MAY 26, 2023

PROJECT NO: 1060-6220

SENT BY: EMAIL

Township of Southgate
Planning Services
185667 Grey County Road 9
Dundalk, Ontario N0C 1B0

Attention: **Clinton Stredwick**
Municipal Planner, Township of Southgate

RE: **GLENELG PHASE 3**
PARTS OF LOTS 225 AND 226, CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
COMMUNITY OF DUNDALK, TOWNSHIP OF SOUTHGATE

Dear Clinton,

C.F. Crozier & Associates Inc. (Crozier) was retained by Flato Inc. to prepare a Traffic Impact Study to support the Glenelg Phase 3 residential development located in the Community of Dundalk, Township of Southgate. The original TIS was submitted August 2022, and has been attached to this letter. This letter has been prepared to address comments provided by Triton Engineering Services Ltd. dated December 12, 2022, and to summarize information pertaining to a potential school block.

The Bluewater District School Board (BWDSB) has requested that a school block be included as an option on the plan, with the specifics of the block detailed in the BWDSB Draft Plan Conditions. This letter evaluates the trips generated by the potential school block and qualitatively assesses the impact of the school on the study road network. It is understood that at the time this letter was prepared, the school block is considered an option to the board and has not yet been confirmed. A fulsome TIS update will be made during the detailed design stage to address the potential implementation of a school once more detailed school plans are available. The BWDSB has specifically requested this process through their Draft Plan Conditions.

A Comment Response Matrix has been prepared to address the comments received on December 12, 2022 (Triton Engineering Services Ltd.) and can be found in **Attachment A.** It is noted that Comment 1.2 was in relation to the layout of the figures in the original report, and a desire to provide additional context given the skewed nature of the roadway. The figures have been updated, and reattached as **Attachment B.**

We have divided the Cover Letter into the following sections.

- Background
- Trip Generation Comparison
- Conclusions

1 First Street, Suite 200
Collingwood, ON L9Y 1A1
T. 705.446.3510
F. 705.446.3520
cfcrozier.ca

CROZIER
CONSULTING ENGINEERS

Background

The school block is proposed to be 8.3 ac and is expected to serve up to 700 students (conservative upper limit). The school block is to be located in between the Bradley Street Extension and Street 'F', bordering Street 'B' to the south and Street 'A' to the north. The revised Draft Plan prepared by MHBC Planning, dated May 18, 2023, proposes the following site statistics:

- 287 Single Detached Units
- 24 Semi-Detached Units
- 74 Townhouse Units
- 3 Future Units
- 3.352 ha School Block

Attachment C contains the revised Draft Plan (MHBC, May 18, 2023).

Trip Generation Comparison

Trip generation for the proposed development was forecasted using published data from ITE Trip Generation Manual, 11th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry wide as a source for trip generation forecasts.

Land Use Code (LUC) 520 Elementary School was applied to the proposed school block with a provision of up to 700 students. **Table 1** outlines the auto trip generation from the 1st Submission TIS (Crozier, August 2022) and **Table 2** outlines the auto trip generation of the development including the proposed school block. **Attachment D** contains the applicable ITE Trip Generation Manual, 11th Edition excerpts.

Table 1: Trip Generation without School Block

	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 210 'Single Family Homes' (369 Units)	Weekday A.M.	63	181	244
	Weekday P.M.	214	125	339
LUC 215 'Single Family Attached Housing' (90 Units)	Weekday A.M.	13	28	41
	Weekday P.M.	28	22	50
TOTAL	**Weekday A.M.**	**76**	**209**	**285**
	Weekday P.M.	**242**	**147**	**389**

Table 2: Trip Generation with School Block (Updated Site Plan)

	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 210 'Single Family Homes' (287 Units)	Weekday A.M.	49	145	194
	Weekday P.M.	169	99	268
LUC 215 'Single Family Attached Housing' (101 Units)	Weekday A.M.	12	35	47
	Weekday P.M.	33	24	57
LUC 520 'Elementary School' (700 Students)	Weekday A.M.	280	238	518
	Weekday P.M.	52	60	112
TOTAL	**Weekday A.M.**	341	418	759
	Weekday P.M.	254	183	437
NET DIFFERENCE	**Weekday A.M.**	**+256**	**+209**	**+474**
	Weekday P.M.	**+12**	**+36**	**+48**

As outlined in **Table 2**, the inclusion of the school block is forecasted to result in an increase of 474 and 48 trips during the weekday a.m. and p.m. peak periods, respectively. As noted previously, a TIS revision is required to quantitatively assess the impact of the school on the study road network. The assessment would include a modified trip distribution for the school, as many trips are anticipated to stay within the neighborhoods adjacent to the site on the north side of Main Street, minimizing the impact to the Main Street and Osprey Street intersection. Additional details such as proposed catchment areas, site entrance locations and refined student population for the school will all inform a more accurate study at the time. If the school decides to forego the proposed location, a new TIS will also be required to assess traffic impacts of a revised lotting configuration and unit count.

