0
17:15:00	0	0	54	2	241	1	0	0	152	0	6	0	0	0	0	0	7	0	0	0
17:30:00	0	0	56	2	246	5	0	0	152	0	6	0	0	0	0	0	7	0	0	0
17:45:00	0	0	56	0	252	6	0	0	152	0	6	0	0	0	0	0	7	0	0	0
18:00:00	0	0	57	1	254	2	0	0	152	0	6	0	0	0	0	0	7	0	0	0
18:15:00	0	0	57	0	254	0	0	0	152	0	6	0	0	0	0	0	7	0	0	0
18:15:15	0	0	57	0	254	0	0	0	152	0	6	0	0	0	0	0	7	0	0	0
















Count Date: 16-May-23 Site #: 2312100006

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Buses - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	16	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	24	4	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	28	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	33	5	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30:00	38	5	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45:00	42	4	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00:00	48	6	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15:00	48	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:00	48	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15:00	49	1	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0
11:30:00	53	4	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45:00	59	6	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00:00	65	6	0	0	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15:00	75	10	0	0	5	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
12:30:00	84	9	0	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45:00	88	4	0	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00:00	93	5	0	0	6	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15:00	93	0	0	0	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00:00	93	0	0	0	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15:00	102	9	0	0	7	1	3	0	0	0	0	0	1	1	0	0	0	0	0	0
15:30:00	111	9	0	0	8	1	3	0	0	0	0	0	1	0	0	0	0	0	0	0
15:45:00	119	8	0	0	8	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0
16:00:00	128	9	0	0	8	0	3	0	0	0	0	0	4	3	0	0	0	0	0	0
16:15:00	143	15	0	0	8	0	3	0	0	0	0	0	4	0	0	0	0	0	0	0
16:30:00	149	6	0	0	8	0	3	0	0	0	0	0	4	0	0	0	0	0	0	0
16:45:00	161	12	0	0	8	0	4	1	0	0	0	0	5	1	0	0	0	0	0	0
17:00:00	167	6	0	0	8	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0
17:15:00	183	16	0	0	8	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0
17:30:00	199	16	0	0	10	2	4	0	0	0	0	0	5	0	0	0	0	0	0	0
17:45:00	208	9	0	0	10	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0
18:00:00	213	5	0	0	10	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0
18:15:00	213	0	0	0	10	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0
18:15:15	213	0	0	0	10	0	4	0	0	0	0	0	5	0	0	0	0	0	0	0

<h2>Morning Peak Diagram</h2>	Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 8:45:00 To: 9:45:00																																									
Municipality: Brechin Site #: 2312100007 Intersection: Concession Rd 4 & Church St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																										
** Non-Signalized Intersection **		Major Road: Concession Rd 4 runs W/E																																									
North Leg Total: 14 North Entering: 4 North Peds: 1 Peds Cross: ☒	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>4</td><td>0</td><td>0</td><td>4</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>4</td><td>0</td><td>0</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	0	0	0	0	Cars	4	0	0	4	Totals	4	0	0		 <table style="margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>9</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>10</td></tr> </table>	Buses	0	Trucks	1	Cars	9	Totals	10	East Leg Total: 99 East Entering: 64 East Peds: 0 Peds Cross: ☒												
Buses	0	0	0	0																																							
Trucks	0	0	0	0																																							
Cars	4	0	0	4																																							
Totals	4	0	0																																								
Buses	0																																										
Trucks	1																																										
Cars	9																																										
Totals	10																																										
 <p style="text-align: center;">Perry Ave</p> <p style="text-align: center;">Concession Rd 4</p> <p style="text-align: center;">Church St</p>																																											
Buses Trucks Cars Totals 7 1 61 69	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>1</td><td>9</td><td>10</td></tr> <tr><td>Trucks</td><td>4</td><td>0</td><td>30</td><td>34</td></tr> <tr><td>Cars</td><td>0</td><td>0</td><td>4</td><td>4</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>4</td><td>1</td><td>43</td><td></td></tr> </table>	Buses	0	1	9	10	Trucks	4	0	30	34	Cars	0	0	4	4	Totals	4	1	43		<table style="margin: auto;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>53</td><td>1</td><td>7</td><td>61</td></tr> <tr><td>3</td><td>0</td><td>0</td><td>3</td></tr> <tr style="border-top: 1px solid black;"><td>56</td><td>1</td><td>7</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	0	0	0	53	1	7	61	3	0	0	3	56	1	7		Peds Cross: ☒ West Peds: 0 West Entering: 48 West Leg Total: 117
Buses	0	1	9	10																																							
Trucks	4	0	30	34																																							
Cars	0	0	4	4																																							
Totals	4	1	43																																								
Cars	Trucks	Buses	Totals																																								
0	0	0	0																																								
53	1	7	61																																								
3	0	0	3																																								
56	1	7																																									
Peds Cross: ☒ South Peds: 1 South Entering: 5 South Leg Total: 12	<table style="margin: auto;"> <tr><td>Cars</td><td>4</td><td>0</td><td>1</td><td>5</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>4</td><td>0</td><td>1</td><td></td></tr> </table>	Cars	4	0	1	5	Trucks	0	0	0	0	Buses	0	0	0	0	Totals	4	0	1																							
Cars	4	0	1	5																																							
Trucks	0	0	0	0																																							
Buses	0	0	0	0																																							
Totals	4	0	1																																								
<h3>Comments</h3>																																											

<h2>Mid-day Peak Diagram</h2>	Specified Period From: 11:00:00 To: 13:00:00	One Hour Peak From: 11:30:00 To: 12:30:00																													
Municipality: Brechin Site #: 2312100007 Intersection: Concession Rd 4 & Church St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																														
** Non-Signalized Intersection **	Major Road: Concession Rd 4 runs W/E																														
North Leg Total: 25 North Entering: 13 North Peds: 2 Peds Cross: ☒	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>11</td><td>0</td><td>1</td><td>12</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>12</td><td>0</td><td>1</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	1	0	0	1	Cars	11	0	1	12	Totals	12	0	1		 <table style="border-collapse: collapse; margin: auto;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>11</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>12</td></tr> </table>	Buses	0	Trucks	1	Cars	11	Totals	12	East Leg Total: 91 East Entering: 49 East Peds: 0 Peds Cross: ☒
Buses	0	0	0	0																											
Trucks	1	0	0	1																											
Cars	11	0	1	12																											
Totals	12	0	1																												
Buses	0																														
Trucks	1																														
Cars	11																														
Totals	12																														
<table style="border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>3</td><td>56</td><td>59</td></tr> </table>	Buses	Trucks	Cars	Totals	0	3	56	59	   <p>Perry Ave</p>	 <table style="border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>44</td><td>2</td><td>0</td><td>46</td></tr> <tr><td>2</td><td>0</td><td>0</td><td>2</td></tr> <tr style="border-top: 1px solid black;"><td>46</td><td>3</td><td>0</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	1	0	1	44	2	0	46	2	0	0	2	46	3	0		
Buses	Trucks	Cars	Totals																												
0	3	56	59																												
Cars	Trucks	Buses	Totals																												
0	1	0	1																												
44	2	0	46																												
2	0	0	2																												
46	3	0																													
 Concession Rd 4	 N S W E	Concession Rd 4 																													
<table style="border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>11</td><td>11</td></tr> <tr><td>0</td><td>1</td><td>32</td><td>33</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr style="border-top: 1px solid black;"><td>0</td><td>1</td><td>44</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	0	11	11	0	1	32	33	0	0	1	1	0	1	44		  	Church St   	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>41</td><td>1</td><td>0</td><td>42</td></tr> </table>	Cars	Trucks	Buses	Totals	41	1	0	42
Buses	Trucks	Cars	Totals																												
0	0	11	11																												
0	1	32	33																												
0	0	1	1																												
0	1	44																													
Cars	Trucks	Buses	Totals																												
41	1	0	42																												
Peds Cross: ☒ West Peds: 0 West Entering: 45 West Leg Total: 104	 <table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Buses</td><td>0</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>3</td></tr> </table>	Cars	3	Trucks	0	Buses	0	Totals	3	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>1</td><td>0</td><td>8</td><td>9</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>1</td><td>0</td><td>8</td><td></td></tr> </table>	Cars	1	0	8	9	Trucks	0	0	0	0	Buses	0	0	0	0	Totals	1	0	8		Peds Cross: ☒ South Peds: 2 South Entering: 9 South Leg Total: 12
Cars	3																														
Trucks	0																														
Buses	0																														
Totals	3																														
Cars	1	0	8	9																											
Trucks	0	0	0	0																											
Buses	0	0	0	0																											
Totals	1	0	8																												
<h3>Comments</h3>																															

<h2>Afternoon Peak Diagram</h2>	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:45:00 To: 16:45:00																																																												
Municipality: Brechin Site #: 2312100007 Intersection: Concession Rd 4 & Church St TFR File #: 1 Count date: 16-May-23	Weather conditions: Person counted: Person prepared: Person checked:																																																													
** Non-Signalized Intersection **	Major Road: Concession Rd 4 runs W/E																																																													
North Leg Total: 26 North Entering: 20 North Peds: 4 Peds Cross: ☒	<table style="border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>17</td><td>2</td><td>1</td><td>20</td></tr> <tr><td>Totals</td><td>17</td><td>2</td><td>1</td><td></td></tr> </table>	Buses	0	0	0	0	Trucks	0	0	0	0	Cars	17	2	1	20	Totals	17	2	1		 <table style="border-collapse: collapse;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>6</td></tr> <tr><td>Totals</td><td>6</td></tr> </table>	Buses	0	Trucks	0	Cars	6	Totals	6	East Leg Total: 104 East Entering: 48 East Peds: 0 Peds Cross: ☒																															
Buses	0	0	0	0																																																										
Trucks	0	0	0	0																																																										
Cars	17	2	1	20																																																										
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<table style="border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>4</td><td>2</td><td>60</td><td>66</td></tr> </table>	Buses	Trucks	Cars	Totals	4	2	60	66	   <p>Perry Ave</p>	 <table style="border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>38</td><td>2</td><td>4</td><td>44</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>4</td></tr> <tr><td>42</td><td>2</td><td>4</td><td></td></tr> </table>	Cars	Trucks	Buses	Totals	0	0	0	0	38	2	4	44	4	0	0	4	42	2	4		<table style="border-collapse: collapse;"> <tr><td>Buses</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>0</td><td>4</td><td>4</td></tr> <tr><td>8</td><td>1</td><td>41</td><td>50</td></tr> <tr><td>0</td><td>0</td><td>5</td><td>5</td></tr> <tr><td>8</td><td>1</td><td>50</td><td></td></tr> </table>	Buses	Trucks	Cars	Totals	0	0	4	4	8	1	41	50	0	0	5	5	8	1	50		  	 <p>Concession Rd 4</p>	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Buses</td><td>Totals</td></tr> <tr><td>47</td><td>1</td><td>8</td><td>56</td></tr> </table>	Cars	Trucks	Buses	Totals	47	1	8	56
Buses	Trucks	Cars	Totals																																																											
4	2	60	66																																																											
Cars	Trucks	Buses	Totals																																																											
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4	0	0	4																																																											
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8	1	41	50																																																											
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Cars	Trucks	Buses	Totals																																																											
47	1	8	56																																																											
Peds Cross: ☒ West Peds: 6 West Entering: 59 West Leg Total: 125	 <table style="border-collapse: collapse;"> <tr><td>Cars</td><td>11</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Buses</td><td>0</td></tr> <tr><td>Totals</td><td>11</td></tr> </table>	Cars	11	Trucks	0	Buses	0	Totals	11	   <p>Church St</p>	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>5</td><td>2</td><td>5</td><td>12</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Buses</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>5</td><td>2</td><td>5</td><td></td></tr> </table>	Cars	5	2	5	12	Trucks	0	0	0	0	Buses	0	0	0	0	Totals	5	2	5		Peds Cross: ☒ South Peds: 0 South Entering: 12 South Leg Total: 23																														
Cars	11																																																													
Trucks	0																																																													
Buses	0																																																													
Totals	11																																																													
Cars	5	2	5	12																																																										
Trucks	0	0	0	0																																																										
Buses	0	0	0	0																																																										
Totals	5	2	5																																																											
<h3>Comments</h3>																																																														

Total Count Diagram

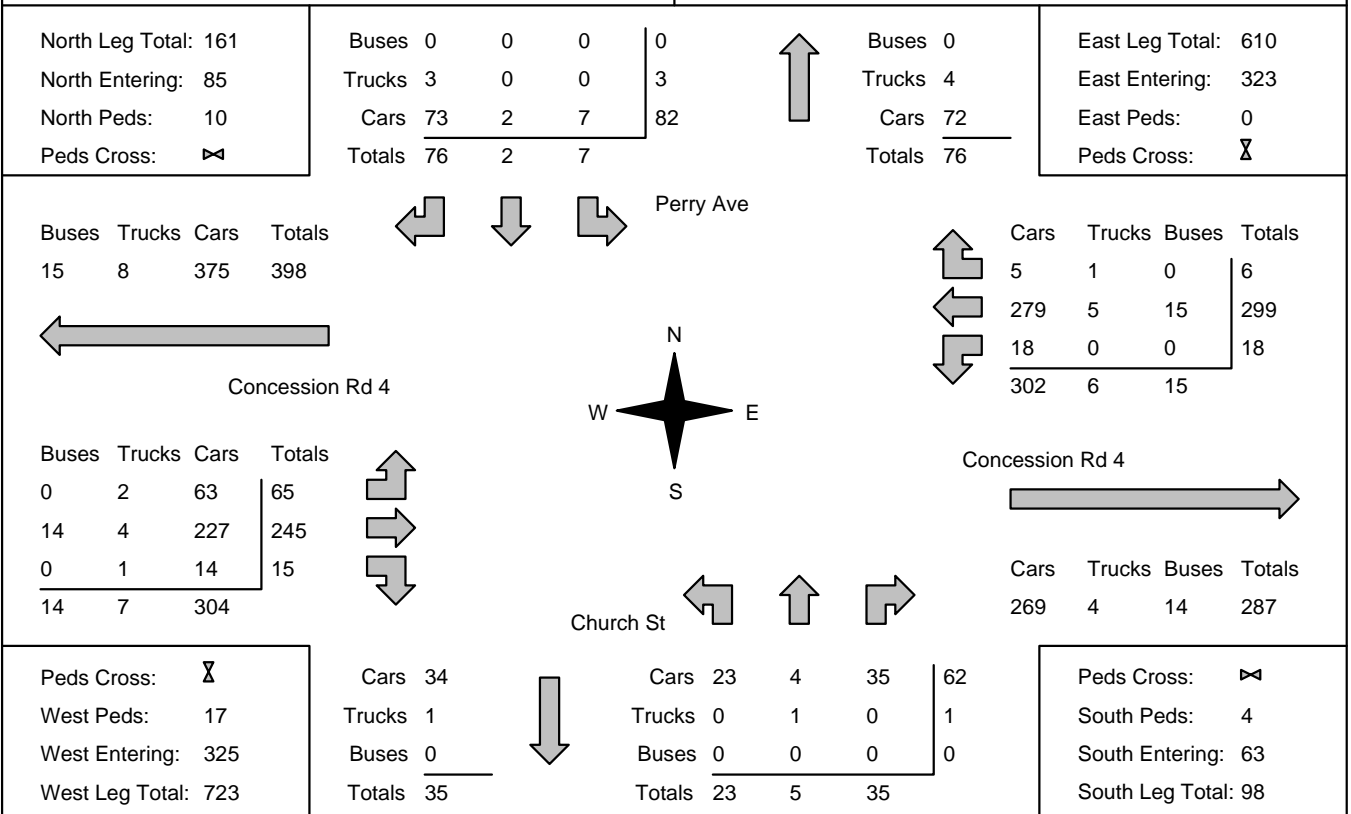
Municipality: Brechin
Site #: 2312100007
Intersection: Concession Rd 4 & Church St
TFR File #: 1
Count date: 16-May-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Concession Rd 4 runs W/E



Comments

Traffic Count Summary

Intersection: Concession Rd 4 & Church St Count Date: 16-May-23 Municipality: Brechin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	1	0	7	8	1	14	8:00:00	3	1	2	6	0
9:00:00	1	0	5	6	0	7	9:00:00	0	0	1	1	1
10:00:00	0	0	4	4	1	12	10:00:00	5	0	3	8	1
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	0	10	10	2	15	12:00:00	1	0	4	5	0
13:00:00	1	0	15	16	1	26	13:00:00	3	2	5	10	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	3	0	5	8	2	15	16:00:00	2	0	5	7	0
17:00:00	0	2	18	20	2	35	17:00:00	8	2	5	15	0
18:00:00	1	0	12	13	1	24	18:00:00	1	0	10	11	0
Totals:	7	2	76	85	10	148	S Totals:	23	5	35	63	4
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	3	35	1	39	0	54	8:00:00	6	8	1	15	3
9:00:00	2	36	1	39	0	79	9:00:00	10	29	1	40	1
10:00:00	3	58	0	61	0	101	10:00:00	7	29	4	40	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	1	47	2	50	0	80	12:00:00	6	24	0	30	2
13:00:00	3	34	0	37	0	80	13:00:00	10	32	1	43	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	39	0	39	0	90	16:00:00	8	42	1	51	2
17:00:00	4	40	0	44	0	92	17:00:00	2	42	4	48	6
18:00:00	2	10	2	14	0	72	18:00:00	16	39	3	58	1
Totals:	18	299	6	323	0	648	W Totals:	65	245	15	325	17
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	12:00			13:00	16:00	17:00	18:00		
Crossing Values:	8	2	5	3			8	7	16	3		



Count Date: 16-May-23 Site #: 2312100007

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Buses - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	11	11	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:30:00	0	0	17	6	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
7:45:00	3	3	26	9	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8:00:00	3	0	33	7	1	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
8:15:00	5	2	47	14	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8:30:00	5	0	52	5	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8:45:00	5	0	58	6	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9:00:00	5	0	68	10	2	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0
9:15:00	7	2	81	13	2	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0
9:30:00	7	0	97	16	2	0	0	0	0	0	0	0	0	0	9	5	0	0	0	0
9:45:00	8	1	111	14	2	0	0	0	1	1	0	0	0	0	9	0	0	0	0	0
10:00:00	8	0	119	8	2	0	0	0	1	0	0	0	0	0	9	0	0	0	0	0
10:15:00	8	0	119	0	2	0	0	0	1	0	0	0	0	0	9	0	0	0	0	0
11:00:00	8	0	119	0	2	0	0	0	1	0	0	0	0	0	9	0	0	0	0	0
11:15:00	9	1	125	6	3	1	0	0	1	0	0	0	0	0	9	0	0	0	0	0
11:30:00	9	0	138	13	3	0	0	0	1	0	0	0	0	0	9	0	0	0	0	0
11:45:00	9	0	150	12	3	0	0	0	2	1	0	0	0	0	9	0	0	0	0	0
12:00:00	9	0	164	14	3	0	0	0	3	1	1	1	0	0	9	0	0	0	0	0
12:15:00	9	0	173	9	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
12:30:00	11	2	182	9	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
12:45:00	11	0	187	5	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
13:00:00	12	1	198	11	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
13:15:00	12	0	198	0	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
15:00:00	12	0	198	0	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
15:15:00	12	0	207	9	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
15:30:00	12	0	215	8	3	0	0	0	3	0	1	0	0	0	9	0	0	0	0	0
15:45:00	12	0	223	8	3	0	0	0	3	0	1	0	0	0	11	2	0	0	0	0
16:00:00	12	0	233	10	3	0	0	0	4	1	1	0	0	0	12	1	0	0	0	0
16:15:00	12	0	246	13	3	0	0	0	4	0	1	0	0	0	15	3	0	0	0	0
16:30:00	16	4	255	9	3	0	0	0	4	0	1	0	0	0	15	0	0	0	0	0
16:45:00	16	0	261	6	3	0	0	0	5	1	1	0	0	0	15	0	0	0	0	0
17:00:00	16	0	269	8	3	0	0	0	5	0	1	0	0	0	15	0	0	0	0	0
17:15:00	16	0	270	1	3	0	0	0	5	0	1	0	0	0	15	0	0	0	0	0
17:30:00	17	1	273	3	4	1	0	0	5	0	1	0	0	0	15	0	0	0	0	0
17:45:00	18	1	278	5	4	0	0	0	5	0	1	0	0	0	15	0	0	0	0	0
18:00:00	18	0	279	1	5	1	0	0	5	0	1	0	0	0	15	0	0	0	0	0
18:15:00	18	0	279	0	5	0	0	0	5	0	1	0	0	0	15	0	0	0	0	0
18:15:15	18	0	279	0	5	0	0	0	5	0	1	0	0	0	15	0	0	0	0	0

Count Date: 16-May-23 Site #: 2312100007

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Buses - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	1	0	5	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
7:45:00	4	3	6	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2
8:00:00	5	1	8	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	3	1
8:15:00	5	0	16	8	0	0	1	0	0	0	1	0	0	0	0	0	0	0	4	1
8:30:00	7	2	21	5	1	1	1	0	0	0	1	0	0	0	0	0	0	0	4	0
8:45:00	11	4	27	6	1	0	1	0	1	1	1	0	0	0	0	0	0	0	4	0
9:00:00	15	4	36	9	1	0	1	0	1	0	1	0	0	0	0	0	0	0	4	0
9:15:00	16	1	44	8	2	1	1	0	1	0	1	0	0	0	2	2	0	0	4	0
9:30:00	16	0	52	8	5	3	1	0	1	0	1	0	0	0	4	2	0	0	4	0
9:45:00	20	4	57	5	5	0	2	1	1	0	1	0	0	0	4	0	0	0	4	0
10:00:00	21	1	61	4	5	0	2	0	1	0	1	0	0	0	4	0	0	0	4	0
10:15:00	21	0	61	0	5	0	2	0	1	0	1	0	0	0	4	0	0	0	4	0
11:00:00	21	0	61	0	5	0	2	0	1	0	1	0	0	0	4	0	0	0	4	0
11:15:00	23	2	64	3	5	0	2	0	2	1	1	0	0	0	4	0	0	0	5	1
11:30:00	24	1	69	5	5	0	2	0	2	0	1	0	0	0	5	1	0	0	6	1
11:45:00	26	2	76	7	5	0	2	0	2	0	1	0	0	0	5	0	0	0	6	0
12:00:00	27	1	83	7	5	0	2	0	2	0	1	0	0	0	5	0	0	0	6	0
12:15:00	31	4	94	11	5	0	2	0	3	1	1	0	0	0	5	0	0	0	6	0
12:30:00	35	4	101	7	6	1	2	0	3	0	1	0	0	0	5	0	0	0	6	0
12:45:00	37	2	106	5	6	0	2	0	3	0	1	0	0	0	5	0	0	0	6	0
13:00:00	37	0	114	8	6	0	2	0	3	0	1	0	0	0	5	0	0	0	8	2
13:15:00	37	0	114	0	6	0	2	0	3	0	1	0	0	0	5	0	0	0	8	0
15:00:00	37	0	114	0	6	0	2	0	3	0	1	0	0	0	5	0	0	0	8	0
15:15:00	40	3	122	8	6	0	2	0	3	0	1	0	0	0	6	1	0	0	9	1
15:30:00	41	1	131	9	6	0	2	0	3	0	1	0	0	0	6	0	0	0	9	0
15:45:00	43	2	141	10	6	0	2	0	3	0	1	0	0	0	6	0	0	0	9	0
16:00:00	45	2	149	8	7	1	2	0	3	0	1	0	0	0	12	6	0	0	10	1
16:15:00	46	1	166	17	8	1	2	0	3	0	1	0	0	0	13	1	0	0	12	2
16:30:00	46	0	171	5	9	1	2	0	3	0	1	0	0	0	13	0	0	0	15	3
16:45:00	47	1	182	11	11	2	2	0	4	1	1	0	0	0	14	1	0	0	15	0
17:00:00	47	0	188	6	11	0	2	0	4	0	1	0	0	0	14	0	0	0	16	1
17:15:00	50	3	203	15	11	0	2	0	4	0	1	0	0	0	14	0	0	0	16	0
17:30:00	57	7	215	12	12	1	2	0	4	0	1	0	0	0	14	0	0	0	17	1
17:45:00	59	2	222	7	12	0	2	0	4	0	1	0	0	0	14	0	0	0	17	0
18:00:00	63	4	227	5	14	2	2	0	4	0	1	0	0	0	14	0	0	0	17	0
18:15:00	63	0	227	0	14	0	2	0	4	0	1	0	0	0	14	0	0	0	17	0
18:15:15	63	0	227	0	14	0	2	0	4	0	1	0	0	0	14	0	0	0	17	0

Appendix B: Level of Service Definitions

CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 1997.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 \leq d \leq 15$
C	Average traffic delays	$15 \leq d \leq 25$
D	Long traffic delays	$25 \leq d \leq 35$
E	Very long traffic delays	$35 \leq d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The capacity of signalized intersections has been determined in terms of delay taken from Chapter 9 of the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 2000.

