Conclusion

Overall, the addition of the school block to the Glenelg Expansion Lands will increase the auto trips to the study road network by 474 and 48 trips during the a.m. and p.m. peak periods, respectively. However, it is anticipated that many of the trips will remain within the internal roads north of Main Street, minimizing the impacts to the Main Street corridor. A revised TIS assessing the impacts of the school is required and will be completed as part of the detailed design process.

The proposed Draft Plan conditions from the BWDSB include the requirement for a revised TIS during detailed design when additional details on the design plan are available. We agree that this should be handled as a condition of draft plan approval.

Attachment E contains the original TIS (Crozier, August 2022) for reference.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Diego Bustamante, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Madeleine Ferguson, P.Eng.
Manager (Planning), Transportation

MF/db

J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Letters\2023.05.26 Cover Letter\2023.05.26_Cover Letter.docx

Encl.

Attachment A – Comment Response Matrix

Attachment B – Revised TIS Figures

Attachment C – Draft Plan (MHBC, May 18, 2023)

Attachment D – ITE Trip Generation Manual, 11th Edition Excerpts

Attachment E – Glenelg Phase 3 TIS (Crozier, August 2022)

Attachment A

Comment Response Matrix

Glenelg Phase 3 - Comment Response Matrix			
COMMENT #	**COMMENT**		**RESPONSE**
Comments on First Submission Draft Plan Submission - Triton Engineering Services Ltd. (December 12, 2022)			
Supporting Studies:			
1.1	Traffic counts were undertaken at all the intersections identified in the Terms of Reference comments, and were done on June 7, 2022. These are considered to be representative, and were not taken during periods when significant Covid-19 restrictions were in place.		Acknowledged.
1.2	Figure 3 shows the existing traffic controls on a plan that is schematic, but shows the general lay-out of the streets, including angles. The rest of the figures (4 through 20) were done on a right-angle schematic, which does not aid understanding, and in particular, does not well represent the alignment of Bradley Street into the proposed subdivision. These figures should be revised to the lay-out of figure 2, with the addition of the new development for greater clarity.		It is common industry practice to show intersections as right-angle schematic for illustrative purposes. An additional figure (#13) has been created to illustrate the future traffic control and roadway orientation with the development of Glenelg Phase 3. The remaining figures have been revised to reflect the updated figure numbering and also illustrate the locations of Glenelg Phases 1, 2 and 3 in relation to the study road network.
1.3	Site Trip Distribution and Assignment appears to follow reasonable assumptions, but Figures 13 and 14 should be expanded to show the proposed development and assumptions for trips in and out of the development on each of its connecting roads.		Acknowledged.
1.4	Section 6.4 Qualitative Impacts on Connecting Roadways is not sufficient. Bradley Street is identified to have future traffic volumes of 150-200 but this is not identified as being peak, one way or two way. The figures indicate pm peak two-way traffic volumes of over 400 vph, which represents an AADT of over 4,000 vpd. Crozier identified 400 vehicles per lane as being "typical" for local streets, but this represents an AADT of approximately 8,000 vpd. The TAC Geometric Guide identifies that Local Residential Streets have AADT of up to 1,000 vpd, and Residential Collectors of up to 8,000 vpd. Since Bradley is a local residential street, and has not been constructed to a Collector standard, volumes of over 4,000 vpd are not appropriate. Further, the street has a right-angle corner, and does not have sidewalks for the full length.		It is acknoweldged that Bradley Street will experience greater traffic volumes with the inclusion of the Glenelg Phase 3 connection. To account for the additional traffic and improve safety for pedestrians, it is recommended that sidewalk be constructed on the west side of Bradley Street which would tie into the existing sidewalk on the north side of Toronto Street. It is noted that there is sidewalk on the east side of Osprey Street N, south of Toronto Street. Sidewalk feasibility and location should be assessed and refined through the detailed design process.
1.5	Scenario: Eco Parkway Crozier were asked to also consider the impact of the future connection of Eco Parkway. The intent was not to analyze the connection, but rather to determine if this future connection would impact the trip distribution and assumptions in the long term. Crozier did not redistribute any of the site traffic as part of their assessment. While it is acknowledged that the proposed southbound primary route would likely continue to be Main Street to Highway 10, Eco Parkway would provide an alternative route that would avoid travel through downtown and possibly lengthy left turns onto Main in the AM peak hour. As such, some traffic may choose to use Glenelg to Ida to Eco Parkway. A review of this potential partial re-distribution should be provided.		The Eco Parkway extension is not expected to impact the trip assignment and distribution of Glenelg Phase 3. Glenelg Phase 3 is located north of Main Street approximately halfway between Ida Street and Highway 10. A vehicle accessing the site to/from the east would need to travel approximately 1.3 km on Main Street from Highway 10 on Main Street before heading north to the site. If a driver was to use the Eco Parkway, a driver would need to travel approximately 2.4 km west of Highway 10 to Ida Street, then approximately 0.7 km east of Ida Street to reach the development. This is an approximate 2.4x increase in travel distance and it is not expected many drivers will take this route.
1.6	The Draft Plan shows that Street A could potentially connect to the east in the future. There is no discussion of this in the TIS. It should be identified whether this would potentially result in an alternative connection to Highway 10 in the future which would alleviate traffic on the adjacent local streets, or potentially introduce more traffic if this connection cannot be provided in future. If Street A is potentially a future Residential Collector, it should have a ROW greater than 20m. Further, if this will function as a Residential Collector, there are numerous closely spaced intersections proposed.		Acknowledged. At this time, MTO has not given any support to a new connection to Highway 10. Additionally the future connection has been shown for evaluation but has not been approved through the EP lands. We intend to work with the Township and MTO to evaluate this further moving forward. It is our assumption that if this were to occur, it would function similar to Milliner Avenue in Edgewood Greens which is a 20 m ROW. This is still a residential neighbourhood with a future school and we do not want it to function as a by pass or draw trips away from Main Street and local businesses.
1.7	Both Street A and Street B are shown connecting to Glenelg Phase 2, which requires crossing the Rail Trail. While connectivity between the developments is important, safe crossing of the rail trail needs to be addressed.		Acknowledged, this will be address through detailed design.