To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The following table describes in detail the characteristics of each level:

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	$d \leq 10$
B	Describes operations with control delay greater than 10 seconds and up to 20 seconds/vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	$10 \leq d \leq 20$
C	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 \leq d \leq 35$
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	$35 \leq d \leq 55$
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$55 \leq d \leq 80$
F	LOS F describes operations with control delay in excess of 80 seconds/vehicle. This <i>oversaturation</i> , considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels.	$d > 80$

Appendix C: Existing Traffic Operations











HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2023 Existing Conditions
 AM Peak Hour

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	78	9	64	26	5	32	34	318	20	13	310	38		
Future Volume (vph)	78	9	64	26	5	32	34	318	20	13	310	38		
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1			
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00			
Frt		0.94			0.93		1.00	0.99		1.00	0.98			
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00			
Satd. Flow (prot)		1618			1711		1755	1709		1690	1682			
Flt Permitted		0.80			0.81		0.53	1.00		0.54	1.00			
Satd. Flow (perm)		1328			1409		975	1709		957	1682			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	87	10	71	29	6	36	38	353	22	14	344	42		
RTOR Reduction (vph)	0	36	0	0	28	0	0	3	0	0	6	0		
Lane Group Flow (vph)	0	132	0	0	43	0	38	372	0	14	380	0		
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		4			8			2			6			
Permitted Phases	4			8			2			6				
Actuated Green, G (s)		11.1			11.1		24.7	24.7		24.7	24.7			
Effective Green, g (s)		11.1			11.1		24.7	24.7		24.7	24.7			
Actuated g/C Ratio		0.23			0.23		0.51	0.51		0.51	0.51			
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1			
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2			
Lane Grp Cap (vph)		307			325		501	879		492	865			
v/s Ratio Prot								0.22			c0.23			
v/s Ratio Perm		c0.10			0.03		0.04			0.01				
v/c Ratio		0.43			0.13		0.08	0.42		0.03	0.44			
Uniform Delay, d1		15.7			14.6		5.9	7.2		5.7	7.3			
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00			
Incremental Delay, d2		1.0			0.2		0.1	0.4		0.0	0.4			
Delay (s)		16.7			14.8		6.0	7.6		5.8	7.7			
Level of Service		B			B		A	A		A	A			
Approach Delay (s)		16.7			14.8			7.4			7.6			
Approach LOS		B			B			A			A			
Intersection Summary														
HCM 2000 Control Delay			9.5									HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.44											
Actuated Cycle Length (s)			48.0								12.2			
Intersection Capacity Utilization			50.7%										ICU Level of Service	A
Analysis Period (min)			15											
c Critical Lane Group														












HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2023 Existing Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	2	380	8	2	409
Future Volume (Veh/h)	4	2	380	8	2	409
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	2	413	9	2	445
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)						222
pX, platoon unblocked	0.95					
vC, conflicting volume	866	418			422	
vC1, stage 1 conf vol	418					
vC2, stage 2 conf vol	449					
vCu, unblocked vol	836	418			422	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	531	635			1137	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	6	422	2	445		
Volume Left	4	0	2	0		
Volume Right	2	9	0	0		
cSH	562	1700	1137	1700		
Volume to Capacity	0.01	0.25	0.00	0.26		
Queue Length 95th (m)	0.2	0.0	0.0	0.0		
Control Delay (s)	11.5	0.0	8.2	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.5	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			31.5%		ICU Level of Service	A
Analysis Period (min)			15			





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & County Rd 47

2023 Existing Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	14	330	53	13	331
Future Volume (Veh/h)	54	14	330	53	13	331
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	60	16	367	59	14	368
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	763	367			426	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	763	367			426	
tC, single (s)	7.3	6.3			4.2	
tC, 2 stage (s)						
tF (s)	4.3	3.4			2.3	
p0 queue free %	78	98			99	
cM capacity (veh/h)	270	663			1092	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	76	367	59	14	368	
Volume Left	60	0	0	14	0	
Volume Right	16	0	59	0	0	
cSH	308	1700	1700	1092	1700	
Volume to Capacity	0.25	0.22	0.03	0.01	0.22	
Queue Length 95th (m)	7.2	0.0	0.0	0.3	0.0	
Control Delay (s)	20.5	0.0	0.0	8.3	0.0	
Lane LOS	C			A		
Approach Delay (s)	20.5	0.0	0.3			
Approach LOS	C					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			27.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2023 Existing Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	5	3	0	1	386	3	1	354	6
Future Volume (Veh/h)	4	0	2	5	3	0	1	386	3	1	354	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	5	3	0	1	420	3	1	385	7
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	814	816	388	811	816	420	392			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	814	816	388	811	816	420	392			423		
tC, single (s)	7.1	6.5	6.7	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	98	99	100	100			100		
cM capacity (veh/h)	294	311	566	277	311	633	1167			1136		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	6	8	1	420	3	1	392					
Volume Left	4	5	1	0	0	1	0					
Volume Right	2	0	0	0	3	0	7					
cSH	350	288	1167	1700	1700	1136	1700					
Volume to Capacity	0.02	0.03	0.00	0.25	0.00	0.00	0.23					
Queue Length 95th (m)	0.4	0.6	0.0	0.0	0.0	0.0	0.0					
Control Delay (s)	15.5	17.8	8.1	0.0	0.0	8.2	0.0					
Lane LOS	C	C	A			A						
Approach Delay (s)	15.5	17.8	0.0			0.0						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			30.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2023 Existing Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	119	6	16	78	5	30
Future Volume (Veh/h)	119	6	16	78	5	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	151	8	20	99	6	38
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			159		294	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			159		294	155
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	96
cM capacity (veh/h)			1420		687	863
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	159	119	44			
Volume Left	0	20	6			
Volume Right	8	0	38			
cSH	1700	1420	834			
Volume to Capacity	0.09	0.01	0.05			
Queue Length 95th (m)	0.0	0.3	1.3			
Control Delay (s)	0.0	1.4	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.4	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			24.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2023 Existing Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	34	4	3	61	4	1
Future Volume (Veh/h)	34	4	3	61	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	5	4	78	5	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			49		132	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			49		132	46
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1558		859	1023
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	49	82	6			
Volume Left	0	4	5			
Volume Right	5	0	1			
cSH	1700	1558	883			
Volume to Capacity	0.03	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.2			
Control Delay (s)	0.0	0.4	9.1			
Lane LOS			A			
Approach Delay (s)	0.0	0.4	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			15.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

















2023 Existing Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	0	55	61	50
Future Volume (Veh/h)	20	1	0	55	61	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	0	63	70	57
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	162	98	127			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	162	98	127			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	829	957	1459			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	63	127			
Volume Left	23	0	0			
Volume Right	1	0	57			
cSH	834	1459	1700			
Volume to Capacity	0.03	0.00	0.07			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.4	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.4	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			16.3%	ICU Level of Service	A	
Analysis Period (min)			15			











HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2023 Existing Conditions
 PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	80	18	59	14	11	39	54	411	9	26	476	70	
Future Volume (vph)	80	18	59	14	11	39	54	411	9	26	476	70	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1		
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00		
Frt		0.95			0.92		1.00	1.00		1.00	0.98		
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1683			1637		1789	1842		1690	1782		
Flt Permitted		0.80			0.90		0.33	1.00		0.45	1.00		
Satd. Flow (perm)		1383			1487		622	1842		796	1782		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	90	20	66	16	12	44	61	462	10	29	535	79	
RTOR Reduction (vph)	0	30	0	0	34	0	0	1	0	0	7	0	
Lane Group Flow (vph)	0	146	0	0	38	0	61	471	0	29	607	0	
Heavy Vehicles (%)	5%	14%	4%	2%	18%	5%	2%	4%	2%	8%	6%	4%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)		12.0			12.0		27.2	27.2		27.2	27.2		
Effective Green, g (s)		12.0			12.0		27.2	27.2		27.2	27.2		
Actuated g/C Ratio		0.23			0.23		0.53	0.53		0.53	0.53		
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1		
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2		
Lane Grp Cap (vph)		322			347		329	974		421	943		
v/s Ratio Prot								0.26				c0.34	
v/s Ratio Perm		c0.11			0.03		0.10			0.04			
v/c Ratio		0.45			0.11		0.19	0.48		0.07	0.64		
Uniform Delay, d1		16.9			15.5		6.3	7.7		5.9	8.6		
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.0			0.1		0.3	0.4		0.1	1.5		
Delay (s)		17.9			15.6		6.6	8.1		6.0	10.2		
Level of Service		B			B		A	A		A	B		
Approach Delay (s)		17.9			15.6			7.9			10.0		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			10.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59										
Actuated Cycle Length (s)			51.4									Sum of lost time (s)	12.2
Intersection Capacity Utilization			70.7%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													












HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2023 Existing Conditions
PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	16	481	22	13	536
Future Volume (Veh/h)	15	16	481	22	13	536
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	17	506	23	14	564
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)					222	
pX, platoon unblocked	0.83					
vC, conflicting volume	1110	518			529	
vC1, stage 1 conf vol	518					
vC2, stage 2 conf vol	592					
vCu, unblocked vol	1027	518			529	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.3	
p0 queue free %	96	97			99	
cM capacity (veh/h)	441	558			1008	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	33	529	14	564		
Volume Left	16	0	14	0		
Volume Right	17	23	0	0		
cSH	495	1700	1008	1700		
Volume to Capacity	0.07	0.31	0.01	0.33		
Queue Length 95th (m)	1.6	0.0	0.3	0.0		
Control Delay (s)	12.8	0.0	8.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.8	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			38.2%		ICU Level of Service	A
Analysis Period (min)			15			





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & County Rd 47

2023 Existing Conditions
PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	16	460	6	14	503
Future Volume (Veh/h)	15	16	460	6	14	503
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	15	16	474	6	14	519
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	1021	474			480	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1021	474			480	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	94	97			99	
cM capacity (veh/h)	258	578			1047	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	31	474	6	14	519	
Volume Left	15	0	0	14	0	
Volume Right	16	0	6	0	0	
cSH	362	1700	1700	1047	1700	
Volume to Capacity	0.09	0.28	0.00	0.01	0.31	
Queue Length 95th (m)	2.1	0.0	0.0	0.3	0.0	
Control Delay (s)	15.9	0.0	0.0	8.5	0.0	
Lane LOS	C			A		
Approach Delay (s)	15.9	0.0		0.2		
Approach LOS	C					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			36.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2023 Existing Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	6	2	1	3	435	2	1	500	9
Future Volume (Veh/h)	7	2	2	6	2	1	3	435	2	1	500	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	6	2	1	3	453	2	1	521	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	988	988	526	985	991	453	530			455		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988	988	526	985	991	453	530			455		
tC, single (s)	7.2	6.5	6.2	7.3	7.0	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	97	99	100	97	99	100	100			100		
cM capacity (veh/h)	212	246	552	211	204	607	1037			1106		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	11	9	3	453	2	1	530					
Volume Left	7	6	3	0	0	1	0					
Volume Right	2	1	0	0	2	0	9					
cSH	246	225	1037	1700	1700	1106	1700					
Volume to Capacity	0.04	0.04	0.00	0.27	0.00	0.00	0.31					
Queue Length 95th (m)	1.1	0.9	0.1	0.0	0.0	0.0	0.0					
Control Delay (s)	20.3	21.7	8.5	0.0	0.0	8.3	0.0					
Lane LOS	C	C	A			A						
Approach Delay (s)	20.3	21.7	0.1			0.0						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			36.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2023 Existing Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	130	6	15	150	6	15
Future Volume (Veh/h)	130	6	15	150	6	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	149	7	17	172	7	17
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			156		358	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			156		358	152
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1424		632	878
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	156	189	24			
Volume Left	0	17	7			
Volume Right	7	0	17			
cSH	1700	1424	789			
Volume to Capacity	0.09	0.01	0.03			
Queue Length 95th (m)	0.0	0.3	0.7			
Control Delay (s)	0.0	0.8	9.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.8	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			29.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2023 Existing Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	51	7	4	44	7	5
Future Volume (Veh/h)	51	7	4	44	7	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	9	5	57	9	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			75		138	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		138	70
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1524		853	992
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	75	62	15			
Volume Left	0	5	9			
Volume Right	9	0	6			
cSH	1700	1524	904			
Volume to Capacity	0.04	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	0.6	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			15.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2023 Existing Conditions
PM Peak Hour



















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	0	15	29	30
Future Volume (Veh/h)	39	2	0	15	29	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	0	20	38	39
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	78	58	77			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78	58	77			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	906	1009	1522			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	20	77			
Volume Left	51	0	0			
Volume Right	3	0	39			
cSH	911	1522	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			13.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix D: Future Background Traffic Operations











HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2033 Background Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	10	70	26	5	32	37	387	20	13	378	41
Future Volume (vph)	86	10	70	26	5	32	37	387	20	13	378	41
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1619			1711		1755	1710		1690	1684	
Flt Permitted		0.80			0.83		0.45	1.00		0.46	1.00	
Satd. Flow (perm)		1327			1442		836	1710		827	1684	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	96	11	78	29	6	36	41	430	22	14	420	46
RTOR Reduction (vph)	0	36	0	0	28	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	149	0	0	43	0	41	450	0	14	461	0
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.6			11.6		25.5	25.5		25.5	25.5	
Effective Green, g (s)		11.6			11.6		25.5	25.5		25.5	25.5	
Actuated g/C Ratio		0.24			0.24		0.52	0.52		0.52	0.52	
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2	
Lane Grp Cap (vph)		312			339		432	884		427	871	
v/s Ratio Prot								0.26			c0.27	
v/s Ratio Perm		c0.11			0.03		0.05			0.02		
v/c Ratio		0.48			0.13		0.09	0.51		0.03	0.53	
Uniform Delay, d1		16.2			14.9		6.0	7.8		5.8	7.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.2		0.1	0.5		0.0	0.6	
Delay (s)		17.4			15.0		6.1	8.3		5.9	8.5	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		17.4			15.0			8.1			8.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			49.3				Sum of lost time (s)			12.2		
Intersection Capacity Utilization			54.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												












HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2033 Background Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	2	463	8	2	498
Future Volume (Veh/h)	4	2	463	8	2	498
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	2	503	9	2	541
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.89					
vC, conflicting volume	1052	508			512	
vC1, stage 1 conf vol	508					
vC2, stage 2 conf vol	545					
vCu, unblocked vol	996	508			512	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	465	565			1053	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	6	512	2	541		
Volume Left	4	0	2	0		
Volume Right	2	9	0	0		
cSH	494	1700	1053	1700		
Volume to Capacity	0.01	0.30	0.00	0.32		
Queue Length 95th (m)	0.3	0.0	0.0	0.0		
Control Delay (s)	12.4	0.0	8.4	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.4	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.2%	ICU Level of Service	A	
Analysis Period (min)			15			





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & County Rd 47

2033 Background Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	15	402	58	14	404
Future Volume (Veh/h)	59	15	402	58	14	404
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	66	17	447	64	16	449
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	928	447			511	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	928	447			511	
tC, single (s)	7.3	6.3			4.2	
tC, 2 stage (s)						
tF (s)	4.3	3.4			2.3	
p0 queue free %	68	97			98	
cM capacity (veh/h)	209	597			1014	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	83	447	64	16	449	
Volume Left	66	0	0	16	0	
Volume Right	17	0	64	0	0	
cSH	241	1700	1700	1014	1700	
Volume to Capacity	0.34	0.26	0.04	0.02	0.26	
Queue Length 95th (m)	11.1	0.0	0.0	0.4	0.0	
Control Delay (s)	27.6	0.0	0.0	8.6	0.0	
Lane LOS	D			A		
Approach Delay (s)	27.6	0.0			0.3	
Approach LOS	D					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2033 Background Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	5	3	0	1	471	3	1	431	6
Future Volume (Veh/h)	4	0	2	5	3	0	1	471	3	1	431	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	5	3	0	1	512	3	1	468	7
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	989	990	472	986	991	512	475			515		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	989	990	472	986	991	512	475			515		
tC, single (s)	7.1	6.5	6.7	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	98	99	100	100			100		
cM capacity (veh/h)	223	246	505	209	246	562	1087			1051		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	6	8	1	512	3	1	475					
Volume Left	4	5	1	0	0	1	0					
Volume Right	2	0	0	0	3	0	7					
cSH	274	221	1087	1700	1700	1051	1700					
Volume to Capacity	0.02	0.04	0.00	0.30	0.00	0.00	0.28					
Queue Length 95th (m)	0.5	0.9	0.0	0.0	0.0	0.0	0.0					
Control Delay (s)	18.4	21.9	8.3	0.0	0.0	8.4	0.0					
Lane LOS	C	C	A			A						
Approach Delay (s)	18.4	21.9	0.0			0.0						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			34.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2033 Background Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	119	6	18	78	5	33
Future Volume (Veh/h)	119	6	18	78	5	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	151	8	23	99	6	42
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			159		300	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			159		300	155
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	95
cM capacity (veh/h)			1420		680	863
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	159	122	48			
Volume Left	0	23	6			
Volume Right	8	0	42			
cSH	1700	1420	835			
Volume to Capacity	0.09	0.02	0.06			
Queue Length 95th (m)	0.0	0.4	1.4			
Control Delay (s)	0.0	1.5	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.5	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			25.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2033 Background Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	34	4	3	61	4	1
Future Volume (Veh/h)	34	4	3	61	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	5	4	78	5	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			49		132	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			49		132	46
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1558		859	1023
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	49	82	6			
Volume Left	0	4	5			
Volume Right	5	0	1			
cSH	1700	1558	883			
Volume to Capacity	0.03	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.2			
Control Delay (s)	0.0	0.4	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			15.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

















2033 Background Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	0	61	68	50
Future Volume (Veh/h)	20	1	0	61	68	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	0	70	78	57
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	176	106	135			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176	106	135			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	813	948	1449			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	70	135			
Volume Left	23	0	0			
Volume Right	1	0	57			
cSH	818	1449	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.5	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	16.6%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2033 Background Conditions
 PM Peak Hour

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	88	19	65	14	11	39	59	501	9	26	581	77		
Future Volume (vph)	88	19	65	14	11	39	59	501	9	26	581	77		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1			
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00			
Frt		0.95			0.92		1.00	1.00		1.00	0.98			
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00			
Satd. Flow (prot)		1683			1637		1789	1843		1690	1784			
Flt Permitted		0.80			0.90		0.24	1.00		0.37	1.00			
Satd. Flow (perm)		1382			1488		454	1843		651	1784			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89		
Adj. Flow (vph)	99	21	73	16	12	44	66	563	10	29	653	87		
RTOR Reduction (vph)	0	30	0	0	34	0	0	1	0	0	6	0		
Lane Group Flow (vph)	0	163	0	0	38	0	66	572	0	29	734	0		
Heavy Vehicles (%)	5%	14%	4%	2%	18%	5%	2%	4%	2%	8%	6%	4%		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		4			8			2			6			
Permitted Phases	4			8			2			6				
Actuated Green, G (s)		13.2			13.2		31.2	31.2		31.2	31.2			
Effective Green, g (s)		13.2			13.2		31.2	31.2		31.2	31.2			
Actuated g/C Ratio		0.23			0.23		0.55	0.55		0.55	0.55			
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1			
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2			
Lane Grp Cap (vph)		322			347		250	1015		358	983			
v/s Ratio Prot								0.31				c0.41		
v/s Ratio Perm		c0.12			0.03		0.15			0.04				
v/c Ratio		0.51			0.11		0.26	0.56		0.08	0.75			
Uniform Delay, d1		18.9			17.1		6.7	8.3		6.0	9.7			
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00			
Incremental Delay, d2		1.3			0.1		0.6	0.7		0.1	3.2			
Delay (s)		20.1			17.2		7.3	9.0		6.1	12.9			
Level of Service		C			B		A	A		A	B			
Approach Delay (s)		20.1			17.2			8.8			12.6			
Approach LOS		C			B			A			B			
Intersection Summary														
HCM 2000 Control Delay			12.2									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.68											
Actuated Cycle Length (s)			56.6								12.2			
Intersection Capacity Utilization			75.7%										ICU Level of Service	D
Analysis Period (min)			15											
c	Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis

2: Highway 12 & Gladstone St












2033 Background Conditions
PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	T	T
Traffic Volume (veh/h)	15	16	587	22	13	654
Future Volume (Veh/h)	15	16	587	22	13	654
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	17	618	23	14	688
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.72					
vC, conflicting volume	1346	630			641	
vC1, stage 1 conf vol	630					
vC2, stage 2 conf vol	716					
vCu, unblocked vol	1285	630			641	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.3	
p0 queue free %	96	96			98	
cM capacity (veh/h)	367	482			915	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	33	641	14	688		
Volume Left	16	0	14	0		
Volume Right	17	23	0	0		
cSH	419	1700	915	1700		
Volume to Capacity	0.08	0.38	0.02	0.40		
Queue Length 95th (m)	1.9	0.0	0.4	0.0		
Control Delay (s)	14.3	0.0	9.0	0.0		
Lane LOS	B		A			
Approach Delay (s)	14.3	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	44.4%		ICU Level of Service		A	
Analysis Period (min)	15					





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & County Rd 47

2033 Background Conditions
PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	17	18	561	7	15	613
Future Volume (Veh/h)	17	18	561	7	15	613
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	19	578	7	15	632
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	1240	578			585	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1240	578			585	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	91	96			98	
cM capacity (veh/h)	190	504			956	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	37	578	7	15	632	
Volume Left	18	0	0	15	0	
Volume Right	19	0	7	0	0	
cSH	280	1700	1700	956	1700	
Volume to Capacity	0.13	0.34	0.00	0.02	0.37	
Queue Length 95th (m)	3.4	0.0	0.0	0.4	0.0	
Control Delay (s)	19.8	0.0	0.0	8.8	0.0	
Lane LOS	C			A		
Approach Delay (s)	19.8	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			42.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2033 Background Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	6	2	1	3	530	2	1	609	9
Future Volume (Veh/h)	7	2	2	6	2	1	3	530	2	1	609	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	6	2	1	3	552	2	1	634	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1200	1200	638	1197	1203	552	643			554		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1200	1200	638	1197	1203	552	643			554		
tC, single (s)	7.2	6.5	6.2	7.3	7.0	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	95	99	100	96	99	100	100			100		
cM capacity (veh/h)	151	184	476	149	149	533	942			1016		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	11	9	3	552	2	1	643					
Volume Left	7	6	3	0	0	1	0					
Volume Right	2	1	0	0	2	0	9					
cSH	179	162	942	1700	1700	1016	1700					
Volume to Capacity	0.06	0.06	0.00	0.32	0.00	0.00	0.38					
Queue Length 95th (m)	1.5	1.3	0.1	0.0	0.0	0.0	0.0					
Control Delay (s)	26.4	28.5	8.8	0.0	0.0	8.5	0.0					
Lane LOS	D	D	A			A						
Approach Delay (s)	26.4	28.5	0.0			0.0						
Approach LOS	D	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			42.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2033 Background Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	130	6	17	150	6	17
Future Volume (Veh/h)	130	6	17	150	6	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	149	7	20	172	7	20
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			156		364	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			156		364	152
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1424		626	878
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	156	192	27			
Volume Left	0	20	7			
Volume Right	7	0	20			
cSH	1700	1424	795			
Volume to Capacity	0.09	0.01	0.03			
Queue Length 95th (m)	0.0	0.3	0.8			
Control Delay (s)	0.0	0.9	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			29.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2033 Background Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	51	7	4	44	7	5
Future Volume (Veh/h)	51	7	4	44	7	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	9	5	57	9	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			75		138	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		138	70
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1524		853	992
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	75	62	15			
Volume Left	0	5	9			
Volume Right	9	0	6			
cSH	1700	1524	904			
Volume to Capacity	0.04	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	0.6	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			15.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4



















2033 Background Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	0	17	32	30
Future Volume (Veh/h)	39	2	0	17	32	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	0	22	42	39
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	84	62	81			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84	62	81			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	899	1004	1517			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	22	81			
Volume Left	51	0	0			
Volume Right	3	0	39			
cSH	904	1517	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			13.5%	ICU Level of Service	A	
Analysis Period (min)			15			











HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2043 Background Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	11	78	26	5	32	41	472	20	13	461	46
Future Volume (vph)	95	11	78	26	5	32	41	472	20	13	461	46
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1619			1711		1755	1711		1690	1685	
Flt Permitted		0.80			0.83		0.37	1.00		0.38	1.00	
Satd. Flow (perm)		1329			1456		676	1711		676	1685	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	12	87	29	6	36	46	524	22	14	512	51
RTOR Reduction (vph)	0	36	0	0	27	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	169	0	0	44	0	46	544	0	14	558	0
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.7			12.7		27.3	27.3		27.3	27.3	
Effective Green, g (s)		12.7			12.7		27.3	27.3		27.3	27.3	
Actuated g/C Ratio		0.24			0.24		0.52	0.52		0.52	0.52	
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2	
Lane Grp Cap (vph)		323			354		353	894		353	881	
v/s Ratio Prot								0.32			c0.33	
v/s Ratio Perm		c0.13			0.03		0.07			0.02		
v/c Ratio		0.52			0.12		0.13	0.61		0.04	0.63	
Uniform Delay, d1		17.1			15.4		6.4	8.7		6.1	8.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			0.2		0.2	1.2		0.0	1.5	
Delay (s)		18.7			15.6		6.6	9.9		6.1	10.4	
Level of Service		B			B		A	A		A	B	
Approach Delay (s)		18.7			15.6			9.7			10.3	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			11.5								HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			52.2							12.2		
Intersection Capacity Utilization			59.2%								ICU Level of Service	B
Analysis Period (min)			15									
c Critical Lane Group												












HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2043 Background Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	2	565	8	2	607
Future Volume (Veh/h)	4	2	565	8	2	607
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	2	614	9	2	660
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)						222
pX, platoon unblocked	0.81					
vC, conflicting volume	1282	618			623	
vC1, stage 1 conf vol	618					
vC2, stage 2 conf vol	664					
vCu, unblocked vol	1230	618			623	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	392	489			958	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	6	623	2	660		
Volume Left	4	0	2	0		
Volume Right	2	9	0	0		
cSH	419	1700	958	1700		
Volume to Capacity	0.01	0.37	0.00	0.39		
Queue Length 95th (m)	0.3	0.0	0.0	0.0		
Control Delay (s)	13.7	0.0	8.8	0.0		
Lane LOS	B		A			
Approach Delay (s)	13.7	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.9%	ICU Level of Service	A	
Analysis Period (min)			15			