Note: Although we have attempted to identify any specific items which do not meet Municipal Standards, the design and standards should be reviewed by the designer in detail to ensure that design meets these standards.

Attachment B

Revised TIS Figures

Project

GLENELG PHASE 3
TOWNSHIP OF SOUTHGATE, COUNTY OF GREY

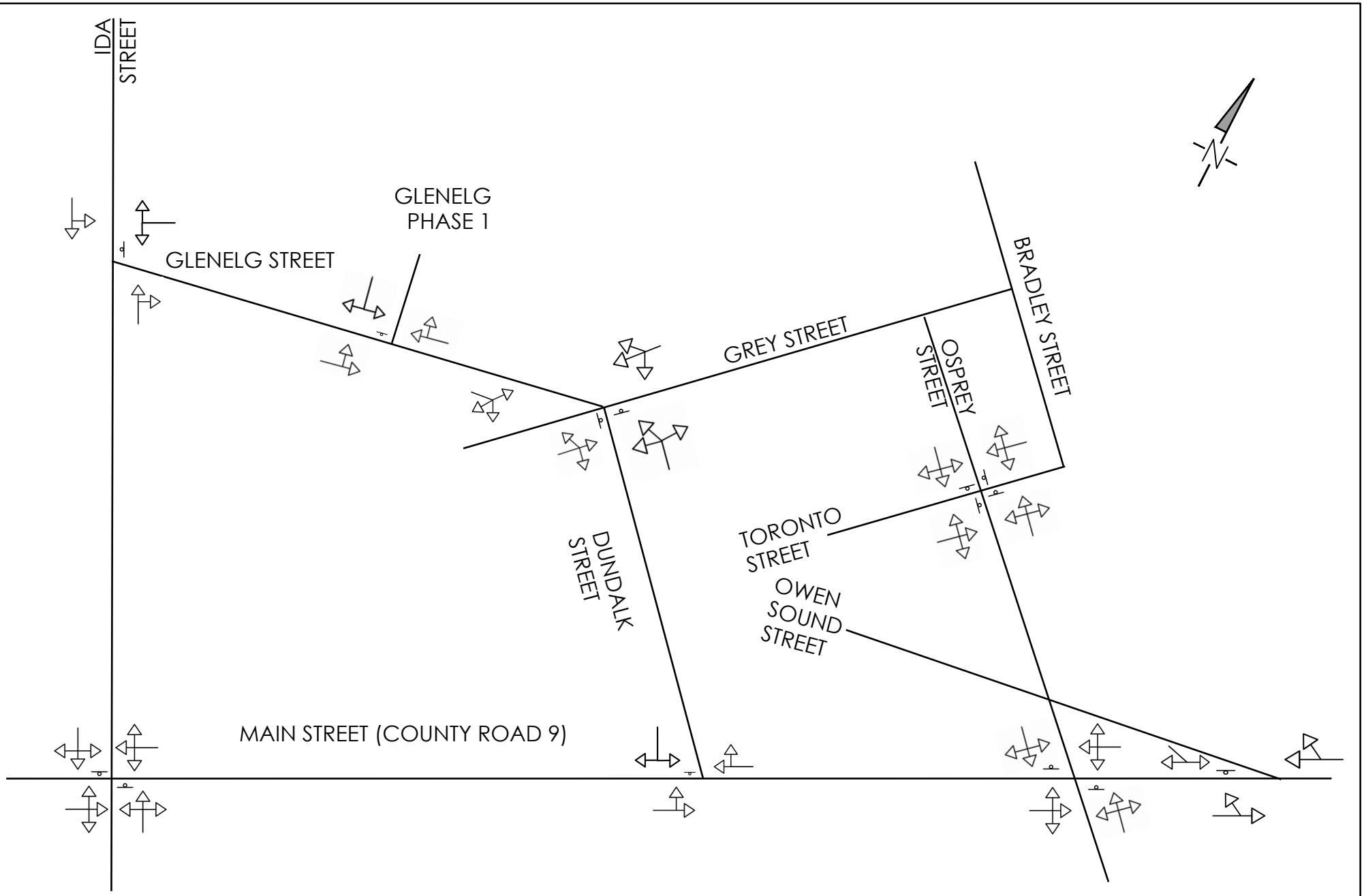
Drawing

SITE LOCATION PLAN

CROZIER
CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
E.H.	E.H.	1060-6220