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & County Rd 47

2043 Background Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	66	17	490	64	15	492
Future Volume (Veh/h)	66	17	490	64	15	492
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	73	19	544	71	17	547
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	1125	544			615	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1125	544			615	
tC, single (s)	7.3	6.3			4.2	
tC, 2 stage (s)						
tF (s)	4.3	3.4			2.3	
p0 queue free %	53	96			98	
cM capacity (veh/h)	154	526			927	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	92	544	71	17	547	
Volume Left	73	0	0	17	0	
Volume Right	19	0	71	0	0	
cSH	180	1700	1700	927	1700	
Volume to Capacity	0.51	0.32	0.04	0.02	0.32	
Queue Length 95th (m)	19.3	0.0	0.0	0.4	0.0	
Control Delay (s)	44.2	0.0	0.0	9.0	0.0	
Lane LOS	E			A		
Approach Delay (s)	44.2	0.0			0.3	
Approach LOS	E					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			37.3%		ICU Level of Service	A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2043 Background Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	5	3	0	1	574	3	1	526	6
Future Volume (Veh/h)	4	0	2	5	3	0	1	574	3	1	526	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	5	3	0	1	624	3	1	572	7
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	1205	1206	576	1202	1207	624	579			627		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1205	1206	576	1202	1207	624	579			627		
tC, single (s)	7.1	6.5	6.7	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	97	98	100	100			100		
cM capacity (veh/h)	158	183	437	148	183	485	995			955		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	6	8	1	624	3	1	579					
Volume Left	4	5	1	0	0	1	0					
Volume Right	2	0	0	0	3	0	7					
cSH	201	159	995	1700	1700	955	1700					
Volume to Capacity	0.03	0.05	0.00	0.37	0.00	0.00	0.34					
Queue Length 95th (m)	0.7	1.2	0.0	0.0	0.0	0.0	0.0					
Control Delay (s)	23.4	28.8	8.6	0.0	0.0	8.8	0.0					
Lane LOS	C	D	A			A						
Approach Delay (s)	23.4	28.8	0.0			0.0						
Approach LOS	C	D										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			40.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2043 Background Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	119	6	20	78	5	37
Future Volume (Veh/h)	119	6	20	78	5	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	151	8	25	99	6	47
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			159		304	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			159		304	155
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	95
cM capacity (veh/h)			1420		676	863
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	159	124	53			
Volume Left	0	25	6			
Volume Right	8	0	47			
cSH	1700	1420	836			
Volume to Capacity	0.09	0.02	0.06			
Queue Length 95th (m)	0.0	0.4	1.5			
Control Delay (s)	0.0	1.6	9.6			
Lane LOS			A			
Approach Delay (s)	0.0	1.6	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			25.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2043 Background Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	34	4	3	61	4	1
Future Volume (Veh/h)	34	4	3	61	4	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	5	4	78	5	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			49		132	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			49		132	46
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1558		859	1023
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	49	82	6			
Volume Left	0	4	5			
Volume Right	5	0	1			
cSH	1700	1558	883			
Volume to Capacity	0.03	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.2			
Control Delay (s)	0.0	0.4	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			15.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

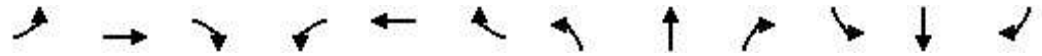
2043 Background Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	0	67	75	50
Future Volume (Veh/h)	20	1	0	67	75	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	0	77	86	57
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	192	114	143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	114	143			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	797	938	1440			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	77	143			
Volume Left	23	0	0			
Volume Right	1	0	57			
cSH	802	1440	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.6	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	17.0%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2043 Background Conditions
 PM Peak Hour



	L			WBT		WBR	NBL	NBT		NBR	SBL		SBT	SBR	
Lane Configurations	↕			↕			↕	↕			↕	↕			
				4	11	39	66	611	9	26	708	85			
Future Volume (vph)	98	21	72	14	11	39	66	611	9	26	708	85			
				0	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.1			6.1			6.1	6.1		6.1	6.1				
				1.00			1.00	1.00		1.00	1.00				
Frt	0.95			0.92			1.00	1.00		1.00	0.98				
				0.99			0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1683			1637			1789	1844		1690	1787				
				0.91			0.15	1.00		0.28	1.00				
Satd. Flow (perm)	1383			1506			290	1844		506	1787				
				9	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	110	24	81	16	12	44	74	687	10	29	796	96			
				0	34	0	0	0	0	0	5	0			
Lane Group Flow (vph)	0	185	0	0	38	0	74	697	0	29	887	0			
				%	18%	5%	2%	4%	2%	8%	6%	4%			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA				
				8			2			6					
Permitted Phases	4			8			2			6					
				14.7			37.8	37.8		37.8	37.8				
Effective Green, g (s)	14.7			14.7			37.8	37.8		37.8	37.8				
				0.23			0.58	0.58		0.58	0.58				
Clearance Time (s)	6.1			6.1			6.1	6.1		6.1	6.1				
				3.0			3.2	3.2		3.2	3.2				
Lane Grp Cap (vph)	314			342			169	1077		295	1044				
							0.38			c0.50					
v/s Ratio Perm	c0.13			0.03			0.25			0.06					
				0.11			0.44	0.65		0.10	0.85				
Uniform Delay, d1	22.3			19.8			7.5	9.0		5.9	11.1				
				1.00			1.00	1.00		1.00	1.00				
Incremental Delay, d2	2.8			0.1			1.9	1.4		0.2	6.7				
				20.0			9.5	10.4		6.1	17.8				
Level of Service	C			B			A	B		A	B				
Approach Delay (s)	25.1			20.0			10.3			17.4					
Approach LOS	C			B			B			B					
Intersection Summary															
HCM 2000 Control Delay	15.6			HCM 2000 Level of Service				B							
HCM 2000 Volume to Capacity ratio	0.78														
Actuated Cycle Length (s)	64.7			Sum of lost time (s)				12.2							
Intersection Capacity Utilization	82.6%			ICU Level of Service				E							
Analysis Period (min)	15														
c Critical Lane Group															

HCM Unsignalized Intersection Capacity Analysis

2: Highway 12 & Gladstone St

2043 Background Conditions
PM Peak Hour














Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	16	715	22	13	797
Future Volume (Veh/h)	15	16	715	22	13	797
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	17	753	23	14	839
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.59					
vC, conflicting volume	1632	764			776	
vC1, stage 1 conf vol	764					
vC2, stage 2 conf vol	867					
vCu, unblocked vol	1724	764			776	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.3	
p0 queue free %	94	96			98	
cM capacity (veh/h)	289	403			814	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	33	776	14	839		
Volume Left	16	0	14	0		
Volume Right	17	23	0	0		
cSH	338	1700	814	1700		
Volume to Capacity	0.10	0.46	0.02	0.49		
Queue Length 95th (m)	2.4	0.0	0.4	0.0		
Control Delay (s)	16.8	0.0	9.5	0.0		
Lane LOS	C		A			
Approach Delay (s)	16.8	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			51.9%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

3: Highway 12 & County Rd 47





















2043 Background Conditions
PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	20	684	8	17	747
Future Volume (Veh/h)	18	20	684	8	17	747
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	19	21	705	8	18	770
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	1511	705			713	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1511	705			713	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	85	95			98	
cM capacity (veh/h)	130	426			855	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	40	705	8	18	770	
Volume Left	19	0	0	18	0	
Volume Right	21	0	8	0	0	
cSH	204	1700	1700	855	1700	
Volume to Capacity	0.20	0.41	0.00	0.02	0.45	
Queue Length 95th (m)	5.4	0.0	0.0	0.5	0.0	
Control Delay (s)	26.9	0.0	0.0	9.3	0.0	
Lane LOS	D			A		
Approach Delay (s)	26.9	0.0			0.2	
Approach LOS	D					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			49.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Highway 12 & Concession Rd 3

2043 Background Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	6	2	1	3	646	2	1	743	9
Future Volume (Veh/h)	7	2	2	6	2	1	3	646	2	1	743	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	6	2	1	3	673	2	1	774	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1462	1462	778	1458	1464	673	783			675		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1462	1462	778	1458	1464	673	783			675		
tC, single (s)	7.2	6.5	6.2	7.3	7.0	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	93	98	99	94	98	100	100			100		
cM capacity (veh/h)	98	128	396	97	101	455	835			916		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	11	9	3	673	2	1	783					
Volume Left	7	6	3	0	0	1	0					
Volume Right	2	1	0	0	2	0	9					
cSH	120	108	835	1700	1700	916	1700					
Volume to Capacity	0.09	0.08	0.00	0.40	0.00	0.00	0.46					
Queue Length 95th (m)	2.3	2.0	0.1	0.0	0.0	0.0	0.0					
Control Delay (s)	38.1	41.5	9.3	0.0	0.0	8.9	0.0					
Lane LOS	E	E	A			A						
Approach Delay (s)	38.1	41.5	0.0			0.0						
Approach LOS	E	E										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			49.7%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2043 Background Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	130	6	18	150	6	18
Future Volume (Veh/h)	130	6	18	150	6	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	149	7	21	172	7	21
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			156		366	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			156		366	152
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1424		624	878
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	156	193	28			
Volume Left	0	21	7			
Volume Right	7	0	21			
cSH	1700	1424	797			
Volume to Capacity	0.09	0.01	0.04			
Queue Length 95th (m)	0.0	0.3	0.8			
Control Delay (s)	0.0	0.9	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			29.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2043 Background Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	51	7	4	44	7	5
Future Volume (Veh/h)	51	7	4	44	7	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	9	5	57	9	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			75		138	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		138	70
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1524		853	992
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	75	62	15			
Volume Left	0	5	9			
Volume Right	9	0	6			
cSH	1700	1524	904			
Volume to Capacity	0.04	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	0.6	9.1			
Lane LOS			A			
Approach Delay (s)	0.0	0.6	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			15.6%	ICU Level of Service	A	
Analysis Period (min)			15			

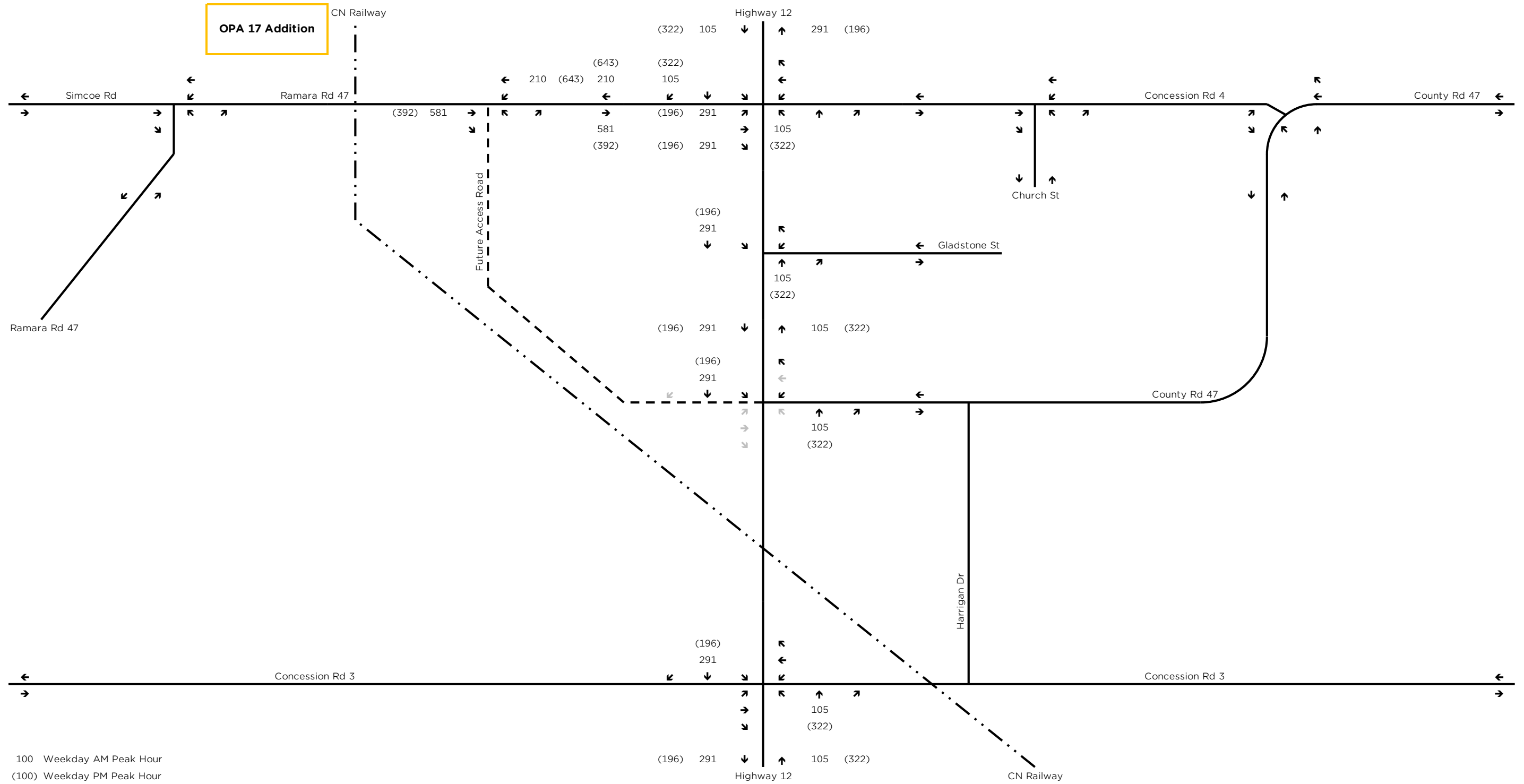
HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2043 Background Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			T	T	
Traffic Volume (veh/h)	39	2	0	18	35	30
Future Volume (Veh/h)	39	2	0	18	35	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	0	24	46	39
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	90	66	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	66	85			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	892	998	1512			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	24	85			
Volume Left	51	0	0			
Volume Right	3	0	39			
cSH	897	1512	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			13.7%	ICU Level of Service	A	
Analysis Period (min)			15			

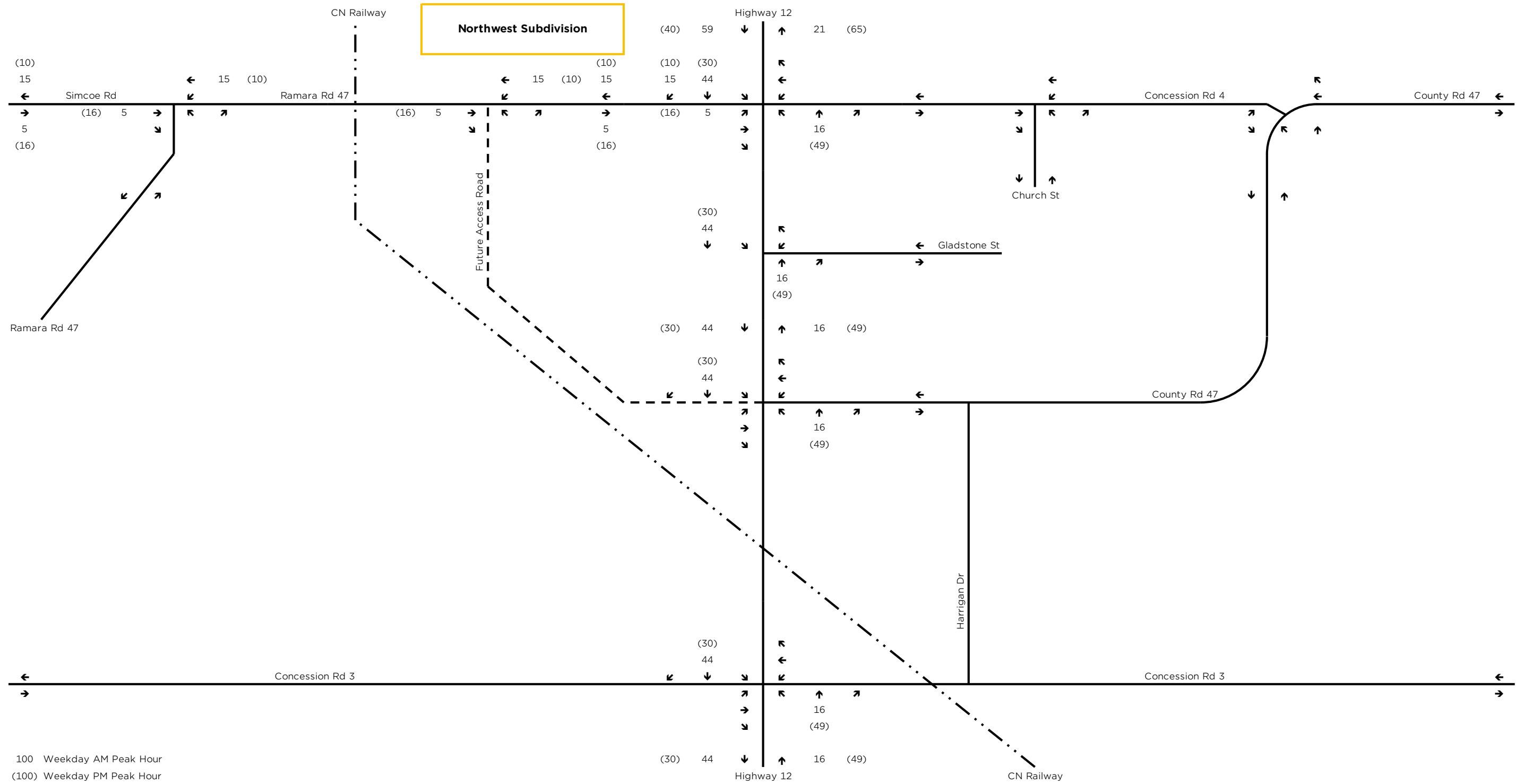
**Appendix E:
Future Development Traffic
Volumes**



BRECHIN TRANSPORTATION STUDY - APPENDIX E

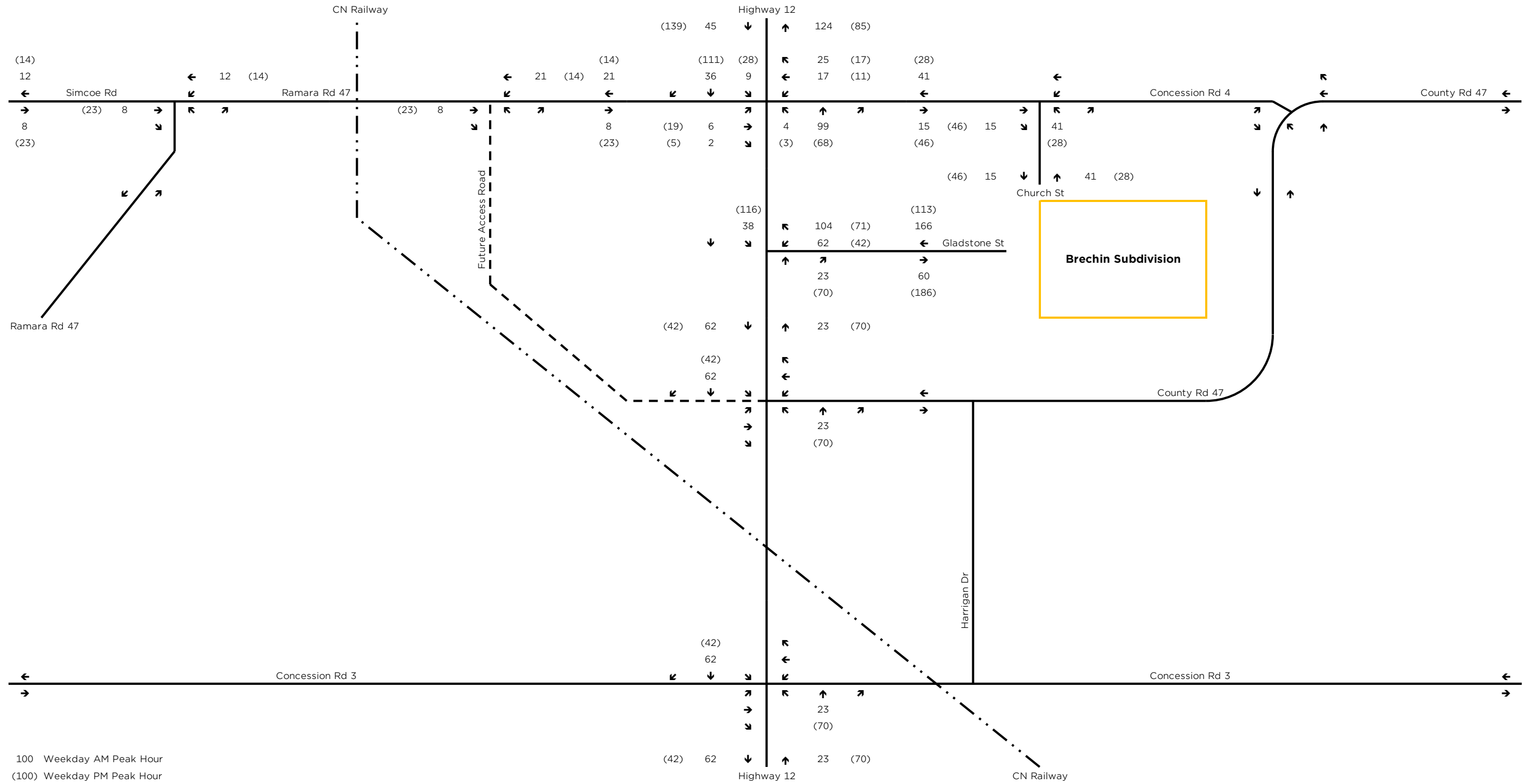
Figure E1: OPA 17 Addition





BRECHIN TRANSPORTATION STUDY - APPENDIX E
 Figure E2: Northwest Subdivision

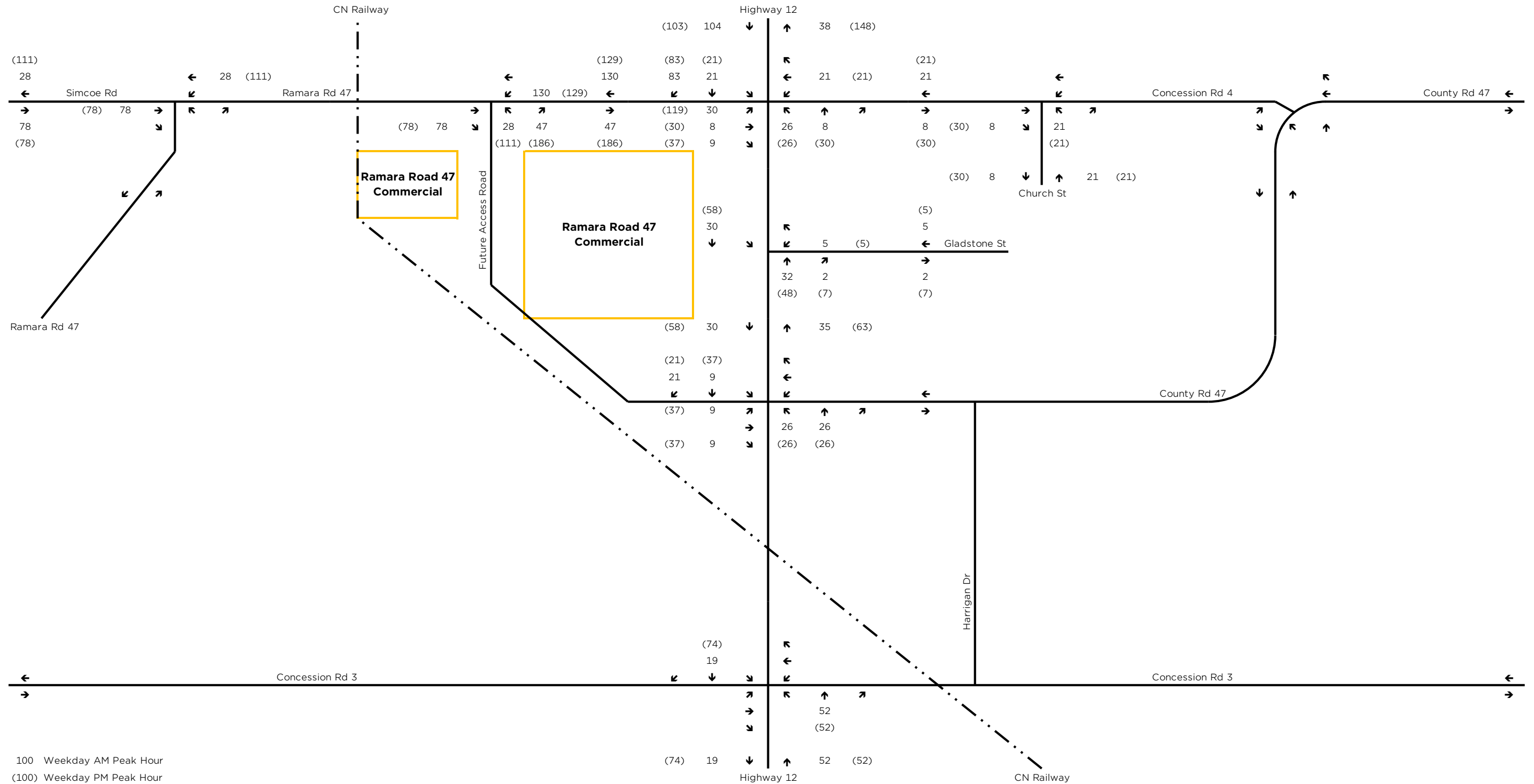




BRECHIN TRANSPORTATION STUDY - APPENDIX E

Figure E3: Brechin Subdivision

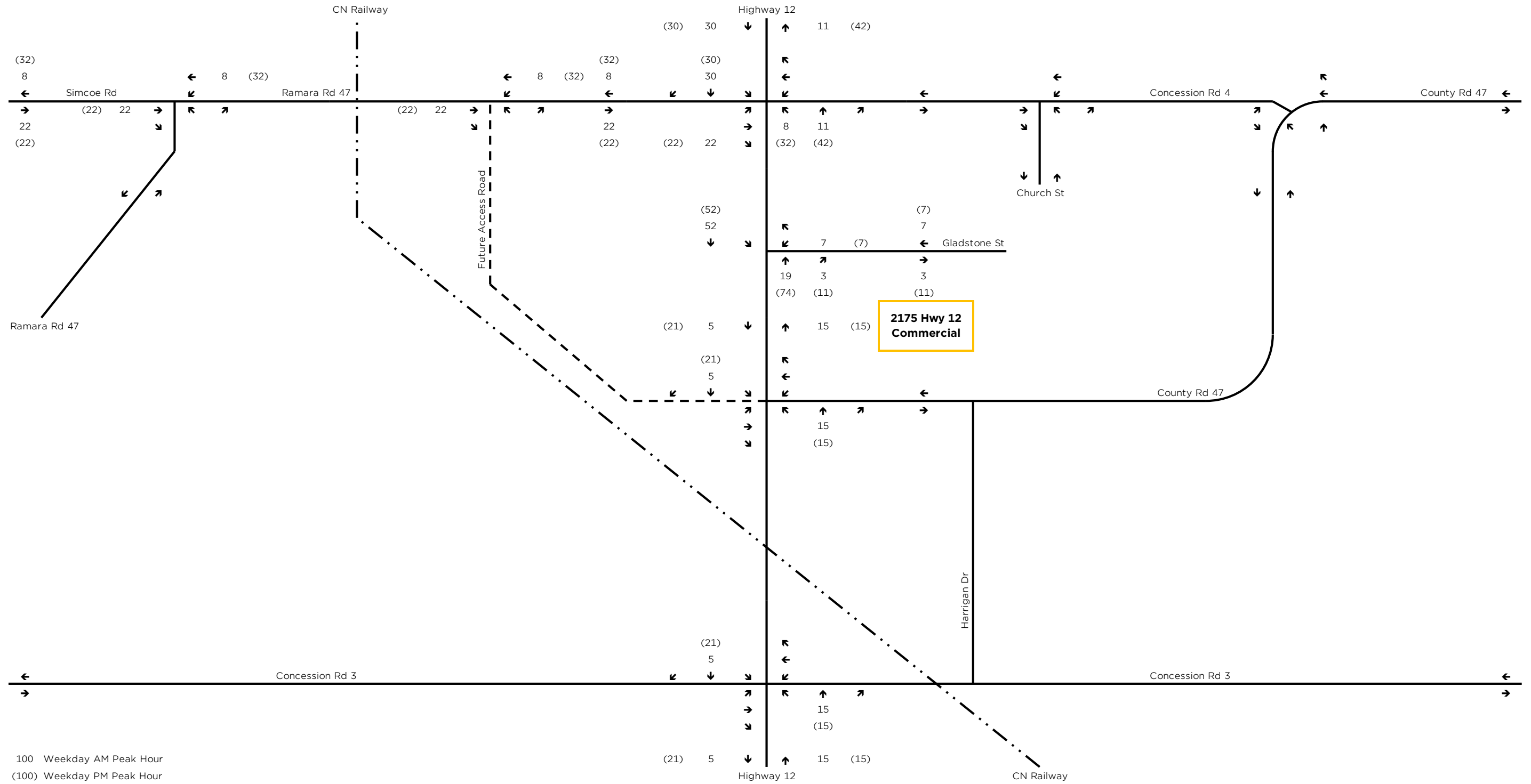




100 Weekday AM Peak Hour
 (100) Weekday PM Peak Hour

BRECHIN TRANSPORTATION STUDY - APPENDIX E
 Figure E4: Ramara Road 47 Commercial

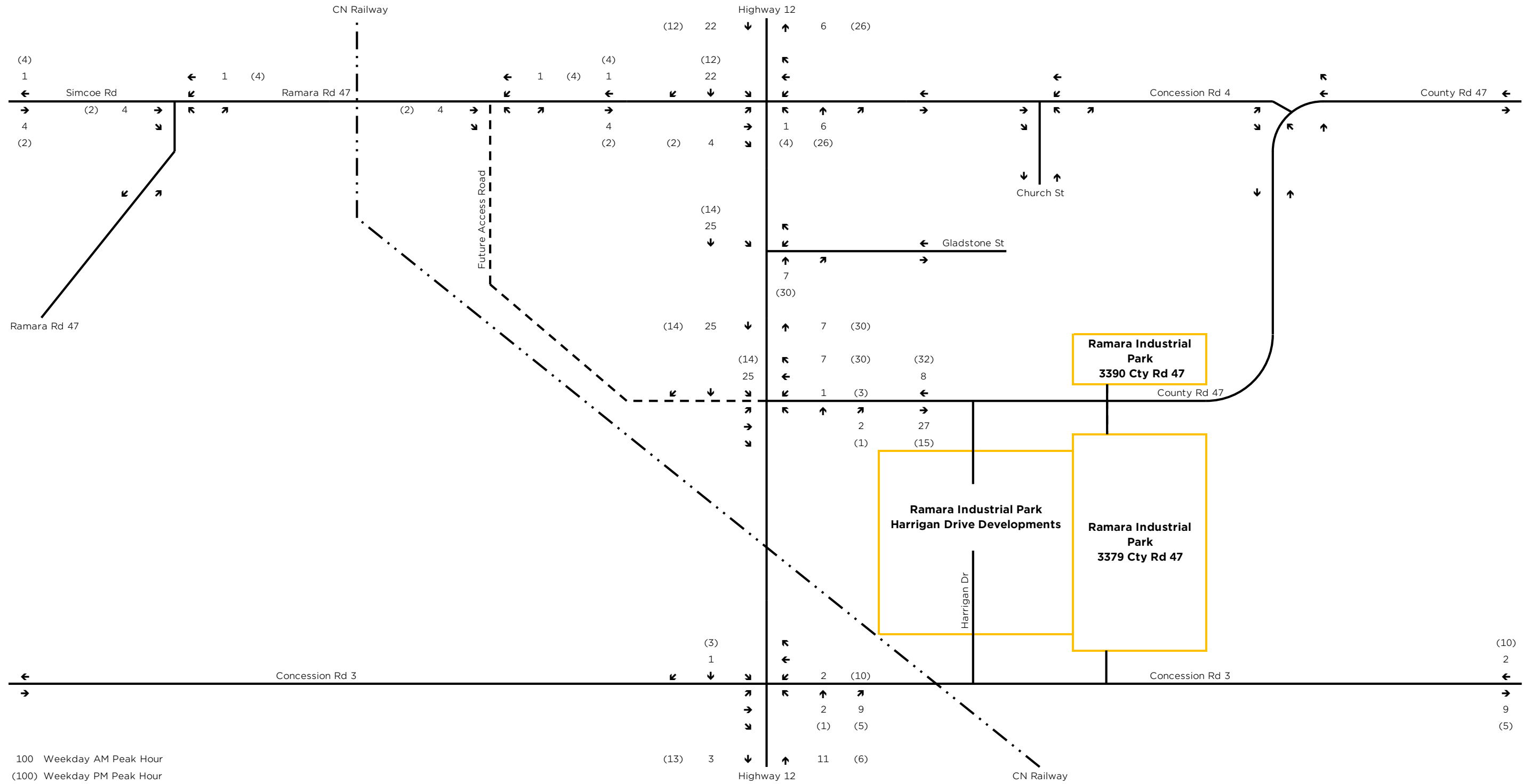




BRECHIN TRANSPORTATION STUDY - APPENDIX E

Figure E5: Highway 12 Commercial





BRECHIN TRANSPORTATION STUDY - APPENDIX E

















Figure E6: Ramara Industrial Park



Appendix F: Future Total Traffic Operations











HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2028 Total Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	15	103	26	22	57	51	482	20	22	483	39
Future Volume (vph)	81	15	103	26	22	57	51	482	20	22	483	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1610			1715		1755	1711		1690	1688	
Flt Permitted		0.82			0.88		0.35	1.00		0.36	1.00	
Satd. Flow (perm)		1339			1536		638	1711		647	1688	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	17	114	29	24	63	57	536	22	24	537	43
RTOR Reduction (vph)	0	55	0	0	47	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	166	0	0	69	0	57	556	0	24	577	0
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.8			12.8		25.6	25.6		25.6	25.6	
Effective Green, g (s)		12.8			12.8		25.6	25.6		25.6	25.6	
Actuated g/C Ratio		0.25			0.25		0.51	0.51		0.51	0.51	
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2	
Lane Grp Cap (vph)		338			388		322	865		327	854	
v/s Ratio Prot								0.32			c0.34	
v/s Ratio Perm		c0.12			0.04		0.09			0.04		
v/c Ratio		0.49			0.18		0.18	0.64		0.07	0.68	
Uniform Delay, d1		16.1			14.8		6.8	9.2		6.4	9.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			0.2		0.3	1.7		0.1	2.2	
Delay (s)		17.2			15.0		7.1	10.8		6.5	11.5	
Level of Service		B			B		A	B		A	B	
Approach Delay (s)		17.2			15.0			10.5			11.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			50.6				Sum of lost time (s)			12.2		
Intersection Capacity Utilization			70.8%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												












HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2028 Total Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	74	106	463	33	40	590
Future Volume (Veh/h)	74	106	463	33	40	590
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	115	503	36	43	641
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (m)						222
pX, platoon unblocked	0.80					
vC, conflicting volume	1248	521			539	
vC1, stage 1 conf vol	521					
vC2, stage 2 conf vol	727					
vCu, unblocked vol	1186	521			539	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	79			96	
cM capacity (veh/h)	380	555			1029	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	195	539	43	641		
Volume Left	80	0	43	0		
Volume Right	115	36	0	0		
cSH	467	1700	1029	1700		
Volume to Capacity	0.42	0.32	0.04	0.38		
Queue Length 95th (m)	15.4	0.0	1.0	0.0		
Control Delay (s)	18.1	0.0	8.6	0.0		
Lane LOS	C		A			
Approach Delay (s)	18.1	0.0	0.5			
Approach LOS	C					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			50.3%		ICU Level of Service	A
Analysis Period (min)			15			





















HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & County Rd 47

2028 Total Conditions
 AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	39	402	63	100	433
Future Volume (Veh/h)	60	39	402	63	100	433
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	67	43	447	70	111	481
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	1150	447			517	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1150	447			517	
tC, single (s)	7.3	6.3			4.2	
tC, 2 stage (s)						
tF (s)	4.3	3.4			2.3	
p0 queue free %	50	93			89	
cM capacity (veh/h)	134	597			1009	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	110	447	70	111	481	
Volume Left	67	0	0	111	0	
Volume Right	43	0	70	0	0	
cSH	192	1700	1700	1009	1700	
Volume to Capacity	0.57	0.26	0.04	0.11	0.28	
Queue Length 95th (m)	23.4	0.0	0.0	2.8	0.0	
Control Delay (s)	46.1	0.0	0.0	9.0	0.0	
Lane LOS	E			A		
Approach Delay (s)	46.1	0.0		1.7		
Approach LOS	E					
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			42.4%	ICU Level of Service	A	
Analysis Period (min)			15			

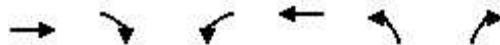
HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2028 Total Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	2	12	3	1	1	471	33	1	462	6
Future Volume (Veh/h)	4	1	2	12	3	1	1	471	33	1	462	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	2	13	3	1	1	512	36	1	502	7
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	1024	1058	506	1020	1025	512	509			548		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1024	1058	506	1020	1025	512	509			548		
tC, single (s)	7.1	6.5	6.7	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	93	99	100	100			100		
cM capacity (veh/h)	211	224	482	197	235	562	1056			1021		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	7	17	1	512	36	1	509					
Volume Left	4	13	1	0	0	1	0					
Volume Right	2	1	0	0	36	0	7					
cSH	254	211	1056	1700	1700	1021	1700					
Volume to Capacity	0.03	0.08	0.00	0.30	0.02	0.00	0.30					
Queue Length 95th (m)	0.6	2.0	0.0	0.0	0.0	0.0	0.0					
Control Delay (s)	19.6	23.5	8.4	0.0	0.0	8.5	0.0					
Lane LOS	C	C	A			A						
Approach Delay (s)	19.6	23.5	0.0			0.0						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			34.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2028 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	161	6	17	101	5	32
Future Volume (Veh/h)	161	6	17	101	5	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	204	8	22	128	6	41
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			212		380	208
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			212		380	208
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	95
cM capacity (veh/h)			1358		612	805
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	212	150	47			
Volume Left	0	22	6			
Volume Right	8	0	41			
cSH	1700	1358	774			
Volume to Capacity	0.12	0.02	0.06			
Queue Length 95th (m)	0.0	0.4	1.5			
Control Delay (s)	0.0	1.2	10.0			
Lane LOS			A	A		
Approach Delay (s)	0.0	1.2	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			28.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2028 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	34	19	3	61	45	1
Future Volume (Veh/h)	34	19	3	61	45	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	24	4	78	58	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			68		142	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			68		142	56
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1533		849	1011
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	68	82	59			
Volume Left	0	4	58			
Volume Right	24	0	1			
cSH	1700	1533	851			
Volume to Capacity	0.04	0.00	0.07			
Queue Length 95th (m)	0.0	0.1	1.7			
Control Delay (s)	0.0	0.4	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			15.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4



















2028 Total Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	1	58	64	50
Future Volume (Veh/h)	20	1	1	58	64	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	1	67	74	57
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	172	102	131			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	102	131			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	818	953	1454			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	68	131			
Volume Left	23	1	0			
Volume Right	1	0	57			
cSH	823	1454	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.5	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.5	0.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2028 Total Conditions
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	37	96	14	22	56	106	652	9	54	709	74
Future Volume (vph)	84	37	96	14	22	56	106	652	9	54	709	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1670			1626		1789	1844		1690	1790	
Flt Permitted		0.85			0.93		0.19	1.00		0.27	1.00	
Satd. Flow (perm)		1452			1529		357	1844		485	1790	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	94	42	108	16	25	63	119	733	10	61	797	83
RTOR Reduction (vph)	0	36	0	0	50	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	208	0	0	54	0	119	743	0	61	877	0
Heavy Vehicles (%)	5%	14%	4%	2%	18%	5%	2%	4%	2%	8%	6%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.5			16.5		48.7	48.7		48.7	48.7	
Effective Green, g (s)		16.5			16.5		48.7	48.7		48.7	48.7	
Actuated g/C Ratio		0.21			0.21		0.63	0.63		0.63	0.63	
Clearance Time (s)		6.1			6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0		3.2	3.2		3.2	3.2	
Lane Grp Cap (vph)		309			325		224	1160		305	1126	
v/s Ratio Prot								0.40			c0.49	
v/s Ratio Perm		c0.14			0.04		0.33			0.13		
v/c Ratio		0.67			0.17		0.53	0.64		0.20	0.78	
Uniform Delay, d1		28.0			24.8		8.0	8.9		6.1	10.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.7			0.2		2.5	1.2		0.3	3.5	
Delay (s)		33.6			25.1		10.5	10.1		6.4	13.9	
Level of Service		C			C		B	B		A	B	
Approach Delay (s)		33.6			25.1			10.2			13.5	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			77.4				Sum of lost time (s)			12.2		
Intersection Capacity Utilization			92.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

2: Highway 12 & Gladstone St












2028 Total Conditions
PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	65	87	709	102	129	693
Future Volume (Veh/h)	65	87	709	102	129	693
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	68	92	746	107	136	729
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.70					
vC, conflicting volume	1800	800			853	
vC1, stage 1 conf vol	800					
vC2, stage 2 conf vol	1001					
vCu, unblocked vol	1927	800			853	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.3	
p0 queue free %	69	76			82	
cM capacity (veh/h)	218	385			761	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	160	853	136	729		
Volume Left	68	0	136	0		
Volume Right	92	107	0	0		
cSH	291	1700	761	1700		
Volume to Capacity	0.55	0.50	0.18	0.43		
Queue Length 95th (m)	23.5	0.0	4.9	0.0		
Control Delay (s)	31.5	0.0	10.8	0.0		
Lane LOS	D		B			
Approach Delay (s)	31.5	0.0	1.7			
Approach LOS	D					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			69.6%		ICU Level of Service	C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & County Rd 47





















2028 Total Conditions
 PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	32	120	592	11	63	618
Future Volume (Veh/h)	32	120	592	11	63	618
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	33	124	610	11	65	637
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	1377	610			621	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1377	610			621	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	78	74			93	
cM capacity (veh/h)	149	484			927	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	157	610	11	65	637	
Volume Left	33	0	0	65	0	
Volume Right	124	0	11	0	0	
cSH	328	1700	1700	927	1700	
Volume to Capacity	0.48	0.36	0.01	0.07	0.37	
Queue Length 95th (m)	18.8	0.0	0.0	1.7	0.0	
Control Delay (s)	25.6	0.0	0.0	9.2	0.0	
Lane LOS	D			A		
Approach Delay (s)	25.6	0.0	0.8			
Approach LOS	D					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			53.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Highway 12 & Concession Rd 3

2028 Total Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	33	2	1	3	569	19	1	632	9
Future Volume (Veh/h)	7	2	2	33	2	1	3	569	19	1	632	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	34	2	1	3	593	20	1	658	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1266	1284	662	1262	1268	593	667			613		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1266	1284	662	1262	1268	593	667			613		
tC, single (s)	7.2	6.5	6.2	7.3	7.0	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	95	99	100	75	99	100	100			100		
cM capacity (veh/h)	136	164	462	134	136	506	923			966		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2					
Volume Total	11	37	3	593	20	1	667					
Volume Left	7	34	3	0	0	1	0					
Volume Right	2	1	0	0	20	0	9					
cSH	161	137	923	1700	1700	966	1700					
Volume to Capacity	0.07	0.27	0.00	0.35	0.01	0.00	0.39					
Queue Length 95th (m)	1.6	7.8	0.1	0.0	0.0	0.0	0.0					
Control Delay (s)	28.9	40.7	8.9	0.0	0.0	8.7	0.0					
Lane LOS	D	E	A			A						
Approach Delay (s)	28.9	40.7	0.0			0.0						
Approach LOS	D	E										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			43.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 5: Ramara Rd 47 & Simcoe Rd

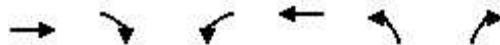
2028 Total Conditions
 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	182	6	16	211	6	16
Future Volume (Veh/h)	182	6	16	211	6	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	209	7	18	243	7	18
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			216		492	212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			216		492	212
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1354		529	813
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	216	261	25			
Volume Left	0	18	7			
Volume Right	7	0	18			
cSH	1700	1354	707			
Volume to Capacity	0.13	0.01	0.04			
Queue Length 95th (m)	0.0	0.3	0.8			
Control Delay (s)	0.0	0.6	10.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			34.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2028 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	51	53	4	44	35	5
Future Volume (Veh/h)	51	53	4	44	35	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	69	5	57	45	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			135		168	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			135		168	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	99
cM capacity (veh/h)			1449		820	955
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	135	62	51			
Volume Left	0	5	45			
Volume Right	69	0	6			
cSH	1700	1449	834			
Volume to Capacity	0.08	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.6	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			15.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4























2028 Total Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	1	16	30	30
Future Volume (Veh/h)	39	2	1	16	30	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	1	21	39	39
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	82	58	78			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	58	78			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	901	1007	1520			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	22	78			
Volume Left	51	1	0			
Volume Right	3	0	39			
cSH	906	1520	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s)	9.2	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.2	0.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			13.4%	ICU Level of Service	A	
Analysis Period (min)			15			












HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2033 Total Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	19	257	26	32	57	118	530	20	22	551	143
Future Volume (vph)	249	19	257	26	32	57	118	530	20	22	551	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		3.0	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.90		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	1612		1789	1693		1755	3309		1690	3234	
Flt Permitted	0.50	1.00		0.57	1.00		0.26	1.00		0.42	1.00	
Satd. Flow (perm)	909	1612		1080	1693		479	3309		748	3234	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	277	21	286	29	36	63	131	589	22	24	612	159
RTOR Reduction (vph)	0	175	0	0	55	0	0	3	0	0	25	0
Lane Group Flow (vph)	277	132	0	29	44	0	131	608	0	24	746	0
Heavy Vehicles (%)	5%	10%	2%	2%	2%	3%	4%	10%	2%	8%	10%	7%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.8	17.8		7.6	7.6		30.7	26.9		24.9	24.0	
Effective Green, g (s)	17.8	17.8		7.6	7.6		30.7	26.9		24.9	24.0	
Actuated g/C Ratio	0.29	0.29		0.12	0.12		0.50	0.44		0.41	0.39	
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		3.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.2		3.0	3.2	
Lane Grp Cap (vph)	364	471		135	211		321	1464		320	1276	
v/s Ratio Prot	c0.09	0.08			0.03		c0.03	0.18		0.00	c0.23	
v/s Ratio Perm	c0.13			0.03			0.18			0.03		
v/c Ratio	0.76	0.28		0.21	0.21		0.41	0.42		0.07	0.58	
Uniform Delay, d1	18.5	16.6		23.9	23.9		8.6	11.6		10.8	14.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	0.3		0.8	0.5		0.8	0.2		0.1	0.7	
Delay (s)	27.6	16.9		24.7	24.4		9.5	11.8		10.9	15.2	
Level of Service	C	B		C	C		A	B		B	B	
Approach Delay (s)		22.0			24.5			11.4			15.1	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			60.8				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			61.4%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											




















HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St

2033 Total Conditions
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	76	106	583	34	40	820
Future Volume (Veh/h)	76	106	583	34	40	820
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	115	634	37	43	891
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.93					
vC, conflicting volume	1184	336	671			
vC1, stage 1 conf vol	652					
vC2, stage 2 conf vol	532					
vCu, unblocked vol	1041	336	671			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	83	95			
cM capacity (veh/h)	410	660	915			
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	198	423	248	43	446	446
Volume Left	83	0	0	43	0	0
Volume Right	115	0	37	0	0	0
cSH	526	1700	1700	915	1700	1700
Volume to Capacity	0.38	0.25	0.15	0.05	0.26	0.26
Queue Length 95th (m)	13.2	0.0	0.0	1.1	0.0	0.0
Control Delay (s)	15.9	0.0	0.0	9.1	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	15.9	0.0	0.4			
Approach LOS	C					
Intersection Summary						
Average Delay	2.0					
Intersection Capacity Utilization	41.3%		ICU Level of Service			A
Analysis Period (min)	15					



















HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & Service Road/County Rd 47

2033 Total Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1	5	63	1	40	13	513	65	101	644	10
Future Volume (Veh/h)	5	1	5	63	1	40	13	513	65	101	644	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Hourly flow rate (vph)	5	1	5	70	1	44	14	570	72	112	716	11
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	1303	1616	364	1222	1585	321	727			642		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1303	1616	364	1222	1585	321	727			642		
tC, single (s)	7.5	6.5	6.9	9.3	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	3.4	2.2			2.3		
p0 queue free %	95	99	99	0	99	93	98			87		
cM capacity (veh/h)	97	88	633	60	92	655	872			886		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	11	115	14	380	262	112	477	250				
Volume Left	5	70	14	0	0	112	0	0				
Volume Right	5	44	0	0	72	0	0	11				
cSH	156	92	872	1700	1700	886	1700	1700				
Volume to Capacity	0.07	1.25	0.02	0.22	0.15	0.13	0.28	0.15				
Queue Length 95th (m)	1.7	61.9	0.4	0.0	0.0	3.3	0.0	0.0				
Control Delay (s)	29.8	257.9	9.2	0.0	0.0	9.6	0.0	0.0				
Lane LOS	D	F	A			A						
Approach Delay (s)	29.8	257.9	0.2			1.3						
Approach LOS	D	F										
Intersection Summary												
Average Delay			19.2									
Intersection Capacity Utilization			40.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2033 Total Conditions
AM Peak Hour

												
	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations												
Future Volume (Veh/h)	4	1	2	12	3	1	1	602	33	1	680	6
Grade	Stop			Stop			Free			Free		
Hourly flow rate (vph)	4	1	2	13	3	1	1	654	36	1	739	7
Lane Width (m)												
Percent Blockage												
Median type	None						None					
Upstream signal (m)												
vC, conflicting volume	1076	1436	373	1048	1422	345	746			690		
vC2, stage 2 conf vol		1436	373	1048	1422	345	746			690		
tC, single (s)	7.5	6.5	7.9	7.9	6.5	6.9	4.1			4.1		
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
cM capacity (veh/h)	170	132	506	158	135	651	858			900		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	17	1	436	254	1	493	253				
Volume Left	4	13	1	0	0	1	0	0				
Volume Right	2	1	0	0	36	0	0	7				
cSH	200	160	858	1700	1700	900	1700	1700				
Volume to Capacity	0.04	0.11	0.00	0.26	0.15	0.00	0.29	0.15				
Queue Length 95th (m)	0.8	2.7	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	23.7	30.2	9.2	0.0	0.0	9.0	0.0	0.0				
Lane LOS	C	D	A			A						
Approach Delay (s)	23.7	30.2	0.0			0.0						
Approach LOS	C	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			29.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2033 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	203	6	18	123	5	33
Future Volume (Veh/h)	203	6	18	123	5	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	257	8	23	156	6	42
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			265		463	261
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			265		463	261
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	94
cM capacity (veh/h)			1299		547	752
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	265	179	48			
Volume Left	0	23	6			
Volume Right	8	0	42			
cSH	1700	1299	718			
Volume to Capacity	0.16	0.02	0.07			
Queue Length 95th (m)	0.0	0.4	1.6			
Control Delay (s)	0.0	1.1	10.4			
Lane LOS			A			B
Approach Delay (s)	0.0	1.1	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			31.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2033 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	34	23	3	61	56	1
Future Volume (Veh/h)	34	23	3	61	56	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	29	4	78	72	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			73		144	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			73		144	58
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1527		846	1007
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	73	82	73			
Volume Left	0	4	72			
Volume Right	29	0	1			
cSH	1700	1527	848			
Volume to Capacity	0.04	0.00	0.09			
Queue Length 95th (m)	0.0	0.1	2.1			
Control Delay (s)	0.0	0.4	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			15.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2033 Total Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	1	61	68	50
Future Volume (Veh/h)	20	1	1	61	68	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	1	70	78	57
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	178	106	135			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	178	106	135			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	811	948	1449			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	71	135			
Volume Left	23	1	0			
Volume Right	1	0	57			
cSH	815	1449	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.5	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.5	0.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			16.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
8: Service Road & Ramara Rd 47

2033 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	
Traffic Volume (veh/h)	501	39	65	228	14	24
Future Volume (Veh/h)	501	39	65	228	14	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	545	42	71	248	15	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	203					
pX, platoon unblocked						
vC, conflicting volume			587			566
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			587			566
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			93			95
cM capacity (veh/h)			988			524
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	587	71	248	41		
Volume Left	0	71	0	15		
Volume Right	42	0	0	26		
cSH	1700	988	1700	386		
Volume to Capacity	0.35	0.07	0.15	0.11		
Queue Length 95th (m)	0.0	1.8	0.0	2.7		
Control Delay (s)	0.0	8.9	0.0	15.4		
Lane LOS	A		C			
Approach Delay (s)	0.0	2.0	15.4			
Approach LOS					C	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			45.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2033 Total Conditions
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	254	53	215	14	33	56	282	739	9	54	789	285
Future Volume (vph)	254	53	215	14	33	56	282	739	9	54	789	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		3.0	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.91		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1651		1789	1645		1789	3538		1755	3412	
Flt Permitted	0.50	1.00		0.58	1.00		0.11	1.00		0.34	1.00	
Satd. Flow (perm)	948	1651		1095	1645		209	3538		637	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	276	58	234	15	36	61	307	803	10	59	858	310
RTOR Reduction (vph)	0	179	0	0	55	0	0	0	0	0	33	0
Lane Group Flow (vph)	276	113	0	15	42	0	307	813	0	59	1135	0
Heavy Vehicles (%)	2%	4%	2%	2%	7%	5%	2%	3%	2%	4%	3%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.3	19.3		7.9	7.9		50.1	43.2		36.9	33.0	
Effective Green, g (s)	19.3	19.3		7.9	7.9		50.1	43.2		36.9	33.0	
Actuated g/C Ratio	0.24	0.24		0.10	0.10		0.61	0.53		0.45	0.40	
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		3.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.2		3.0	3.2	
Lane Grp Cap (vph)	310	390		106	159		401	1873		341	1379	
v/s Ratio Prot	c0.09	0.07			0.03		c0.13	0.23		0.01	0.33	
v/s Ratio Perm	c0.12			0.01			c0.34			0.07		
v/c Ratio	0.89	0.29		0.14	0.26		0.77	0.43		0.17	0.82	
Uniform Delay, d1	29.1	25.5		33.7	34.2		18.7	11.7		12.7	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.6	0.4		0.6	0.9		8.5	0.2		0.2	4.2	
Delay (s)	54.7	26.0		34.4	35.0		27.2	11.9		12.9	25.9	
Level of Service	D	C		C	D		C	B		B	C	
Approach Delay (s)		39.9			35.0			16.1			25.2	
Approach LOS		D			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			25.0				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			81.6				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			80.8%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St



