Scale	Date	Check By	Drawing
N.T.S.	2022.08/15	E.H.	FIG. 2



Legend

STOP CONTROL

Project

GLENELG PHASE 3
TOWNSHIP OF SOUTHGATE, COUNTY OF GREY

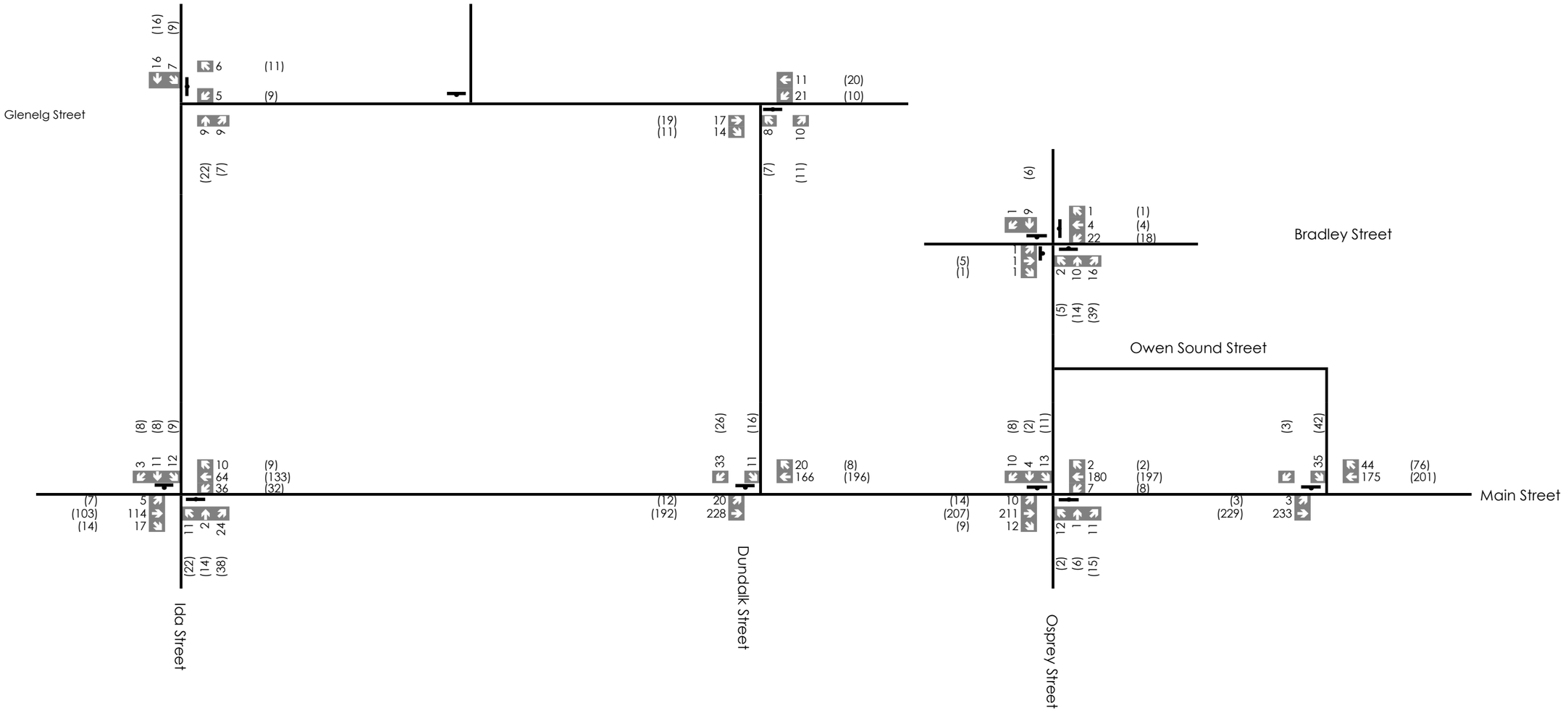
Drawing

EXISTING TRAFFIC CONTROLS AND LANE CONFIGURATION

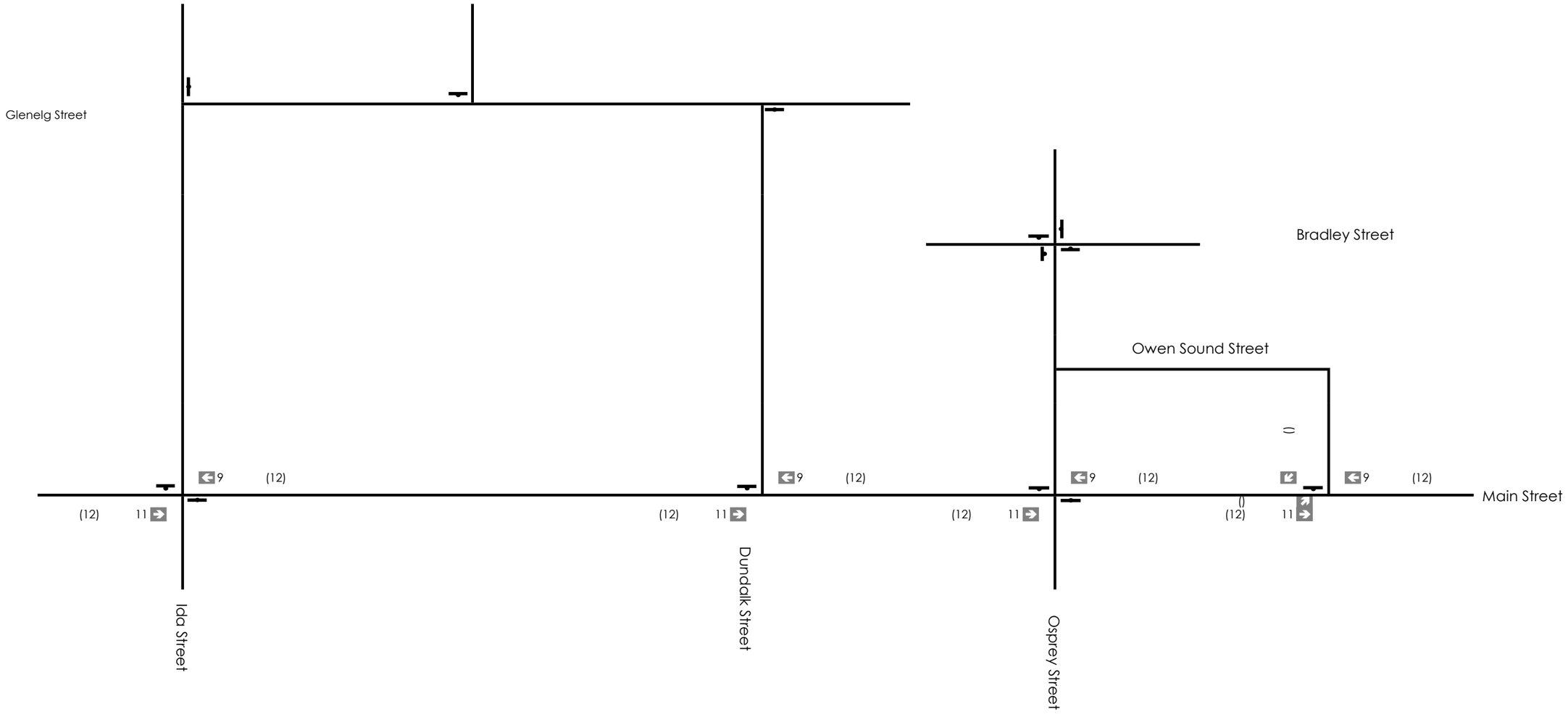
CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
E.H.	E.H.	1060-6220

Scale	Date	Check By	Drawing
N.T.S.	2022.08/15	E.H.	FIG. 3



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 4
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Existing Traffic Volumes		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.