2033 Total Conditions
PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	87	973	106	129	896
Future Volume (Veh/h)	67	87	973	106	129	896
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	92	1024	112	136	943
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			222			
pX, platoon unblocked	0.84					
vC, conflicting volume	1824		568		1136	
vC1, stage 1 conf vol	1080					
vC2, stage 2 conf vol	744					
vCu, unblocked vol	1600		568		1136	
tC, single (s)	6.8		6.9		4.3	
tC, 2 stage (s)	5.8					
tF (s)	3.5		3.3		2.3	
p0 queue free %	71		80		76	
cM capacity (veh/h)	243		466		577	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	163	683	453	136	472	472
Volume Left	71	0	0	136	0	0
Volume Right	92	0	112	0	0	0
cSH	333	1700	1700	577	1700	1700
Volume to Capacity	0.49	0.40	0.27	0.24	0.28	0.28
Queue Length 95th (m)	19.5	0.0	0.0	6.9	0.0	0.0
Control Delay (s)	25.8	0.0	0.0	13.1	0.0	0.0
Lane LOS	D			B		
Approach Delay (s)	25.8	0.0		1.7		
Approach LOS	D					
Intersection Summary						
Average Delay	2.5					
Intersection Capacity Utilization	56.5%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & Service Road/County Rd 47




















2033 Total Conditions
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1	19	33	1	121	13	843	11	64	808	10
Future Volume (Veh/h)	19	1	19	33	1	121	13	843	11	64	808	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.97	0.92	0.97	0.92	0.97	0.97	0.97	0.97	0.92
Hourly flow rate (vph)	21	1	21	34	1	125	14	869	11	66	833	11
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	1558	1878	422	1472	1878	440	844			880		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1558	1878	422	1472	1878	440	844			880		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	61	98	96	56	98	77	98			91		
cM capacity (veh/h)	53	63	580	77	63	549	788			721		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	43	160	14	579	301	66	555	289				
Volume Left	21	34	14	0	0	66	0	0				
Volume Right	21	125	0	0	11	0	0	11				
cSH	96	234	788	1700	1700	721	1700	1700				
Volume to Capacity	0.45	0.68	0.02	0.34	0.18	0.09	0.33	0.17				
Queue Length 95th (m)	14.3	33.5	0.4	0.0	0.0	2.3	0.0	0.0				
Control Delay (s)	69.4	48.3	9.7	0.0	0.0	10.5	0.0	0.0				
Lane LOS	F	E	A			B						
Approach Delay (s)	69.4	48.3	0.2			0.8						
Approach LOS	F	E										
Intersection Summary												
Average Delay			5.7									
Intersection Capacity Utilization			47.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Highway 12 & Concession Rd 3

2033 Total Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	33	2	1	3	830	19	1	840	9
Future Volume (Veh/h)	7	2	2	33	2	1	3	830	19	1	840	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	34	2	1	3	865	20	1	875	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1322	1772	442	1324	1767	442	884			885		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1322	1772	442	1324	1767	442	884			885		
tC, single (s)	7.8	6.5	6.9	7.8	7.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	93	98	100	65	96	100	100			100		
cM capacity (veh/h)	99	82	563	97	50	563	761			760		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	11	37	3	577	308	1	583	301				
Volume Left	7	34	3	0	0	1	0	0				
Volume Right	2	1	0	0	20	0	0	9				
cSH	112	95	761	1700	1700	760	1700	1700				
Volume to Capacity	0.10	0.39	0.00	0.34	0.18	0.00	0.34	0.18				
Queue Length 95th (m)	2.4	12.0	0.1	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	40.7	65.6	9.7	0.0	0.0	9.7	0.0	0.0				
Lane LOS	E	F	A			A						
Approach Delay (s)	40.7	65.6	0.0			0.0						
Approach LOS	E	F										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			33.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2033 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	229	6	17	271	6	17
Future Volume (Veh/h)	229	6	17	271	6	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	263	7	20	311	7	20
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			270		618	266
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			270		618	266
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		98	97
cM capacity (veh/h)			1293		446	758
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	270	331	27			
Volume Left	0	20	7			
Volume Right	7	0	20			
cSH	1700	1293	642			
Volume to Capacity	0.16	0.02	0.04			
Queue Length 95th (m)	0.0	0.4	1.0			
Control Delay (s)	0.0	0.6	10.9			
Lane LOS			A	B		
Approach Delay (s)	0.0	0.6	10.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			38.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2033 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	51	68	4	44	46	5
Future Volume (Veh/h)	51	68	4	44	46	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	88	5	57	60	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			154		177	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			154		177	110
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	99
cM capacity (veh/h)			1426		810	943
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	154	62	66			
Volume Left	0	5	60			
Volume Right	88	0	6			
cSH	1700	1426	820			
Volume to Capacity	0.09	0.00	0.08			
Queue Length 95th (m)	0.0	0.1	2.0			
Control Delay (s)	0.0	0.6	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			16.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2033 Total Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	1	17	32	30
Future Volume (Veh/h)	39	2	1	17	32	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	1	22	42	39
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	86	62	81			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86	62	81			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	896	1004	1517			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	23	81			
Volume Left	51	1	0			
Volume Right	3	0	39			
cSH	901	1517	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s)	9.2	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.2	0.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			13.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
8: Service Road & Ramara Rd 47

2033 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	429	39	65	535	56	93
Future Volume (Veh/h)	429	39	65	535	56	93
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	466	42	71	582	61	101
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	203					
pX, platoon unblocked					0.94	
vC, conflicting volume			508		1211	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			508		1192	487
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		66	83
cM capacity (veh/h)			1057		181	581
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	508	71	582	162		
Volume Left	0	71	0	61		
Volume Right	42	0	0	101		
cSH	1700	1057	1700	317		
Volume to Capacity	0.30	0.07	0.34	0.51		
Queue Length 95th (m)	0.0	1.6	0.0	20.9		
Control Delay (s)	0.0	8.7	0.0	27.6		
Lane LOS	A		D			
Approach Delay (s)	0.0	0.9	27.6			
Approach LOS	D					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			47.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2038 Total Conditions
 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	24	410	26	42	57	186	582	20	22	623	246
Future Volume (vph)	416	24	410	26	42	57	186	582	20	22	623	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1562	1526	1601	1789	1712		1755	3253		1690	3230	1526
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.24	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1562	1526	1601	1789	1712		439	3253		670	3230	1526
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	462	27	456	29	47	63	207	647	22	24	692	273
RTOR Reduction (vph)	0	0	346	0	50	0	0	2	0	0	0	183
Lane Group Flow (vph)	245	244	110	29	60	0	207	667	0	24	692	90
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	21.3	21.3	21.3	8.1	8.1		40.3	34.5		30.9	29.1	29.1
Effective Green, g (s)	21.3	21.3	21.3	8.1	8.1		40.3	34.5		30.9	29.1	29.1
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.46	0.39		0.35	0.33	0.33
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.2		3.0	3.2	3.2
Lane Grp Cap (vph)	378	369	387	164	157		308	1275		256	1068	504
v/s Ratio Prot	0.16	c0.16		0.02	c0.04		c0.05	0.21		0.00	0.21	
v/s Ratio Perm			0.07				c0.25			0.03		0.06
v/c Ratio	0.65	0.66	0.29	0.18	0.38		0.67	0.52		0.09	0.65	0.18
Uniform Delay, d1	30.0	30.1	27.2	36.9	37.6		16.0	20.5		18.8	25.1	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.8	4.4	0.4	0.5	1.6		5.7	0.4		0.2	1.4	0.2
Delay (s)	33.8	34.5	27.6	37.4	39.2		21.6	20.9		19.0	26.5	21.1
Level of Service	C	C	C	D	D		C	C		B	C	C
Approach Delay (s)		31.0			38.8			21.1			24.8	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.3				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			88.0				Sum of lost time (s)			22.3		
Intersection Capacity Utilization			66.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St





















2038 Total Conditions
AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	79	106	707	35	40	1054
Future Volume (Veh/h)	79	106	707	35	40	1054
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	115	768	38	43	1146
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.84					
vC, conflicting volume	1446	403			806	
vC1, stage 1 conf vol	787					
vC2, stage 2 conf vol	659					
vCu, unblocked vol	1154	403			806	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	81			95	
cM capacity (veh/h)	360	597			814	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	201	512	294	43	573	573
Volume Left	86	0	0	43	0	0
Volume Right	115	0	38	0	0	0
cSH	466	1700	1700	814	1700	1700
Volume to Capacity	0.43	0.30	0.17	0.05	0.34	0.34
Queue Length 95th (m)	16.3	0.0	0.0	1.3	0.0	0.0
Control Delay (s)	18.5	0.0	0.0	9.7	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	18.5	0.0			0.3	
Approach LOS	C					
Intersection Summary						
Average Delay	1.9					
Intersection Capacity Utilization	46.7%		ICU Level of Service		A	
Analysis Period (min)	15					





















HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & Service Road/County Rd 47

2038 Total Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	9	66	1	40	26	629	68	102	858	21
Future Volume (Veh/h)	9	1	9	66	1	40	26	629	68	102	858	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Hourly flow rate (vph)	10	1	10	73	1	44	28	699	76	113	953	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1640	2022	488	1506	1995	388	976			775		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1640	2022	488	1506	1995	388	976			775		
tC, single (s)	7.5	6.5	6.9	9.3	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	3.4	2.2			2.3		
p0 queue free %	81	98	98	0	98	93	96			86		
cM capacity (veh/h)	52	47	526	31	49	592	703			786		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	21	118	28	466	309	113	635	341				
Volume Left	10	73	28	0	0	113	0	0				
Volume Right	10	44	0	0	76	0	0	23				
cSH	90	48	703	1700	1700	786	1700	1700				
Volume to Capacity	0.23	2.45	0.04	0.27	0.18	0.14	0.37	0.20				
Queue Length 95th (m)	6.3	93.6	0.9	0.0	0.0	3.8	0.0	0.0				
Control Delay (s)	56.5	838.1	10.3	0.0	0.0	10.3	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	56.5	838.1	0.4			1.1						
Approach LOS	F	F										
Intersection Summary												
Average Delay			50.0									
Intersection Capacity Utilization			46.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2038 Total Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	2	12	3	1	1	738	33	1	901	6
Future Volume (Veh/h)	4	1	2	12	3	1	1	738	33	1	901	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	2	13	3	1	1	802	36	1	979	7
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	1791	1824	493	1298	1792	802	986			838		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1791	1824	493	1298	1792	802	986			838		
tC, single (s)	7.5	6.5	7.9	7.9	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	100	87	96	100	100			100		
cM capacity (veh/h)	49	76	412	100	80	327	696			792		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	17	1	802	36	1	653	333				
Volume Left	4	13	1	0	0	1	0	0				
Volume Right	2	1	0	0	36	0	0	7				
cSH	70	100	696	1700	1700	792	1700	1700				
Volume to Capacity	0.10	0.17	0.00	0.47	0.02	0.00	0.38	0.20				
Queue Length 95th (m)	2.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	61.6	48.3	10.2	0.0	0.0	9.6	0.0	0.0				
Lane LOS	F	E	B			A						
Approach Delay (s)	61.6	48.3	0.0			0.0						
Approach LOS	F	E										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			48.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2038 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	244	6	19	145	5	35
Future Volume (Veh/h)	244	6	19	145	5	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	309	8	24	184	6	44
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			317		545	313
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			317		545	313
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	94
cM capacity (veh/h)			1243		490	702
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	317	208	50			
Volume Left	0	24	6			
Volume Right	8	0	44			
cSH	1700	1243	668			
Volume to Capacity	0.19	0.02	0.07			
Queue Length 95th (m)	0.0	0.4	1.8			
Control Delay (s)	0.0	1.1	10.8			
Lane LOS			A	B		
Approach Delay (s)	0.0	1.1	10.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			33.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2038 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	34	27	3	61	66	1
Future Volume (Veh/h)	34	27	3	61	66	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	35	4	78	85	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			79		148	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			79		148	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		90	100
cM capacity (veh/h)			1519		842	1004
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	79	82	86			
Volume Left	0	4	85			
Volume Right	35	0	1			
cSH	1700	1519	844			
Volume to Capacity	0.05	0.00	0.10			
Queue Length 95th (m)	0.0	0.1	2.6			
Control Delay (s)	0.0	0.4	9.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.4	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			16.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2038 Total Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	1	64	71	50
Future Volume (Veh/h)	20	1	1	64	71	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	1	74	82	57
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	186	110	139			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	110	139			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	802	943	1445			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	75	139			
Volume Left	23	1	0			
Volume Right	1	0	57			
cSH	807	1445	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.6	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.6	0.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			16.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
8: Service Road & Ramara Rd 47

2038 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (vph)	803	78	130	345	28	47
Future Volume (vph)	803	78	130	345	28	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1861		1789	1883	1692	
Flt Permitted	1.00		0.20	1.00	0.98	
Satd. Flow (perm)	1861		379	1883	1692	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	873	85	141	375	30	51
RTOR Reduction (vph)	3	0	0	0	43	0
Lane Group Flow (vph)	955	0	141	375	38	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	70.2		70.2	70.2	15.4	
Effective Green, g (s)	70.2		70.2	70.2	15.4	
Actuated g/C Ratio	0.72		0.72	0.72	0.16	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1338		272	1354	266	
v/s Ratio Prot	c0.51			0.20	c0.02	
v/s Ratio Perm			0.37			
v/c Ratio	0.71		0.52	0.28	0.14	
Uniform Delay, d1	7.9		6.1	4.8	35.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.3		6.9	0.5	0.2	
Delay (s)	11.2		13.0	5.3	35.7	
Level of Service	B		B	A	D	
Approach Delay (s)	11.2			7.4	35.7	
Approach LOS	B			A	D	

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2038 Total Conditions
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	69	335	14	43	56	459	831	9	54	874	496
Future Volume (vph)	424	69	335	14	43	56	459	831	9	54	874	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1700	1727	1601	1789	1724		1789	3573		1755	3579	1601
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.10	1.00		0.31	1.00	1.00
Satd. Flow (perm)	1700	1727	1601	1789	1724		183	3573		577	3579	1601
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	75	364	15	47	61	499	903	10	59	950	539
RTOR Reduction (vph)	0	0	235	0	34	0	0	0	0	0	0	273
Lane Group Flow (vph)	267	269	129	15	74	0	499	913	0	59	950	266
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%	2%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	25.2	25.2	25.2	10.1	10.1		74.3	66.4		41.0	37.1	37.1
Effective Green, g (s)	25.2	25.2	25.2	10.1	10.1		74.3	66.4		41.0	37.1	37.1
Actuated g/C Ratio	0.20	0.20	0.20	0.08	0.08		0.58	0.52		0.32	0.29	0.29
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.2		3.0	3.2	3.2
Lane Grp Cap (vph)	334	340	315	141	136		523	1854		220	1038	464
v/s Ratio Prot	c0.16	0.16		0.01	c0.04		c0.25	0.26		0.01	0.27	
v/s Ratio Perm			0.08				c0.31			0.08		0.17
v/c Ratio	0.80	0.79	0.41	0.11	0.54		0.95	0.49		0.27	0.92	0.57
Uniform Delay, d1	48.9	48.8	44.8	54.7	56.7		37.8	19.9		30.5	43.9	38.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	11.9	0.9	0.3	4.4		28.0	0.2		0.7	12.2	1.8
Delay (s)	61.5	60.7	45.7	55.0	61.1		65.8	20.1		31.2	56.1	40.4
Level of Service	E	E	D	E	E		E	C		C	E	D
Approach Delay (s)		54.9			60.3			36.2			49.7	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			46.4				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			127.9				Sum of lost time (s)			22.3		
Intersection Capacity Utilization			83.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St




















2038 Total Conditions
PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	70	87	1244	110	129	1106
Future Volume (Veh/h)	70	87	1244	110	129	1106
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	74	92	1309	116	136	1164
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			222			
pX, platoon unblocked	0.76					
vC, conflicting volume	2221		712		1425	
vC1, stage 1 conf vol	1367					
vC2, stage 2 conf vol	854					
vCu, unblocked vol	1969		712		1425	
tC, single (s)	6.8		6.9		4.3	
tC, 2 stage (s)	5.8					
tF (s)	3.5		3.3		2.3	
p0 queue free %	59		75		69	
cM capacity (veh/h)	179		375		444	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	166	873	552	136	582	582
Volume Left	74	0	0	136	0	0
Volume Right	92	0	116	0	0	0
cSH	252	1700	1700	444	1700	1700
Volume to Capacity	0.66	0.51	0.32	0.31	0.34	0.34
Queue Length 95th (m)	31.8	0.0	0.0	9.7	0.0	0.0
Control Delay (s)	43.3	0.0	0.0	16.6	0.0	0.0
Lane LOS	E			C		
Approach Delay (s)	43.3	0.0		1.7		
Approach LOS	E					
Intersection Summary						
Average Delay	3.3					
Intersection Capacity Utilization	64.3%		ICU Level of Service			C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & Service Road/County Rd 47




















2038 Total Conditions
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1	37	34	1	122	26	1100	11	65	1003	21
Future Volume (Veh/h)	37	1	37	34	1	122	26	1100	11	65	1003	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.97	0.92	0.97	0.92	0.97	0.97	0.97	0.97	0.92
Hourly flow rate (vph)	40	1	40	35	1	126	28	1134	11	67	1034	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1929	2380	528	1887	2386	572	1057			1145		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1929	2380	528	1887	2386	572	1057			1145		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	0	97	92	0	96	72	96			88		
cM capacity (veh/h)	25	29	495	34	28	448	655			567		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	81	162	28	756	389	67	689	368				
Volume Left	40	35	28	0	0	67	0	0				
Volume Right	40	126	0	0	11	0	0	23				
cSH	47	120	655	1700	1700	567	1700	1700				
Volume to Capacity	1.74	1.35	0.04	0.44	0.23	0.12	0.41	0.22				
Queue Length 95th (m)	61.3	82.3	1.0	0.0	0.0	3.0	0.0	0.0				
Control Delay (s)	545.1	269.1	10.7	0.0	0.0	12.2	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	545.1	269.1	0.3			0.7						
Approach LOS	F	F										
Intersection Summary												
Average Delay			35.0									
Intersection Capacity Utilization			54.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Highway 12 & Concession Rd 3

2038 Total Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	33	2	1	3	1097	19	1	1053	9
Future Volume (Veh/h)	7	2	2	33	2	1	3	1097	19	1	1053	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	34	2	1	3	1143	20	1	1097	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2254	2272	553	1702	2257	1143	1106			1163		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2254	2272	553	1702	2257	1143	1106			1163		
tC, single (s)	7.8	6.5	6.9	7.8	7.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	60	95	100	30	91	99	100			100		
cM capacity (veh/h)	18	39	477	48	22	194	627			596		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	11	37	3	1143	20	1	731	375				
Volume Left	7	34	3	0	0	1	0	0				
Volume Right	2	1	0	0	20	0	0	9				
cSH	24	46	627	1700	1700	596	1700	1700				
Volume to Capacity	0.45	0.80	0.00	0.67	0.01	0.00	0.43	0.22				
Queue Length 95th (m)	10.3	24.3	0.1	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	241.4	211.8	10.8	0.0	0.0	11.0	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	241.4	211.8	0.0			0.0						
Approach LOS	F	F										
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization			67.7%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2038 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	276	6	17	332	6	17
Future Volume (Veh/h)	276	6	17	332	6	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	317	7	20	382	7	20
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			324		742	320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			324		742	320
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		98	97
cM capacity (veh/h)			1236		377	707
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	324	402	27			
Volume Left	0	20	7			
Volume Right	7	0	20			
cSH	1700	1236	576			
Volume to Capacity	0.19	0.02	0.05			
Queue Length 95th (m)	0.0	0.4	1.1			
Control Delay (s)	0.0	0.6	11.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	11.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			41.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2038 Total Conditions
PM Peak Hour



				NBL	NBR
Lane Configurations				56	5
Future Volume (Veh/h)	51	83	4	44	56
Grade	0%			0%	0%
Hourly flow rate (vph)	66	108	5	57	73
Lane Width (m)					
Percent Blockage					
Median type	None		None		
Upstream signal (m)	168				
vC, conflicting volume	174			187	120
vC2, stage 2 conf vol				187	120
tC, single (s)	4.1			6.4	6.2
tF (s)	2.2			3.5	3.3
cM capacity (veh/h)	1403			799	931
Volume Total	174	62	79		
Volume Right	108	0	6		
Volume to Capacity	0.10	0.00	0.10		
Control Delay (s)	0.0	0.6	9.9		
Lane LOS		A	A		
Approach Delay (s)	0.0	0.6	9.9		
Approach LOS			A		
Intersection Summary					
Average Delay	2.6				
Intersection Capacity Utilization	17.8%			ICU Level of Service	A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2038 Total Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	1	17	33	30
Future Volume (Veh/h)	39	2	1	17	33	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	1	22	43	39
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	86	62	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86	62	82			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	895	1002	1515			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	23	82			
Volume Left	51	1	0			
Volume Right	3	0	39			
cSH	900	1515	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s)	9.3	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.3	0.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			13.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
8: Service Road & Ramara Rd 47

2038 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (vph)	642	78	129	869	111	186
Future Volume (vph)	642	78	129	869	111	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1856		1789	1883	1693	
Flt Permitted	1.00		0.24	1.00	0.98	
Satd. Flow (perm)	1856		458	1883	1693	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	698	85	140	945	121	202
RTOR Reduction (vph)	6	0	0	0	92	0
Lane Group Flow (vph)	777	0	140	945	231	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	40.6		40.6	40.6	13.8	
Effective Green, g (s)	40.6		40.6	40.6	13.8	
Actuated g/C Ratio	0.61		0.61	0.61	0.21	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1134		280	1151	351	
v/s Ratio Prot	0.42			c0.50	c0.14	
v/s Ratio Perm			0.31			
v/c Ratio	0.69		0.50	0.82	0.66	
Uniform Delay, d1	8.6		7.2	10.1	24.1	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.4		6.3	6.6	4.4	
Delay (s)	12.0		13.5	16.7	28.6	
Level of Service	B		B	B	C	
Approach Delay (s)	12.0			16.3	28.6	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2043 Total Conditions
 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	24	414	26	42	57	188	626	20	22	666	249
Future Volume (vph)	421	24	414	26	42	57	188	626	20	22	666	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1562	1526	1601	1789	1712		1755	3253		1690	3230	1526
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.20	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1562	1526	1601	1789	1712		372	3253		590	3230	1526
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	468	27	460	29	47	63	209	696	22	24	740	277
RTOR Reduction (vph)	0	0	350	0	48	0	0	2	0	0	0	189
Lane Group Flow (vph)	248	247	110	29	62	0	209	716	0	24	740	88
Heavy Vehicles (%)	11%	43%	2%	2%	2%	3%	4%	12%	2%	8%	13%	7%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	21.5	21.5	21.5	10.7	10.7		39.8	34.0		30.5	28.7	28.7
Effective Green, g (s)	21.5	21.5	21.5	10.7	10.7		39.8	34.0		30.5	28.7	28.7
Actuated g/C Ratio	0.24	0.24	0.24	0.12	0.12		0.44	0.38		0.34	0.32	0.32
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.2		3.0	3.2	3.2
Lane Grp Cap (vph)	371	363	381	211	202		272	1224		221	1026	485
v/s Ratio Prot	0.16	c0.16		0.02	c0.04		c0.06	0.22		0.00	0.23	
v/s Ratio Perm			0.07				c0.28			0.03		0.06
v/c Ratio	0.67	0.68	0.29	0.14	0.30		0.77	0.59		0.11	0.72	0.18
Uniform Delay, d1	31.2	31.3	28.1	35.7	36.4		17.8	22.5		20.2	27.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.5	5.2	0.4	0.3	0.9		12.3	0.7		0.2	2.6	0.2
Delay (s)	35.7	36.5	28.6	36.0	37.3		30.1	23.2		20.4	29.8	22.5
Level of Service	D	D	C	D	D		C	C		C	C	C
Approach Delay (s)		32.5			37.0			24.8			27.7	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			90.3				Sum of lost time (s)			22.3		
Intersection Capacity Utilization			67.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St




















2043 Total Conditions
AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	79	106	761	35	40	1112
Future Volume (Veh/h)	79	106	761	35	40	1112
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	115	827	38	43	1209
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (m)			222			
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
tF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	201	551	314	43	604	604
Volume Left	86	0	0	43	0	0
Volume Right	115	0	38	0	0	0
cSH	442	1700	1700	774	1700	1700
Volume to Capacity	0.45	0.32	0.18	0.06	0.36	0.36
Queue Length 95th (m)	17.7	0.0	0.0	1.3	0.0	0.0
Control Delay (s)	19.8	0.0	0.0	9.9	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	19.8	0.0	0.3			
Approach LOS	C					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			48.3%		ICU Level of Service	
Analysis Period (min)			15			
			A			





















HCM Unsignalized Intersection Capacity Analysis
 3: Highway 12 & Service Road/County Rd 47