Legend

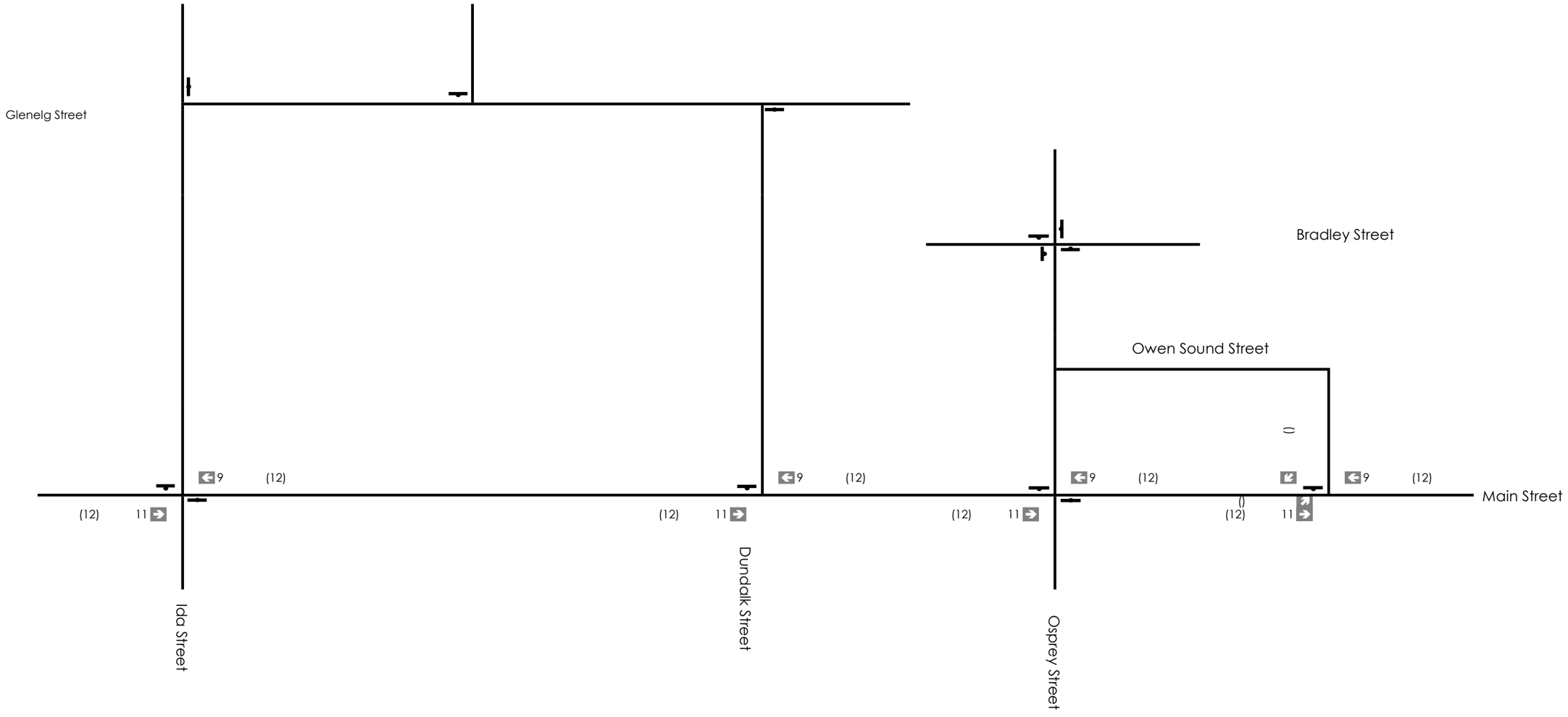
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Edgewood Greens Commercial Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 5
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