2043 Total Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	9	70	1	41	26	675	72	102	904	21
Future Volume (Veh/h)	9	1	9	70	1	41	26	675	72	102	904	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Hourly flow rate (vph)	10	1	10	78	1	46	28	750	80	113	1004	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1719	2128	514	1584	2099	415	1027			830		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1719	2128	514	1584	2099	415	1027			830		
tC, single (s)	7.5	6.5	6.9	9.3	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	3.4	2.2			2.3		
p0 queue free %	78	98	98	0	98	92	96			85		
cM capacity (veh/h)	45	40	506	26	42	567	672			748		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	21	125	28	500	330	113	669	358				
Volume Left	10	78	28	0	0	113	0	0				
Volume Right	10	46	0	0	80	0	0	23				
cSH	78	40	672	1700	1700	748	1700	1700				
Volume to Capacity	0.27	3.11	0.04	0.29	0.19	0.15	0.39	0.21				
Queue Length 95th (m)	7.4	Err	1.0	0.0	0.0	4.0	0.0	0.0				
Control Delay (s)	67.3	Err	10.6	0.0	0.0	10.7	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	67.3	Err	0.3			1.1						
Approach LOS	F	F										
Intersection Summary												
Average Delay			584.3									
Intersection Capacity Utilization			48.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Highway 12 & Concession Rd 3

2043 Total Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	2	12	3	1	1	792	33	1	951	6
Future Volume (Veh/h)	4	1	2	12	3	1	1	792	33	1	951	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	2	13	3	1	1	861	36	1	1034	7
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	1905	1938	520	1384	1906	861	1041			897		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1905	1938	520	1384	1906	861	1041			897		
tC, single (s)	7.5	6.5	7.9	7.9	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.8	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	90	98	99	85	96	100	100			100		
cM capacity (veh/h)	40	65	393	86	68	299	664			753		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	17	1	861	36	1	689	352				
Volume Left	4	13	1	0	0	1	0	0				
Volume Right	2	1	0	0	36	0	0	7				
cSH	58	85	664	1700	1700	753	1700	1700				
Volume to Capacity	0.12	0.20	0.00	0.51	0.02	0.00	0.41	0.21				
Queue Length 95th (m)	2.9	5.3	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	75.2	57.4	10.4	0.0	0.0	9.8	0.0	0.0				
Lane LOS	F	F	B			A						
Approach Delay (s)	75.2	57.4	0.0			0.0						
Approach LOS	F	F										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			51.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2043 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	244	6	20	145	5	37
Future Volume (Veh/h)	244	6	20	145	5	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	309	8	25	184	6	47
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			317		547	313
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			317		547	313
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			98		99	93
cM capacity (veh/h)			1243		488	702
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	317	209	53			
Volume Left	0	25	6			
Volume Right	8	0	47			
cSH	1700	1243	669			
Volume to Capacity	0.19	0.02	0.08			
Queue Length 95th (m)	0.0	0.5	2.0			
Control Delay (s)	0.0	1.1	10.8			
Lane LOS			A			B
Approach Delay (s)	0.0	1.1	10.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			34.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2043 Total Conditions
AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	34	27	3	61	66	1
Future Volume (Veh/h)	34	27	3	61	66	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	35	4	78	85	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			79		148	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			79		148	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		90	100
cM capacity (veh/h)			1519		842	1004
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	79	82	86			
Volume Left	0	4	85			
Volume Right	35	0	1			
cSH	1700	1519	844			
Volume to Capacity	0.05	0.00	0.10			
Queue Length 95th (m)	0.0	0.1	2.6			
Control Delay (s)	0.0	0.4	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			16.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2043 Total Conditions
AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	1	67	75	50
Future Volume (Veh/h)	20	1	1	67	75	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	1	1	77	86	57
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	194	114	143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	194	114	143			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	795	938	1440			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	78	143			
Volume Left	23	1	0			
Volume Right	1	0	57			
cSH	800	1440	1700			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.7	0.0	0.0			
Control Delay (s)	9.6	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.6	0.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			17.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 8: Service Road & Ramara Rd 47

2043 Total Conditions
 AM Peak Hour



M						
Lane Configurations	↷		↶	↑	↷	
T						
Future Volume (vph)	812	78	130	349	28	47
I						
Total Lost time (s)	6.0		6.0	6.0	6.0	
L						
Frt	0.99		1.00	1.00	0.92	
F						
Satd. Flow (prot)	1861		1789	1883	1692	
F						
Satd. Flow (perm)	1861		369	1883	1692	
P						
Adj. Flow (vph)	883	85	141	379	30	51
R						
Lane Group Flow (vph)	965	0	141	379	38	0
T						
Protected Phases	2			6	8	
P						
Actuated Green, G (s)	70.2		70.2	70.2	15.4	
E						
Actuated g/C Ratio	0.72		0.72	0.72	0.16	
C						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
L						
v/s Ratio Prot	c0.52			0.20	c0.02	
v						
v/c Ratio	0.72		0.53	0.28	0.14	
U						
Progression Factor	1.00		1.00	1.00	1.00	
I						
Delay (s)	11.4		13.7	5.3	35.7	
L						
Approach Delay (s)	11.4			7.6	35.7	
A						
I						
H						
HCM 2000 Volume to Capacity ratio			0.62			
A						
Intersection Capacity Utilization		95.8%		ICU Level of Service		F
A						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: Highway 12 & Ramara Rd 47/Concession Rd 4

2043 Total Conditions
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	429	70	339	14	43	56	462	888	9	54	941	500
Future Volume (vph)	429	70	339	14	43	56	462	888	9	54	941	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1700	1727	1601	1789	1724		1789	3573		1755	3579	1601
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.09	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1700	1727	1601	1789	1724		173	3573		543	3579	1601
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	466	76	368	15	47	61	502	965	10	59	1023	543
RTOR Reduction (vph)	0	0	235	0	34	0	0	0	0	0	0	251
Lane Group Flow (vph)	270	272	133	15	74	0	502	975	0	59	1023	292
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%	2%
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	25.8	25.8	25.8	10.0	10.0		76.6	68.7		43.4	39.5	39.5
Effective Green, g (s)	25.8	25.8	25.8	10.0	10.0		76.6	68.7		43.4	39.5	39.5
Actuated g/C Ratio	0.20	0.20	0.20	0.08	0.08		0.59	0.53		0.33	0.30	0.30
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1		4.0	6.1		4.0	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.2		3.0	3.2	3.2
Lane Grp Cap (vph)	335	340	316	136	131		510	1878		216	1081	483
v/s Ratio Prot	c0.16	0.16		0.01	c0.04		c0.25	0.27		0.01	0.29	
v/s Ratio Perm			0.08				c0.33			0.08		0.18
v/c Ratio	0.81	0.80	0.42	0.11	0.56		0.98	0.52		0.27	0.95	0.60
Uniform Delay, d1	50.1	50.0	45.9	56.2	58.2		40.0	20.2		30.2	44.6	38.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.2	12.6	0.9	0.4	5.5		35.5	0.3		0.7	16.0	2.2
Delay (s)	63.2	62.6	46.8	56.6	63.7		75.6	20.5		30.9	60.6	41.1
Level of Service	E	E	D	E	E		E	C		C	E	D
Approach Delay (s)		56.4			62.8			39.2			53.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			49.1				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			130.7				Sum of lost time (s)			22.3		
Intersection Capacity Utilization			85.5%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Highway 12 & Gladstone St




















2043 Total Conditions
PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	70	87	1311	110	129	1181
Future Volume (Veh/h)	70	87	1311	110	129	1181
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	74	92	1380	116	136	1243
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (m)				222		
pX, platoon unblocked	0.73					
vC, conflicting volume	2332	748	1496			
vC1, stage 1 conf vol	1438					
vC2, stage 2 conf vol	894					
vCu, unblocked vol	2086	748	1496			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.3			
p0 queue free %	55	74	67			
cM capacity (veh/h)	165	355	416			
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	166	920	576	136	622	622
Volume Left	74	0	0	136	0	0
Volume Right	92	0	116	0	0	0
cSH	234	1700	1700	416	1700	1700
Volume to Capacity	0.71	0.54	0.34	0.33	0.37	0.37
Queue Length 95th (m)	35.7	0.0	0.0	10.6	0.0	0.0
Control Delay (s)	50.6	0.0	0.0	17.8	0.0	0.0
Lane LOS	F			C		
Approach Delay (s)	50.6	0.0	1.8			
Approach LOS	F					
Intersection Summary						
Average Delay	3.6					
Intersection Capacity Utilization	66.1%			ICU Level of Service		C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Highway 12 & Service Road/County Rd 47




















2043 Total Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1	37	35	1	123	26	1165	12	65	1073	21
Future Volume (Veh/h)	37	1	37	35	1	123	26	1165	12	65	1073	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.97	0.92	0.97	0.92	0.97	0.97	0.97	0.97	0.92
Hourly flow rate (vph)	40	1	40	36	1	127	28	1201	12	67	1106	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2036	2520	564	1990	2526	606	1129			1213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2036	2520	564	1990	2526	606	1129			1213		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.1	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	0	96	91	0	96	70	95			87		
cM capacity (veh/h)	20	23	468	28	23	425	615			533		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	81	164	28	801	412	67	737	392				
Volume Left	40	36	28	0	0	67	0	0				
Volume Right	40	127	0	0	12	0	0	23				
cSH	37	100	615	1700	1700	533	1700	1700				
Volume to Capacity	2.16	1.64	0.05	0.47	0.24	0.13	0.43	0.23				
Queue Length 95th (m)	67.4	97.3	1.1	0.0	0.0	3.3	0.0	0.0				
Control Delay (s)	765.8	402.4	11.1	0.0	0.0	12.7	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	765.8	402.4	0.3			0.7						
Approach LOS	F	F										
Intersection Summary												
Average Delay			48.2									
Intersection Capacity Utilization			56.3%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Highway 12 & Concession Rd 3

2043 Total Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	2	2	33	2	1	3	1157	19	1	1123	9
Future Volume (Veh/h)	7	2	2	33	2	1	3	1157	19	1	1123	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	2	2	34	2	1	3	1205	20	1	1170	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2390	2408	590	1801	2392	1205	1179			1225		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2390	2408	590	1801	2392	1205	1179			1225		
tC, single (s)	7.8	6.5	6.9	7.8	7.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	48	94	100	15	88	99	99			100		
cM capacity (veh/h)	14	32	451	40	17	176	588			565		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	11	37	3	1205	20	1	780	399				
Volume Left	7	34	3	0	0	1	0	0				
Volume Right	2	1	0	0	20	0	0	9				
cSH	19	38	588	1700	1700	565	1700	1700				
Volume to Capacity	0.58	0.97	0.01	0.71	0.01	0.00	0.46	0.23				
Queue Length 95th (m)	12.2	27.8	0.1	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	345.6	296.7	11.2	0.0	0.0	11.4	0.0	0.0				
Lane LOS	F	F	B			B						
Approach Delay (s)	345.6	296.7	0.0			0.0						
Approach LOS	F	F										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			70.9%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Ramara Rd 47 & Simcoe Rd

2043 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	276	6	18	332	6	18
Future Volume (Veh/h)	276	6	18	332	6	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	317	7	21	382	7	21
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			324			320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			324			320
tC, single (s)			4.1			6.3
tC, 2 stage (s)						
tF (s)			2.2			3.4
p0 queue free %			98			97
cM capacity (veh/h)			1236			707
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	324	403	28			
Volume Left	0	21	7			
Volume Right	7	0	21			
cSH	1700	1236	579			
Volume to Capacity	0.19	0.02	0.05			
Queue Length 95th (m)	0.0	0.4	1.2			
Control Delay (s)	0.0	0.6	11.5			
Lane LOS			A			B
Approach Delay (s)	0.0	0.6	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			42.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Church St & Concession Rd 4

2043 Total Conditions
PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	51	83	4	44	56	5
Future Volume (Veh/h)	51	83	4	44	56	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	66	108	5	57	73	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	168					
pX, platoon unblocked						
vC, conflicting volume			174		187	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			174		187	120
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	99
cM capacity (veh/h)			1403		799	931
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	174	62	79			
Volume Left	0	5	73			
Volume Right	108	0	6			
cSH	1700	1403	808			
Volume to Capacity	0.10	0.00	0.10			
Queue Length 95th (m)	0.0	0.1	2.5			
Control Delay (s)	0.0	0.6	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			17.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: County Rd 47 & Concession Rd 4

2043 Total Conditions
PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	2	1	18	35	30
Future Volume (Veh/h)	39	2	1	18	35	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	51	3	1	24	46	39
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	92	66	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92	66	85			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	889	998	1512			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	54	25	85			
Volume Left	51	1	0			
Volume Right	3	0	39			
cSH	894	1512	1700			
Volume to Capacity	0.06	0.00	0.05			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s)	9.3	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.3	0.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			13.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 8: Service Road & Ramara Rd 47

2043 Total Conditions
 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Traffic Volume (vph)	652	78	129	876	111	186
Future Volume (vph)	652	78	129	876	111	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1856		1789	1883	1693	
Flt Permitted	1.00		0.24	1.00	0.98	
Satd. Flow (perm)	1856		445	1883	1693	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	709	85	140	952	121	202
RTOR Reduction (vph)	5	0	0	0	92	0
Lane Group Flow (vph)	789	0	140	952	231	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	40.6		40.6	40.6	13.8	
Effective Green, g (s)	40.6		40.6	40.6	13.8	
Actuated g/C Ratio	0.61		0.61	0.61	0.21	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1134		272	1151	351	
v/s Ratio Prot	0.42			c0.51	c0.14	
v/s Ratio Perm			0.31			
v/c Ratio	0.70		0.51	0.83	0.66	
Uniform Delay, d1	8.7		7.3	10.1	24.1	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.5		6.8	6.9	4.4	
Delay (s)	12.3		14.1	17.0	28.6	
Level of Service	B		B	B	C	
Approach Delay (s)	12.3			16.6	28.6	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Appendix G: Traffic Signal Warrants

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Highway 12		
Analysis Period	2033 Total Conditions	North-South Street	Service Road/County Road 47		
Flow Conditions	Free flow (rural)	Major Street	North-South		
T Intersection	No	Approach Lanes per Direction	1		
		Existing or Planned Intersection	planned intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Northbound	65	513	13	11	843	13	19	339	7
Southbound	10	644	101	10	808	64	5	363	41
MINOR STREET									
Eastbound	5	1	5	19	1	19	6	1	6
Westbound	40	1	63	121	1	33	40	1	24
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1346	115	1461	1749	194	1943	774	77	851
CROSSING VOLUMES			69			53			31

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	851	100%	43%
	B. Vehicle volume, along minor streets (average hour)	120 or 180 <small>(full intersection) (tee intersection)</small>	150%	77	43%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	774	100%	41%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	50 or 120 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	31	41%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

Restricted Flow Conditions - roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions - roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Highway 12		
Analysis Period	2038 Total Conditions	North-South Street	Gladstone Street		
Flow Conditions	Restricted flow (urban)	Major Street	North-South		
T Intersection	Yes	Approach Lanes per Direction	2		
		Existing or Planned Intersection	existing intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Northbound	35	707	0	110	1244	0	36	488	0
Southbound	0	1054	40	0	1106	129	0	540	42
MINOR STREET									
Eastbound	0	0	0	0	0	0	0	0	0
Westbound	106	0	79	87	0	70	48	0	37
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1836	185	2021	2589	157	2746	1106	86	1192
CROSSING VOLUMES			79			135			53

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	1192	100%	28%
	B. Vehicle volume, along minor streets (average hour)	170 or 255 <small>(full intersection) (tee intersection)</small>	120%	86	28%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	1106	100%	26%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	75 or 170 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	53	26%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

Restricted Flow Conditions - roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions - roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Highway 12		
Analysis Period	2038 Total Conditions	North-South Street	Service Road/County Road 47		
Flow Conditions	Free flow (rural)	Major Street	North-South		
T Intersection	No	Approach Lanes per Direction	2		
		Existing or Planned Intersection	planned intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Northbound	68	629	26	11	1100	26	20	432	13
Southbound	21	858	102	21	1003	65	11	465	42
MINOR STREET									
Eastbound	9	1	9	37	1	37	12	1	12
Westbound	40	1	66	122	1	34	41	1	25
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1704	126	1830	2226	232	2458	983	90	1072
CROSSING VOLUMES			76			72			37

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	1072	100%	50%
	B. Vehicle volume, along minor streets (average hour)	120 or 180 <small>(full intersection) (tee intersection)</small>	150%	90	50%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	983	100%	21%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	50 or 120 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	37	21%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

Restricted Flow Conditions - roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions - roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Ramara Road 47		
Analysis Period	2038 Total Conditions	North-South Street	Future Access Road		
Flow Conditions	Restricted flow (urban)	Major Street	East-West		
T Intersection	Yes	Approach Lanes per Direction	1		
		Existing or Planned Intersection	planned intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Eastbound	78	803	0	78	642	0	39	361	0
Westbound	0	345	130	0	869	129	0	304	65
MINOR STREET									
Northbound	47	0	28	186	0	111	58	0	35
Southbound	0	0	0	0	0	0	0	0	0
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1356	75	1431	1718	297	2015	769	93	862
CROSSING VOLUMES			93			176			67

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	862	80%	24%
	B. Vehicle volume, along minor streets (average hour)	170 or 255 <small>(full intersection) (tee intersection)</small>	150%	93	24%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	769	71%	60%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	75 or 170 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	67	60%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Highway 12		
Analysis Period	2043 Total Conditions	North-South Street	Gladstone Street		
Flow Conditions	Restricted flow (urban)	Major Street	North-South		
T Intersection	Yes	Approach Lanes per Direction	2		
		Existing or Planned Intersection	existing intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Northbound	35	761	0	110	1311	0	36	518	0
Southbound	0	1112	40	0	1181	129	0	573	42
MINOR STREET									
Eastbound	0	0	0	0	0	0	0	0	0
Westbound	106	0	79	87	0	70	48	0	37
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1948	185	2133	2731	157	2888	1170	86	1255
CROSSING VOLUMES			79			135			53

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	1255	100%	28%
	B. Vehicle volume, along minor streets (average hour)	170 or 255 <small>(full intersection) (tee intersection)</small>	120%	86	28%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	720 or 900 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	1170	100%	26%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	75 or 170 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	120%	53	26%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

Restricted Flow Conditions - roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions - roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Township of Ramara	Date	01 Nov 2023
Agency or Company	Tatham Engineering Ltd	East-West Street	Highway 12		
Analysis Period	2043 Total Conditions	North-South Street	Future Access Road/County Road 47		
Flow Conditions	Free flow (rural)	Major Street	North-South		
T Intersection	No	Approach Lanes per Direction	2		
		Existing or Planned Intersection	planned intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Northbound	72	675	26	12	1165	26	21	460	13
Southbound	21	904	102	21	1073	65	11	494	42
MINOR STREET									
Eastbound	9	1	9	37	1	37	12	1	12
Westbound	41	1	70	123	1	35	41	1	26
PEDESTRIANS									
crossing MAJOR street		0			0			0	
crossing MINOR street		0			0			0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1800	131	1931	2362	234	2596	1041	91	1132
CROSSING VOLUMES			80			73			38

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	1132	100%	51%
	B. Vehicle volume, along minor streets (average hour)	120 or 180 <small>(full intersection) (tee intersection)</small>	150%	91	51%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	480 or 600 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	1041	100%	21%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	50 or 120 <small>(1 lane approach on main road) (2 or more lane approach on main road)</small>	150%	38	21%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

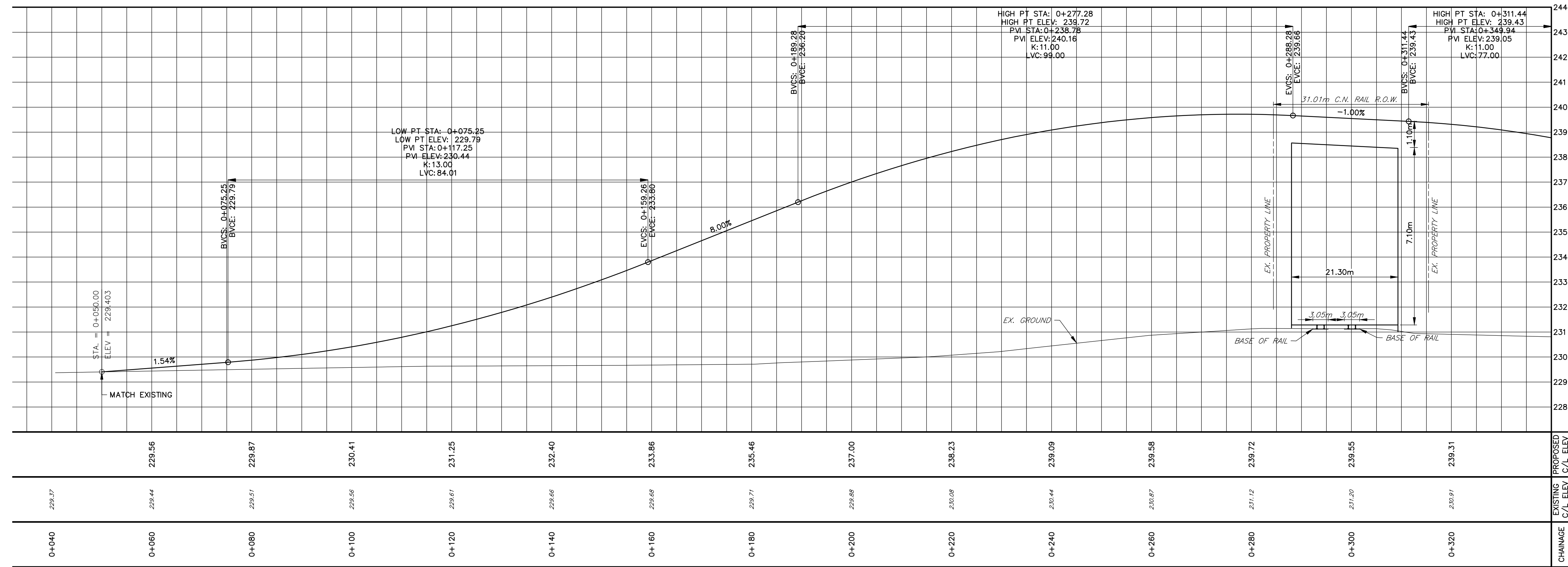
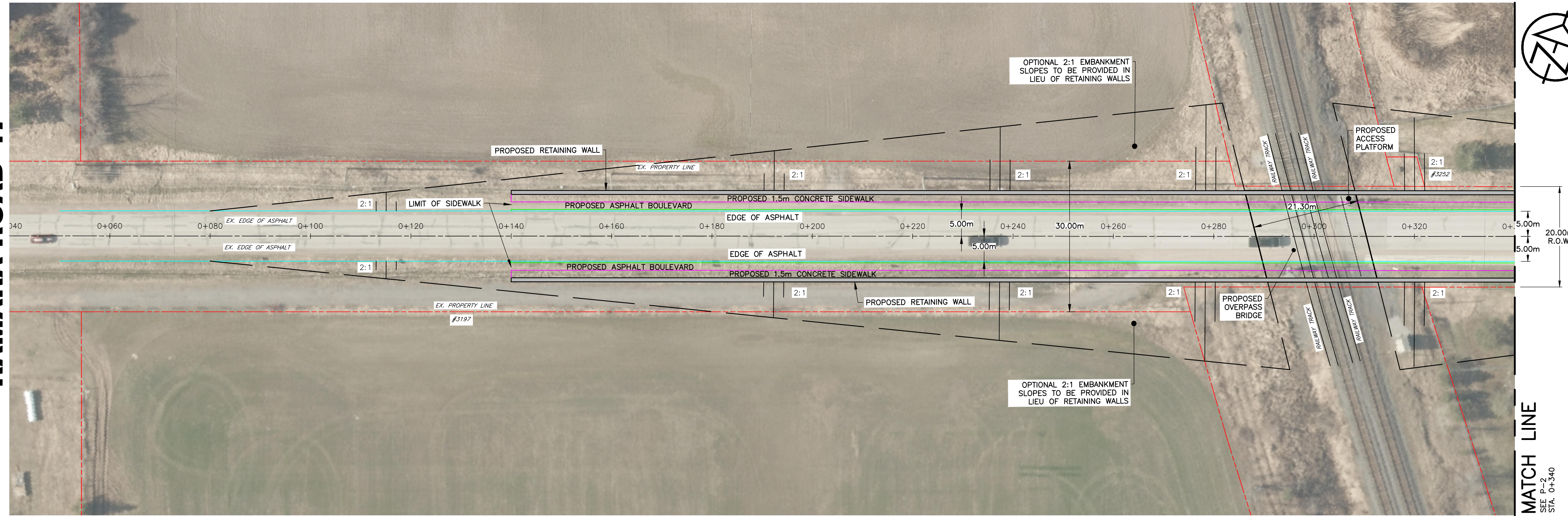
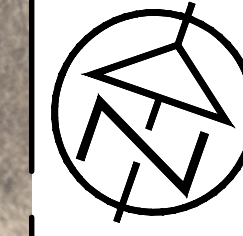
Restricted Flow Conditions - roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

Free Flow Conditions - roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

**Appendix H:
Ramara Road 47 Grade
Separation**

CN RAIL

RAMARA ROAD 47



DISCLAIMER AND COPYRIGHT
 CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.
 TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

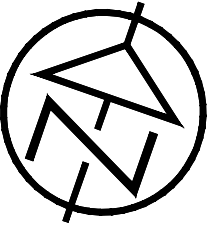
BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA