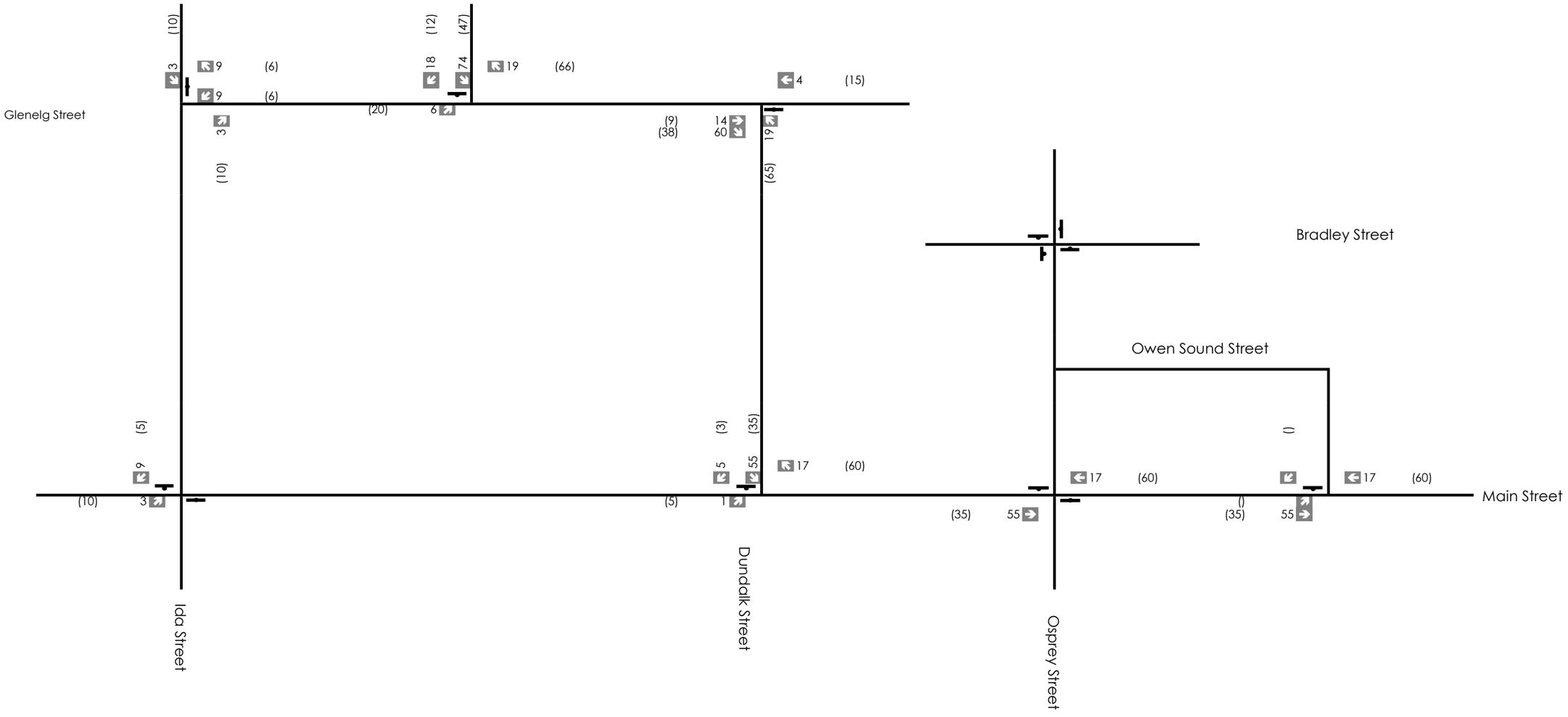
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Edgewood Greens Residential Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 6
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

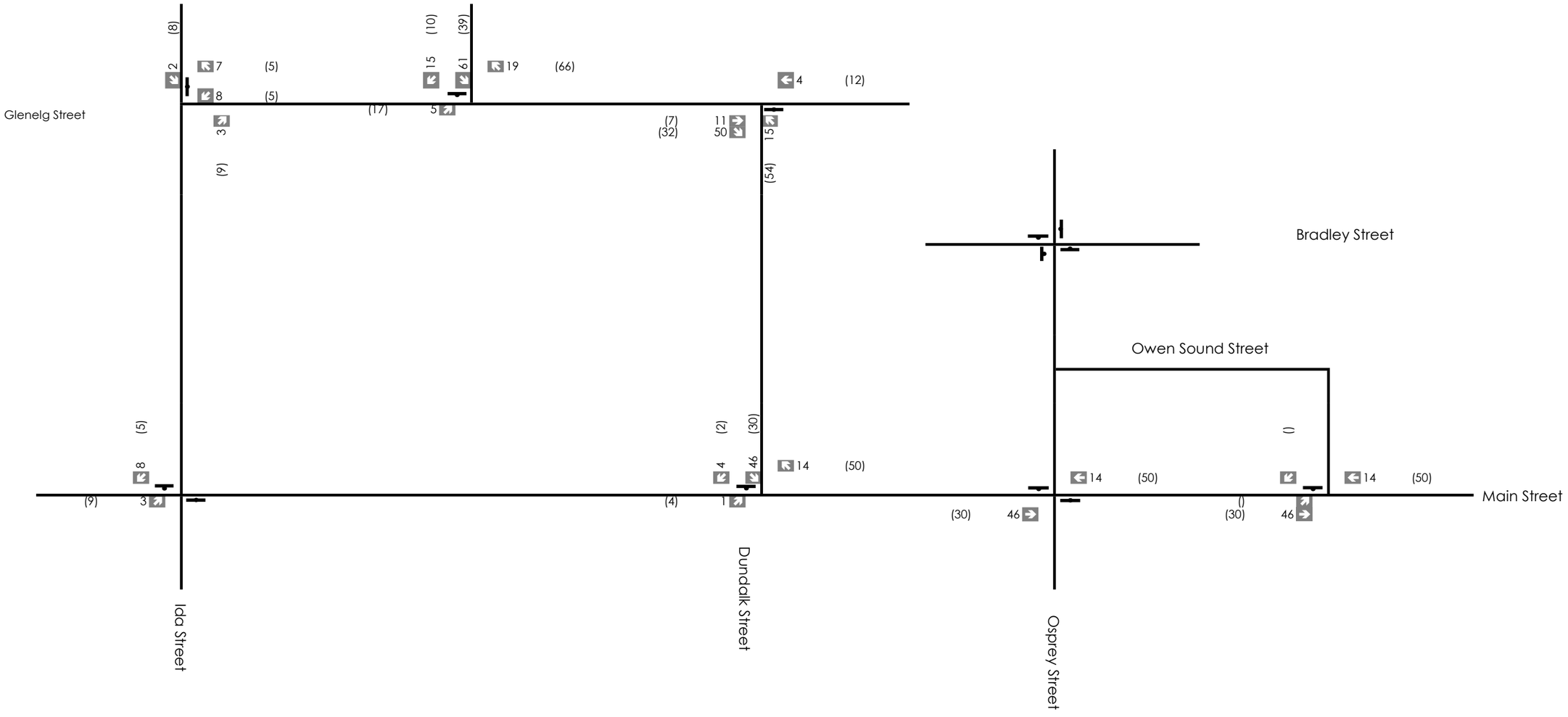
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Glenelg Phase 1 Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 7
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