CN RAIL OVERPASS
RAMARA ROAD 47

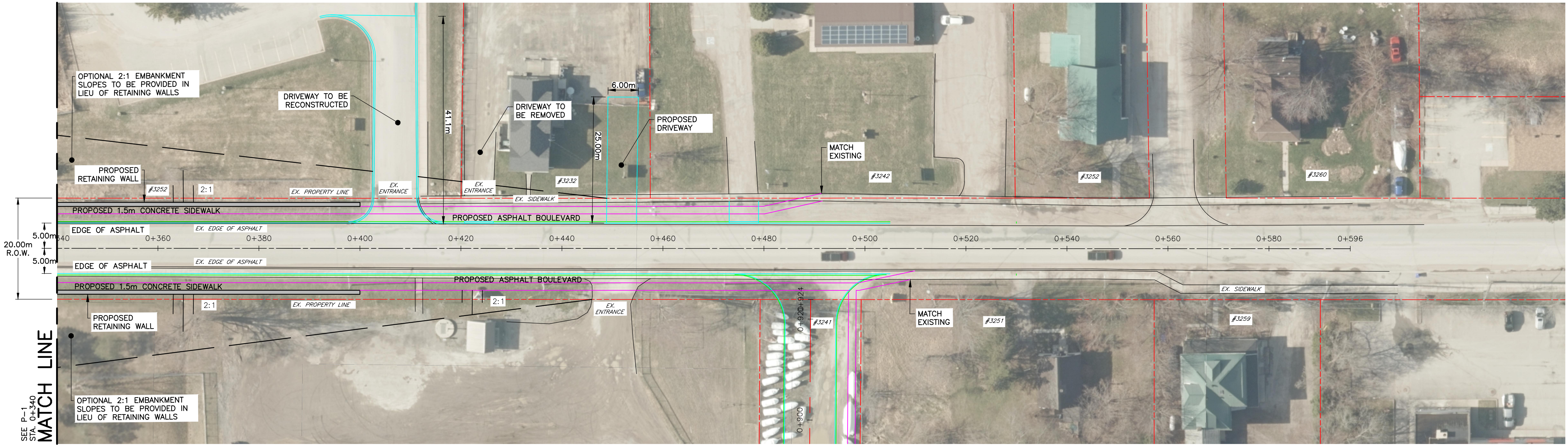


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DRAWN: DDOH	DATE: APR 2023	
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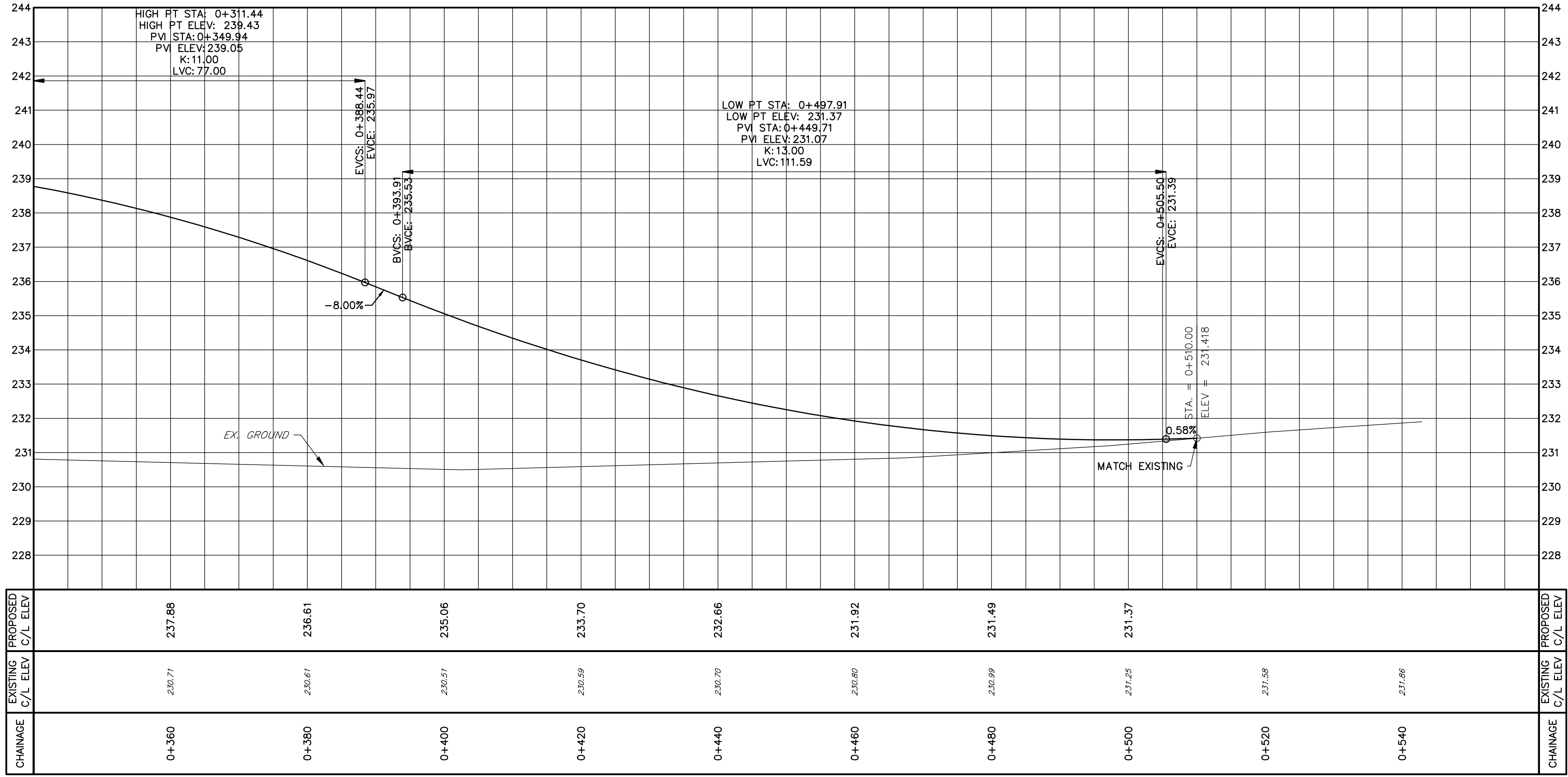
MARY STREET



RAMARA ROAD 47



FUTURE ACCESS ROAD



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BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

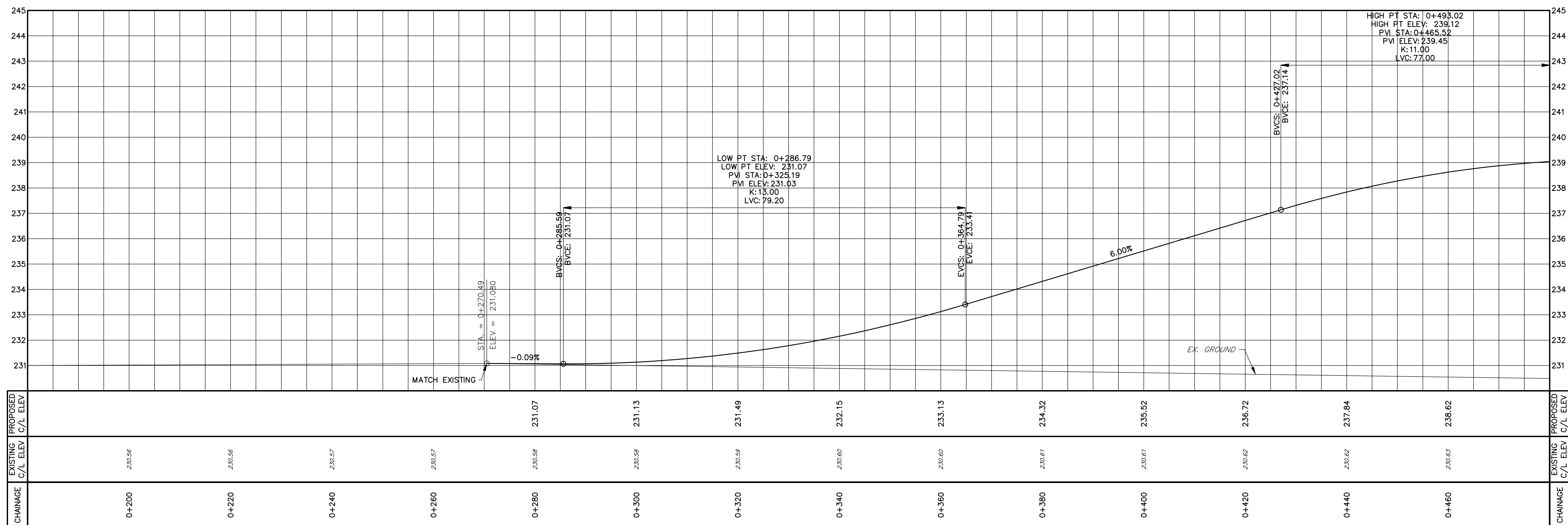
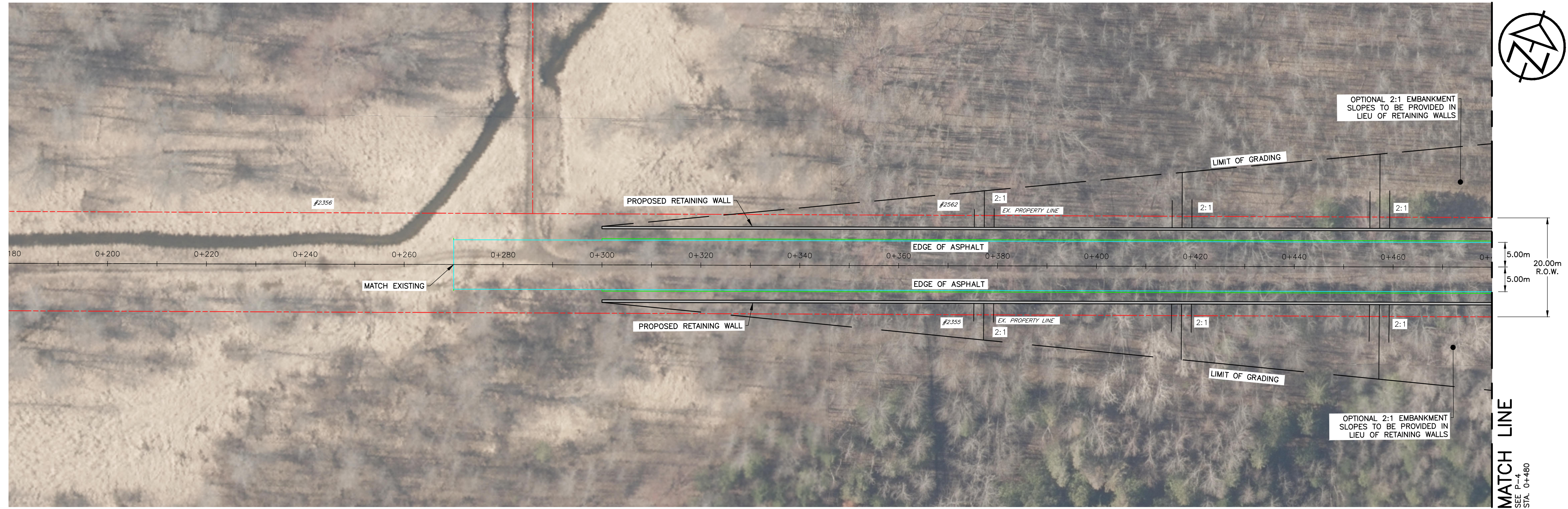
BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA
 CN RAIL OVERPASS
 RAMARA ROAD 47

TATHAM ENGINEERING

DESIGN: JS	FILE: 423399	DWG: P-2
DRAWN: DDOH	DATE: APR 2023	
CHECK: SKR	SCALE: 1:500	

**Appendix I:
Concession Road 5 Grade
Separation**

CONCESSION ROAD 5



DISCLAIMER AND COPYRIGHT

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BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

BRECHIN TRANSPORTATION STUDY TOWNSHIP OF RAMARA

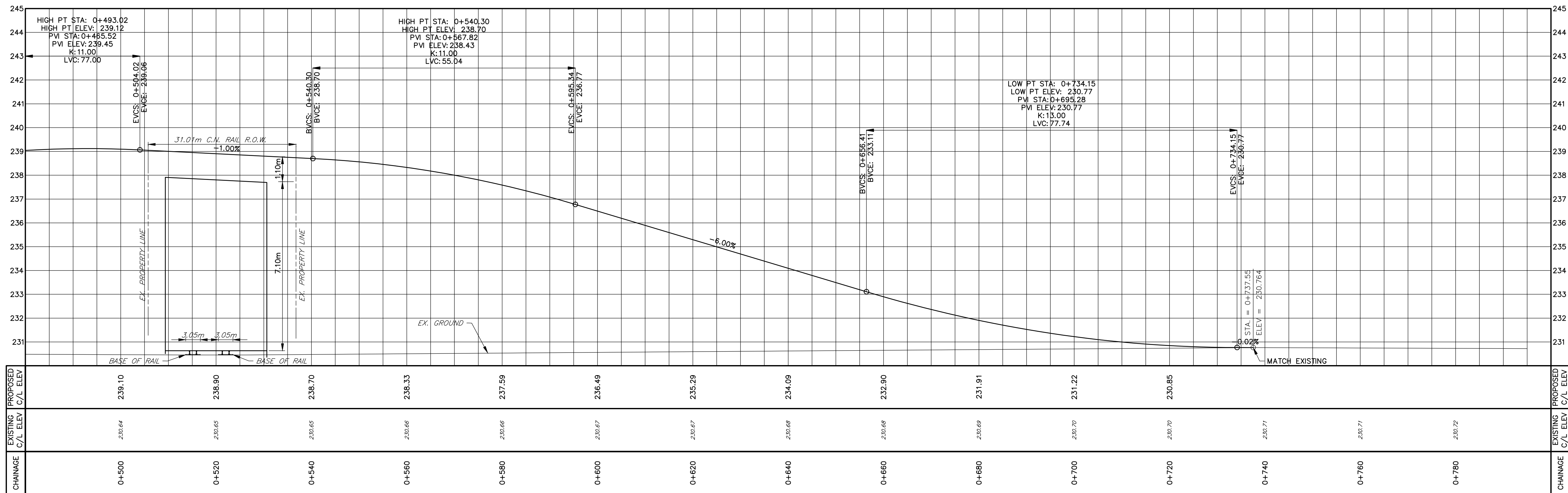
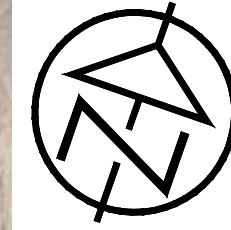
CN RAIL OVERPASS CONCESSION ROAD 5



DESIGN: JS	FILE: 423399	DWG: P-3
DRAWN: DDOH	DATE: APR 2023	
CHECK: SKR	SCALE: 1:500	

CONCESSION ROAD 5

CN RAIL



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BENCHMARKS

Station	Existing C/L Elev	Proposed C/L Elev
0+500	230.64	239.10
0+520	230.65	238.90
0+540	230.65	238.70
0+560	230.66	238.33
0+580	230.66	237.59
0+600	230.67	236.49
0+620	230.67	235.29
0+640	230.68	234.09
0+660	230.69	232.90
0+680	230.69	231.91
0+700	230.70	231.22
0+720	230.70	230.85
0+740	230.71	230.71
0+760	230.71	230.71
0+780	230.72	230.72

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

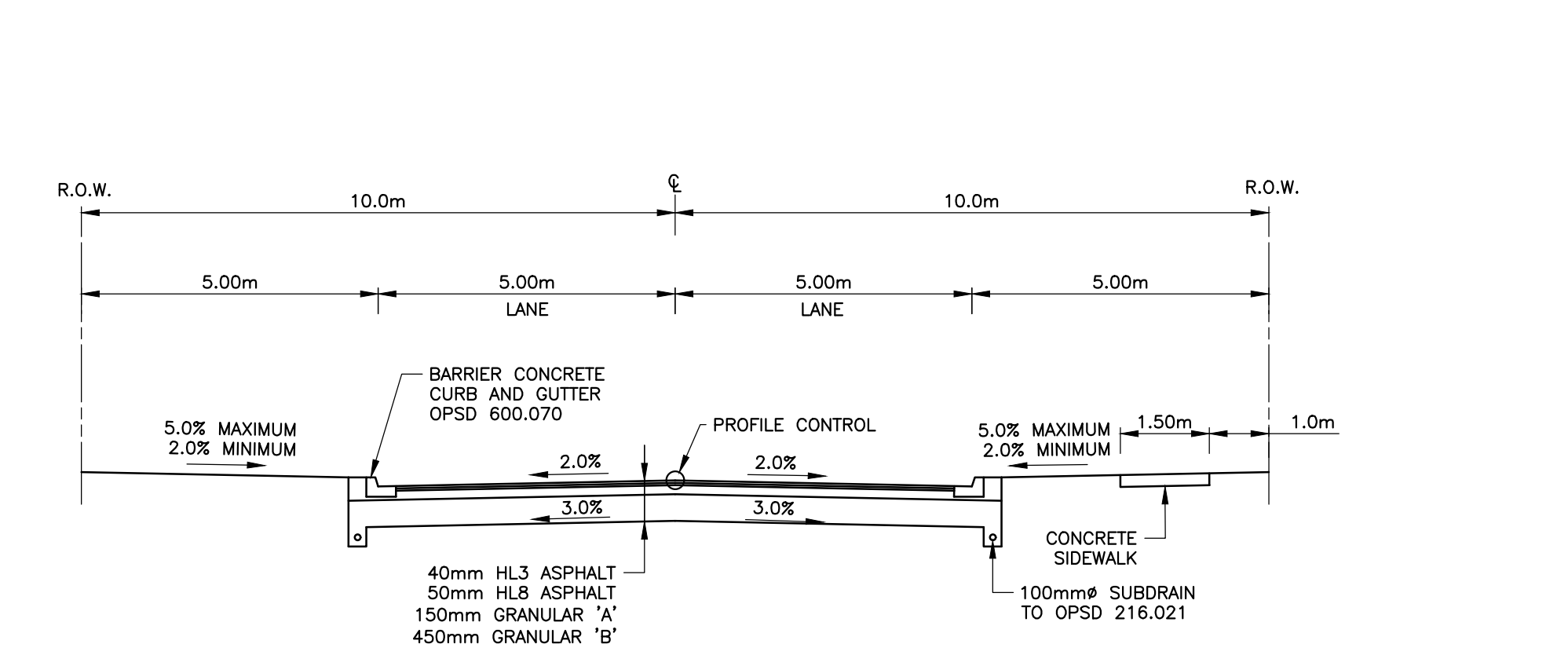
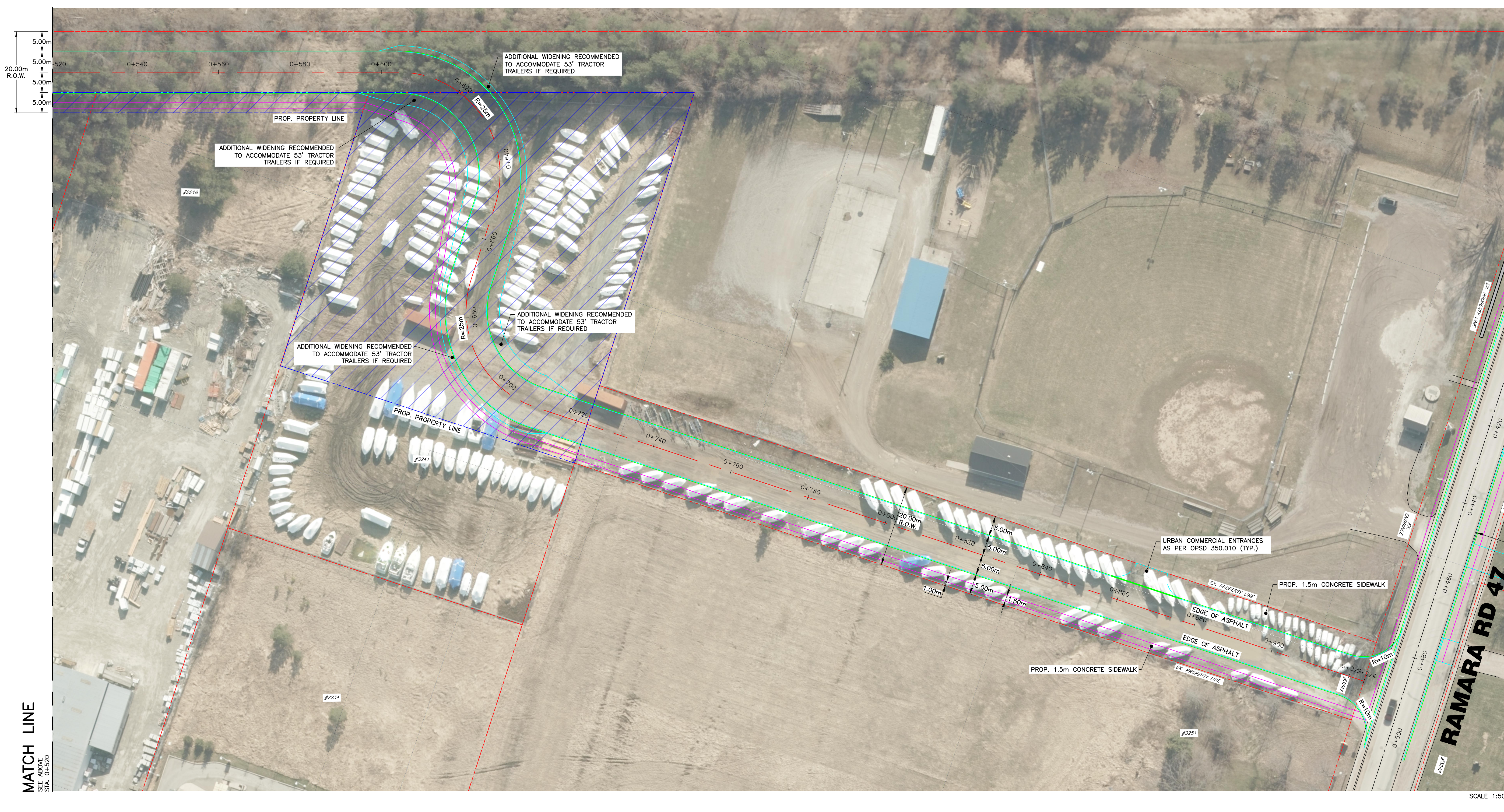
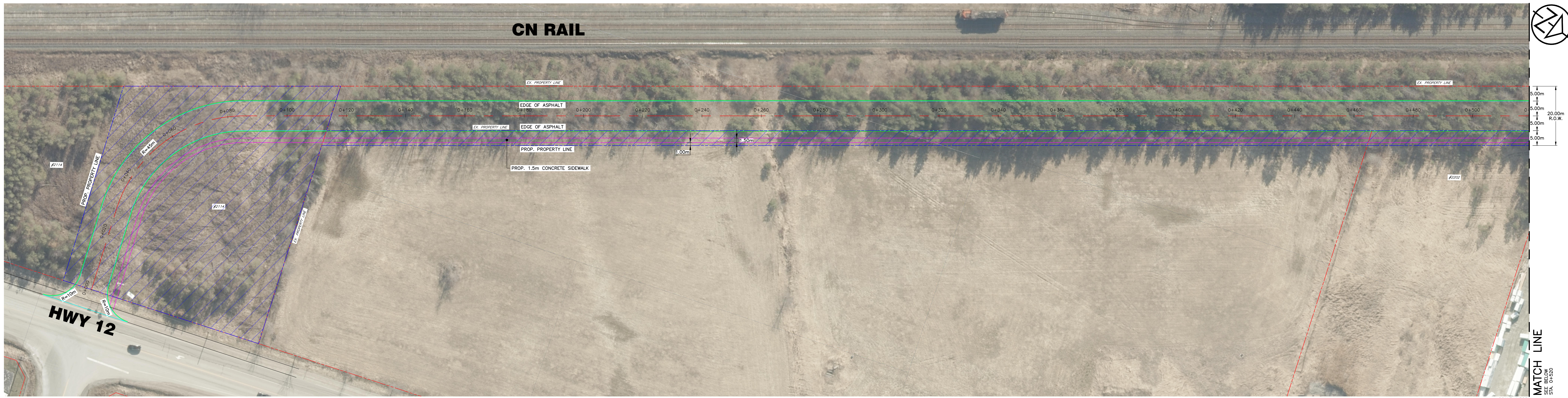
BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA

CN RAIL OVERPASS
CONCESSION ROAD 5

TATHAM ENGINEERING

DESIGN: JS	FILE: 423399	DWG: P-4
DRAWN: DDOH	DATE: APR 2023	
CHECK: SKR	SCALE: 1:500	

**Appendix J:
Highway 12 Access Road**



TYPICAL SECTION
 *BASED ON TOWNSHIP OF RAMARA STD. NO. 211

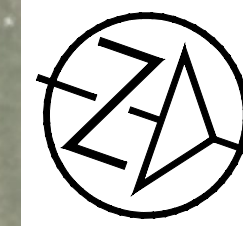
LEGEND

- EX. PROPERTY LINE
- PROP. EDGE OF PAVEMENT
- PROP. CONCRETE BARRIER CURB AND GUTTER QPSD 600.070
- PROP. CONCRETE SIDEWALK
- PROP. PROPERTY TAKING

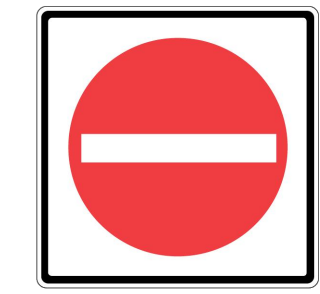
BRECHIN TRANSPORTATION STUDY		TATHAM ENGINEERING	
TOWNSHIP OF RAMARA		DESIGN: JS	FILE: 423399
HWY 12 ACCESS ROAD		DRAWN: DDOH	DATE: APR 2023
		CHECK: SKR	SCALE: 1:500
			DWG: P-5

**Appendix K:
O'Neill Street Access Road**

MARY ST



SIGN LEGEND



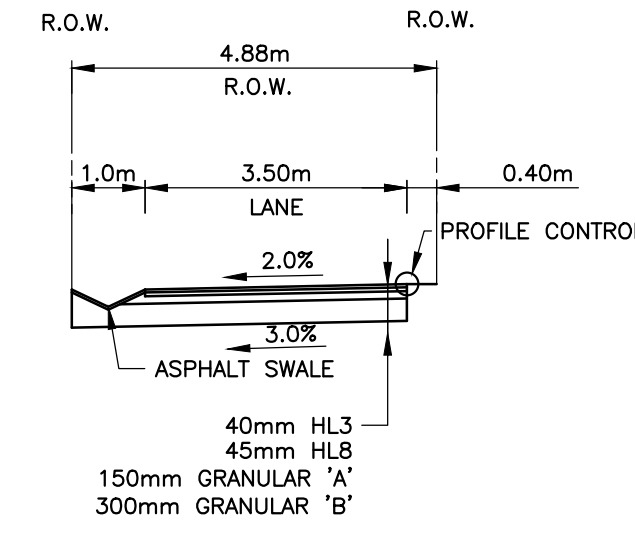
Rb-19



Rb-19t



Rb-21



TYPICAL SECTION

LEGEND

- EX. PROPERTY LINE
- EX. EDGE OF PAVEMENT
- PROP. EDGE OF PAVEMENT
- PROP. PAVEMENT MARKING
- PROP. DITCH
- PROP. CURB
- PROP. PROPERTY LINE
- 1 PARKING SPACES

DISCLAIMER AND COPYRIGHT
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BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

ENGINEER STAMP

BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA
 O'NEILL STREET/MARY STREET
 LANE

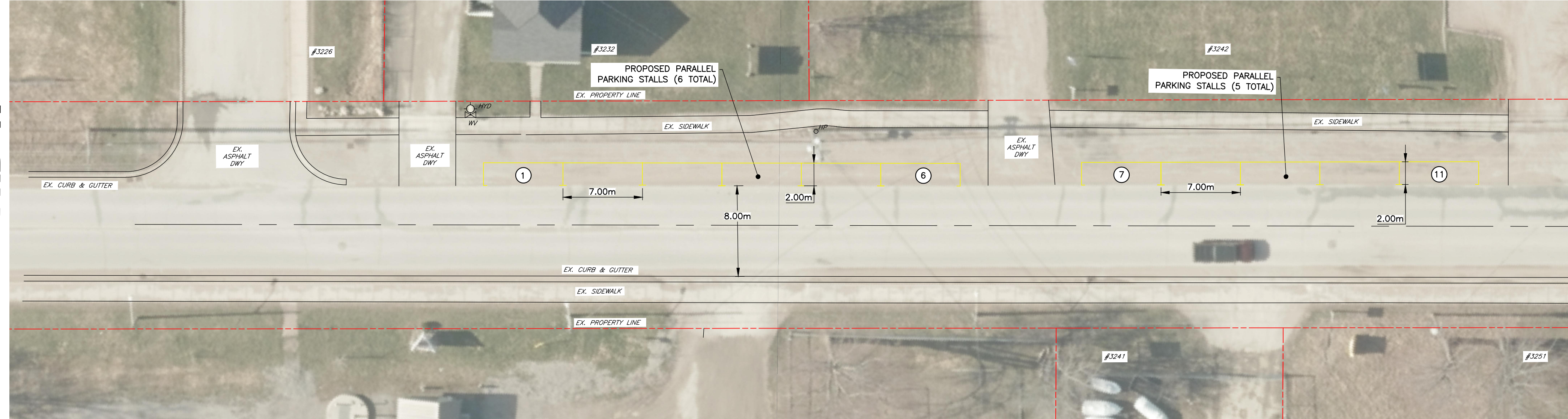
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FILE: 423399
DWG: P-6

DRAWN: DDOH
DATE: APR 2023

CHECK: SKR
SCALE: 1:250

**Appendix L:
Ramara Road 47 Parking**

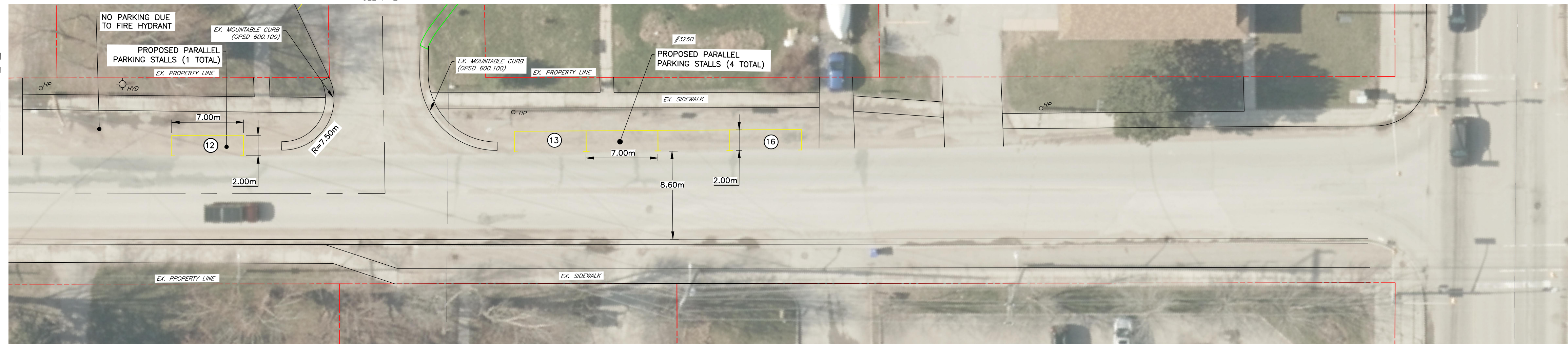
RAMARA RD 47



MARY ST
SEE P-2

HWY 12

RAMARA RD 47



LEGEND

- EX. PROPERTY LINE
- EX. EDGE OF PAVEMENT
- PROP. EDGE OF PAVEMENT
- PROP. PAVEMENT MARKING
- PROP. DITCH
- PROP. CURB
- PROP. PROPERTY LINE
- ⓪ PARKING SPACES

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

**BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA**

**RAMARA ROAD 47
PARKING LAYOUT**

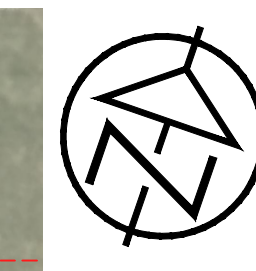
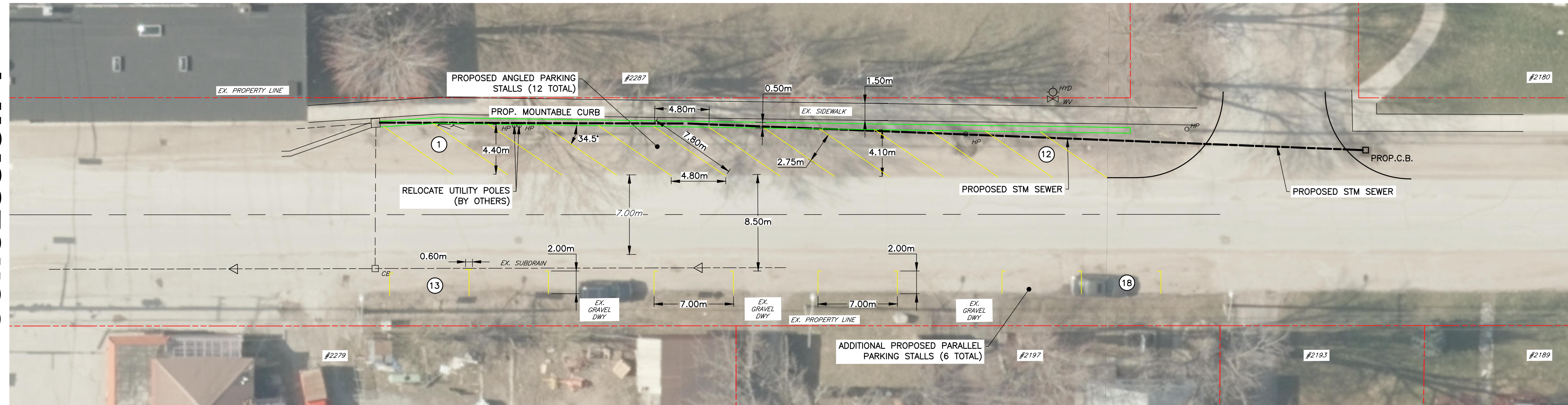


DESIGN: JS	FILE: 423399	DWG: P-7
DRAWN: DDOH	DATE: APR 2023	
CHECK: SKR	SCALE: 1:250	

**Appendix M:
Concession Road 4 & Mary Street
Parking**

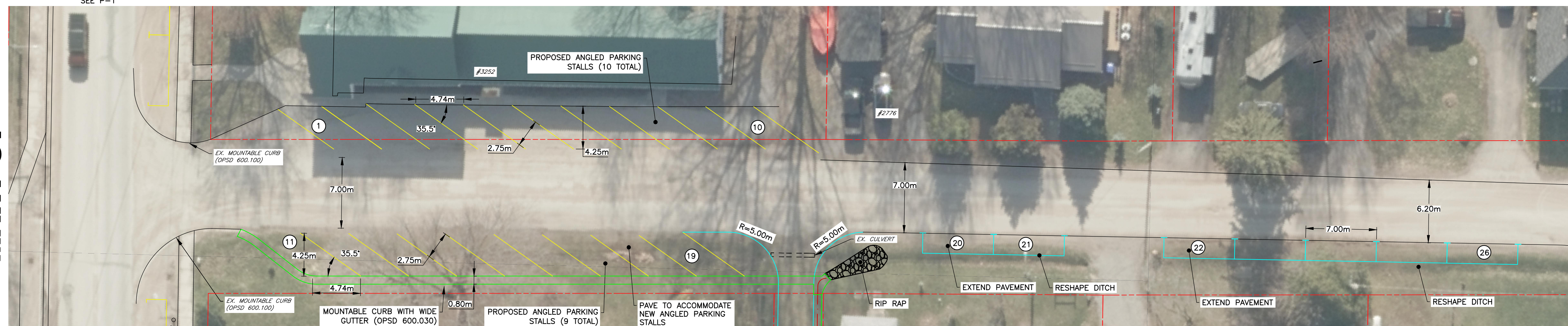
PERRY AVE

CONCESSION 4



RAMARA RD 47

MARY ST



- LEGEND**
- EX. PROPERTY LINE
 - EX. EDGE OF PAVEMENT
 - PROP. EDGE OF PAVEMENT
 - PROP. PAVEMENT MARKING
 - PROP. DITCH
 - PROP. CURB
 - PROP. PROPERTY LINE
 - PARKING SPACES

DISCLAIMER AND COPYRIGHT
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BENCHMARKS

NOTES

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	1ST SUBMISSION	SEPT/23	

ENGINEER STAMP

BRECHIN TRANSPORTATION STUDY
TOWNSHIP OF RAMARA
 CONCESSION 4 & MARY STREET
 PARKING LOT LAYOUT

TATHAM ENGINEERING

DESIGN: JS	FILE: 423399	DWG: P-8
DRAWN: DDOH	DATE: APR 2023	
CHECK: SKR	SCALE: 1:250	

Appendix N: Preliminary Cost Estimates



**Brechin Transportation Study
Ramara Road 47 - CN Rail Overpass
Township of Ramara**

**File: 423399
Date: September 1, 2023**

PRELIMINARY ESTIMATE OF PROBABLE COSTS

Item	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1 General Work					\$ 277,000.00
1.1	Mobilization & Demobilization	LS	100%	\$ 250,000.00	\$ 250,000.00
1.2	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
1.3	Traffic Control	LS	1	\$ 25,000	\$ 25,000
2 Removals					\$ 193,535.00
2.1	Strip and Dispose Topsoil	sq.m.	4,323	\$ 28.00	\$ 121,030.00
2.2	Clearing and Grubbing	LS	100%	\$ 2,500.00	\$ 2,500.00
2.3	Remove, Salvage and Relocate Existing Signs	each	8	\$ 400.00	\$ 3,200.00
2.4	Removal of Asphalt (Full Depth)	sq.m.	3750	\$ 10	\$ 37,500
2.5	Removal of Asphalt Driveway	sq.m.	55	\$ 16	\$ 880
2.6	Removal of Concrete Curb and Gutter (All Types)	m	288	\$ 35	\$ 10,080
2.7	Removal of Concrete Sidewalk	sq.m.	471	\$ 20	\$ 9,420
2.8	Removal of Asphalt Boulevard	sq.m.	345	\$ 15	\$ 5,175
2.9	Removal of Existing Structures	ea.	5	\$ 750	\$ 3,750
3 Roadworks					\$ 1,232,307.84
3.1	Adjustment of Existing Sanitary Structures	ea.	3	\$ 750	\$ 2,250
3.2	Earth Excavation (Grading)	LS	100%	\$ 50,000.00	\$ 50,000
3.3	Surface Course Asphalt (40mm)	t	478	\$ 140	\$ 66,920
3.4	Binder Course Asphalt Upper (50mm)	t	592	\$ 130	\$ 76,960
3.5	Binder Course Asphalt Lower (50mm)	t	570	\$ 130	\$ 74,100
3.6	Driveways SuperPave HL3 (50 mm depth)	sq.m.	710	\$ 35	\$ 24,850
3.7	Asphalt Boulevard	sq.m.	624	\$ 35	\$ 21,840
3.8	Granular 'A' (150 mm Depth)	t	2265	\$ 30	\$ 67,941
3.9	Granular 'B', Type I (450 mm Depth)	t	5662	\$ 35	\$ 198,160
3.10	Concrete Sidewalk	sq.m.	1,589	\$ 105	\$ 166,887
3.11	Concrete Barrier Curb (OPSD 600.010)	m	880	\$ 200	\$ 176,000
3.12	150mm Dia. Pipe Subdrain c/w Filter Sock	m	880	\$ 25	\$ 22,000
3.13	600 mm x 600 mm Catchbasin	ea.	8	\$ 4,400	\$ 35,200
3.14	Connect to Existing Structures and Sewers	ea.	2	\$ 3,000	\$ 6,000
3.15	Steel Beam Guide Rail, Type M20	m	670	\$ 250	\$ 167,500
3.16	Softstop Terminal System (OPSD 922.161)	ea.	4	\$ 10,000	\$ 40,000
3.17	Pavement Marking, Durable	m	1,320	\$ 5	\$ 6,600
3.18	Topsoil, Seed & Mulch	sq.m.	2,550	\$ 10	\$ 25,500
3.19	Topsoil and Sod	sq.m.	240	\$ 15	\$ 3,600

Item	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
4	STRUCTURAL - BRIDGE AND GENERAL WORK				\$ 11,649,883.00
4.1	New Bridge	LS	1	\$ 6,250,000	\$ 6,250,000
4.2	CN Flagging	LS	100	\$ 1,500	\$ 150,000
4.3	Structural Backfill	cu.m.	27,595	\$ 25	\$ 689,883
4.4	Retaining wall	sq.m.	3,800	\$ 1,200	\$ 4,560,000
TOTAL					\$ 13,352,725.84
Contingency - 10%					\$ 1,335,272.58
TOTAL WITH CONTINGENCY					\$ 14,687,998.42

Notes: 1. Estimate excludes HST.

PRELIMINARY ESTIMATE OF PROBABLE COSTS

Item	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1 General Work					\$ 254,500.00
1.1	Mobilization & Demobilization	LS	100%	\$ 250,000.00	\$ 250,000.00
1.2	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
1.3	Traffic Control	LS	1	\$ 2,500	\$ 2,500
2 Removals					\$ 210,500.00
2.1	Topsoil Stripping, Screening & Stockpiling	sq.m.	8,800	\$ 18	\$ 158,400
2.2	Clearing and Grubbing	sq.m.	8,800	\$ 5.5	\$ 48,400
2.3	Remove, Salvage and Relocate Existing Signs	each	4	\$ 400.00	\$ 1,600
2.4	Removal of Asphalt (Full Depth)	sq.m.	140	\$ 15	\$ 2,100
3 Road Works					\$ 1,221,629.80
3.1	Earth Excavation (Grading)	LS	100%	\$ 50,000.00	\$ 50,000
3.2	Surface Course Asphalt (40mm)	t	462	\$ 140	\$ 64,680
3.3	Base Course Asphalt Upper (50mm)	t	578	\$ 130	\$ 75,075
3.4	Granular 'A' (150 mm Depth)	t	2,151	\$ 30	\$ 64,541
3.5	Granular 'B', Type I (450 mm Depth)	t	5,378	\$ 35	\$ 188,244
3.6	Asphalt Boulevard	sq.m.	1640	\$ 35	\$ 57,400
3.7	Concrete Curb & Gutter (OPSD 600.040)	m	838	\$ 90	\$ 75,420
3.8	600 mm x 600 mm Catchbasin	ea.	6	\$ 4,400	\$ 26,400
3.9	Pipe Subdrains	m	838	\$ 450	\$ 377,100
3.10	Pavement Marking, Durable	m	1,320	\$ 6	\$ 7,920
3.11	Steel Beam Guide Rail, Type M20	m	779	\$ 250	\$ 194,850
3.12	Softstop Terminal System (OPSD 922.161)	m	4	\$ 10,000	\$ 40,000
4 STRUCTURAL - BRIDGE AND GENERAL WORK					\$ 9,788,360.00
4.1	New Bridge	LS	1	\$ 5,000,000	\$ 5,000,000
4.2	CN Flagging	LS	100	\$ 1,500	\$ 150,000
4.3	Structural Backfill	m ³	22,334	\$ 25	\$ 558,360
4.4	Retaining wall	m ²	3,400	\$ 1,200	\$ 4,080,000
TOTAL					\$ 11,474,989.80
Contingency - 10%					\$ 1,147,498.98
TOTAL WITH CONTINGENCY					\$ 12,622,488.78

Notes: 1. Estimate excludes HST.



PRELIMINARY ESTIMATE OF PROBABLE COSTS

**Brechin Transportation Study
Highway 12 Alternate Access Road**

Township of Ramara

File: 423399

Date: September 1, 2023

Item No.	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1	General Work				\$ 27,000.00
1.1	Mobilization & Demobilization	LS	100%	\$ 25,000.00	\$ 25,000.00
1.2	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
2	Removals				\$ 259,800.00
2.1	Strip and Dispose Topsoil	m ²	10,500	\$ 18.00	\$ 189,000.00
2.2	Clearing and Grubbing	LS	100%	\$ 70,000.00	\$ 70,000.00
2.3	Remove, Salvage and Relocate Existing Signs	each	2	\$ 400.00	\$ 800.00
3	Road Works				\$ 1,783,596.42
3.1	Excavation & Grading	LS	100%	\$ 425,000.00	\$ 425,000.00
3.2	Surface Course Asphalt (40 mm)	t	996	\$ 140.00	\$ 139,403.04
3.3	Base Course Asphalt (50 mm)	t	1,245	\$ 130.00	\$ 161,807.10
3.4	Granular B (450 mm Depth)	t	11,780	\$ 30.00	\$ 353,411.10
3.5	Granular A (150mm Depth)	t	4,712	\$ 35.00	\$ 164,925.18
3.6	Tactile Plates	each	4	\$ 500.00	\$ 2,000.00
3.7	Concrete Curb & Gutter (OPSD 600.070)	m	1,902	\$ 90	\$ 171,180.00
3.8	Supply and Install Concrete Sidewalk	m ²	1,382	\$ 160.00	\$ 221,120.00
3.9	150mm Dia. Pipe Subdrain c/w Filter Sock	m	1,902	\$ 25.00	\$ 47,550.00
3.10	Topsoil and Sod	m ²	8,100	\$ 12.00	\$ 97,200.00
4	STORM SEWER				\$ 764,333.33
4.1	600 mm x 600 mm Catchbasin	ea	10	\$ 5,500.00	\$ 57,444.44
4.2	1200 mm Dia. Catchbasin (Manhole)	ea.	10	\$ 11,000	\$ 114,889
4.3	Oil Grit Separator (STC 14000)	ea.	1	\$ 125,000	\$ 125,000
4.4	300 mm Dia. Pipe Sewer	m	500	\$ 450	\$ 225,000
4.5	450 mm Dia. Pipe Sewer	m	440	\$ 550	\$ 242,000
TOTAL					\$ 2,834,729.75
	Contingency - 10%				\$ 283,472.98
TOTAL WITH CONTINGENCY					\$ 3,118,202.73

Notes: 1. Estimate excludes HST.



PRELIMINARY ESTIMATE OF PROBABLE COSTS

Brechin Transportation Study

O'Neill Lane Access Road

Township of Ramara

File: 423399

Date: September 1, 2023

Item No.	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1	General Work				\$ 9,000.00
1.1	Mobilization & Demobilization	LS	100%	\$ 5,000.00	\$ 5,000.00
1.2	Traffic Control	LS	100%	\$ 2,000.00	\$ 2,000.00
1.3	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
2	Removals				\$ 6,250.00
2.1	Clearing and Grubbing	LS	100%	\$ 5,000.00	\$ 5,000.00
2.2	Remove, Salvage and Relocate Existing Signs	each	1	\$ 750.00	\$ 750.00
2.3	Removal of Existing Culvert	each	1	\$ 500.00	\$ 500.00
3	Road Works				\$ 57,891.56
3.1	Topsoil Stripping, Screening & Stockpiling	sq.m.	186	\$ 20.00	\$ 3,724.00
3.2	Excavation & Grading	LS	100%	\$ 20,000.00	\$ 20,000.00
3.3	Surface Course Asphalt (40 mm) - HL3 or SP 12.5	t	50	\$ 140.00	\$ 6,982.50
3.4	Base Course Asphalt (45 mm) - SP 19	t	56	\$ 130.00	\$ 7,294.22
3.5	Gravel Driveway	t	11	\$ 50.00	\$ 529.20
3.6	Granular B (300 mm Depth)	t	299	\$ 30.00	\$ 8,977.50
3.7	Granular A (150mm Depth)	t	226	\$ 32.50	\$ 7,334.15
3.8	Asphalt Gutter	m	122	\$ 25.00	\$ 3,050.00
TOTAL					\$ 73,141.56
	Contingency - 10%				\$ 7,314.16
TOTAL WITH CONTINGENCY					\$ 80,455.72

Notes: 1. Estimate excludes HST.



PRELIMINARY ESTIMATE OF PROBABLE COSTS

Brechin Transportation Study

Ramara Road 47 (Parking)

Township of Ramara

File: 423399

Date: September 8, 2023

Item No.	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1	General Work				\$ 2,500.00
1.1	Mobilization & Demobilization	LS	100%	\$ 1,000.00	\$ 1,000.00
1.2	Traffic Control	LS	100%	\$ 1,500.00	\$ 1,500.00
2	Road Works				\$ 1,104.00
2.1	Pavement Marking, Durable Solid White (10 cm)	m	184	\$ 6	\$ 1,104.00
TOTAL					\$ 3,604.00
Contingency - 10%					\$ 360.40
TOTAL WITH CONTINGENCY					\$ 3,964.40

Notes:

1. Estimate excludes HST.



PRELIMINARY ESTIMATE OF PROBABLE COSTS

Brechin Transportation Study

Concession Road 4 (Parking)

Township of Ramara

File: 423399

Date: September 8, 2023

Item No.	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1	General Work				\$ 17,000.00
1.1	Mobilization & Demobilization	LS	100%	\$ 10,000.00	\$ 10,000.00
1.2	Traffic Control	LS	100%	\$ 5,000.00	\$ 5,000.00
1.3	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
2	Removals				\$ 41,650.00
2.1	Remove Existing Asphalt - Full Depth	sq.m.	66	\$ 25.00	\$ 1,650.00
2.2	Relocate Existing Hydro Poles including Communications	LS	1	\$ 40,000.00	\$ 40,000.00
3	Road Works				\$ 66,313.84
3.1	Excavation & Grading	LS	1	\$ 5,000.00	\$ 5,000.00
3.2	Concrete Curb and Gutter (OPSD 600.060)	m	66	\$ 110.00	\$ 7,260.00
3.3	Pipe Subdrain (150 mm Perforated) c/w Filter Sock	m	66	\$ 35.00	\$ 2,310.00
3.4	Granular A (150 mm)	t	22	\$ 30.00	\$ 655.78
3.5	Base Course Asphalt (50 mm)	t	4	\$ 450.00	\$ 1,949.06
3.6	Surface Course Asphalt (40 mm)	t	6	\$ 500.00	\$ 2,772.00
3.7	Supply and Install Storm Sewer (250 mm diameter)	m	87	\$ 450.00	\$ 39,150.00
3.8	Supply and Install 600 mm x 600 mm Catchbasin	ea.	1	\$ 6,500.00	\$ 6,500.00
3.9	Pavement Marking, Durable Solid White, 10 cm	m	120	\$ 6.00	\$ 717.00
TOTAL					\$ 124,963.84
	Contingency - 10%				\$ 12,496.38
TOTAL WITH CONTINGENCY					\$ 137,460.22

Notes: 1. Estimate excludes HST.



PRELIMINARY ESTIMATE OF PROBABLE COSTS

Brechin Transportation Study

Mary Street (Parking)

Township of Ramara

File: 423399

Date: September 8, 2023

Item No.	Description	Unit	Estimated Quantity	Estimated Unit Price	Estimated Price
1	General Work				\$ 12,000.00
1.1	Mobilization & Demobilization	LS	100%	\$ 5,000.00	\$ 5,000.00
1.2	Traffic Control	LS	100%	\$ 5,000.00	\$ 5,000.00
1.3	Contract Signs	each	2	\$ 1,000.00	\$ 2,000.00
2	Removals				\$ 2,700.00
2.1	Remove, Salvage And Relocate Existing Signs	each	2	\$ 350.00	\$ 700.00
2.2	Remove Existing Culvert	each	1	\$ 500.00	\$ 500.00
2.3	Clearing and Grubbing	LS	100%	\$ 1,500.00	\$ 1,500.00
3	Road Works				\$ 42,431.36
3.1	Topsoil Stripping, Screening & Stockpiling	m ²	98.0	\$ 20.00	\$ 1,960.00
3.2	Excavation & Grading	LS	100%	\$ 7,500.00	\$ 7,500.00
3.3	Base Course Asphalt (50 mm)	t	42	\$ 130.00	\$ 5,460.00
3.4	Surface Course Asphalt (40 mm)	t	34	\$ 140.00	\$ 4,704.00
3.5	Granular A (150mm Depth)	t	159	\$ 35.00	\$ 5,564.16
3.6	Granular B (300mm Depth)	t	193	\$ 35.00	\$ 6,762.00
3.7	Concrete Curb & Gutter (OPSD 600.030)	m	58	\$ 110	\$ 6,380.00
3.8	Pipe Subdrain (150 mm Perforated) c/w Filter Sock	m	58	\$ 35.00	\$ 2,030.00
3.9	R10 Rip Rap c/w Filter Cloth (300 mm Thick)	sq.m.	10	\$ 75.00	\$ 750.00
3.10	Pavement Marking, Durable Solid White (10 cm)	m	220	\$ 6	\$ 1,321.20
TOTAL					\$ 57,131.36
Contingency - 10%					\$ 5,713.14
TOTAL WITH CONTINGENCY					\$ 62,844.50

Notes: 1. Estimate excludes HST.