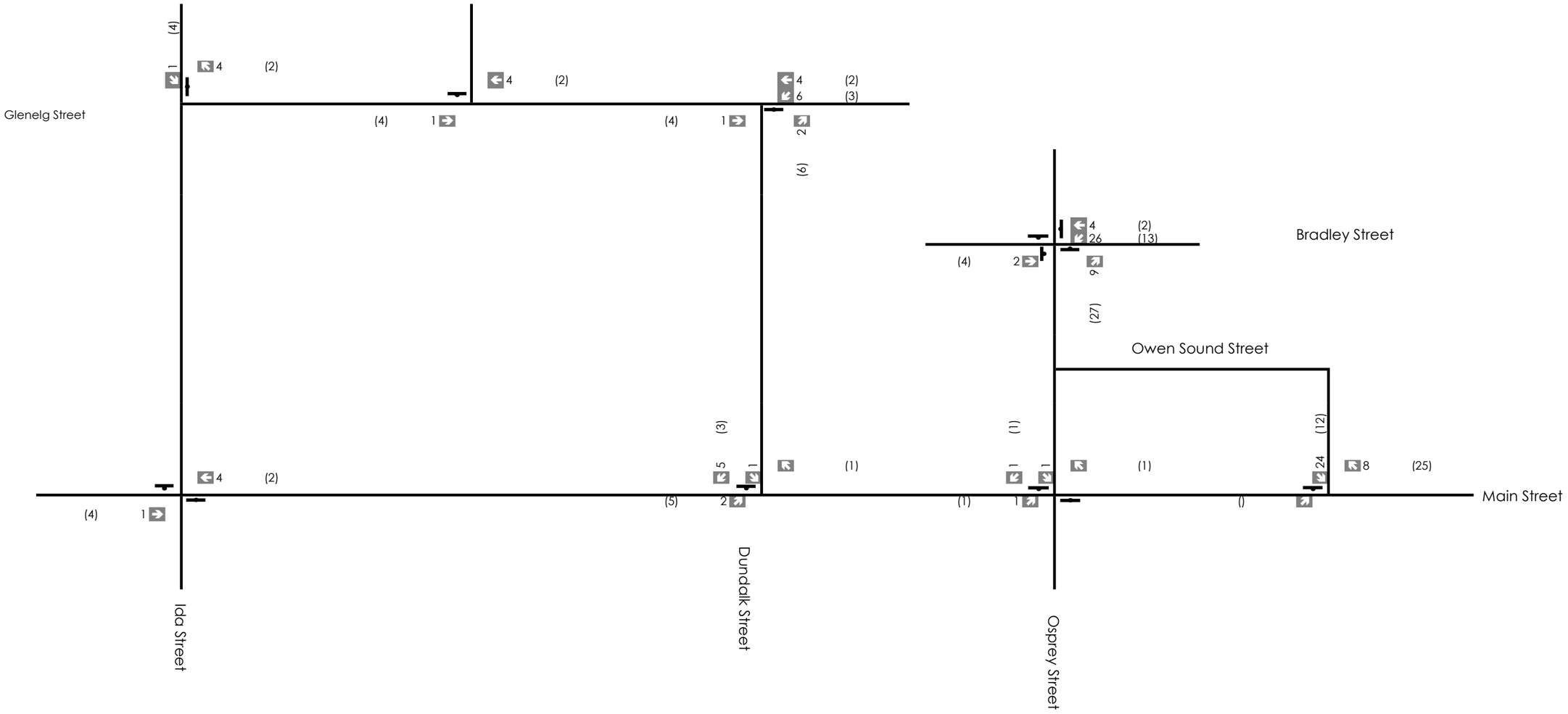
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Glenelg Phase 2 Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 8
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: White Rose Phase 3 Trip Assignment

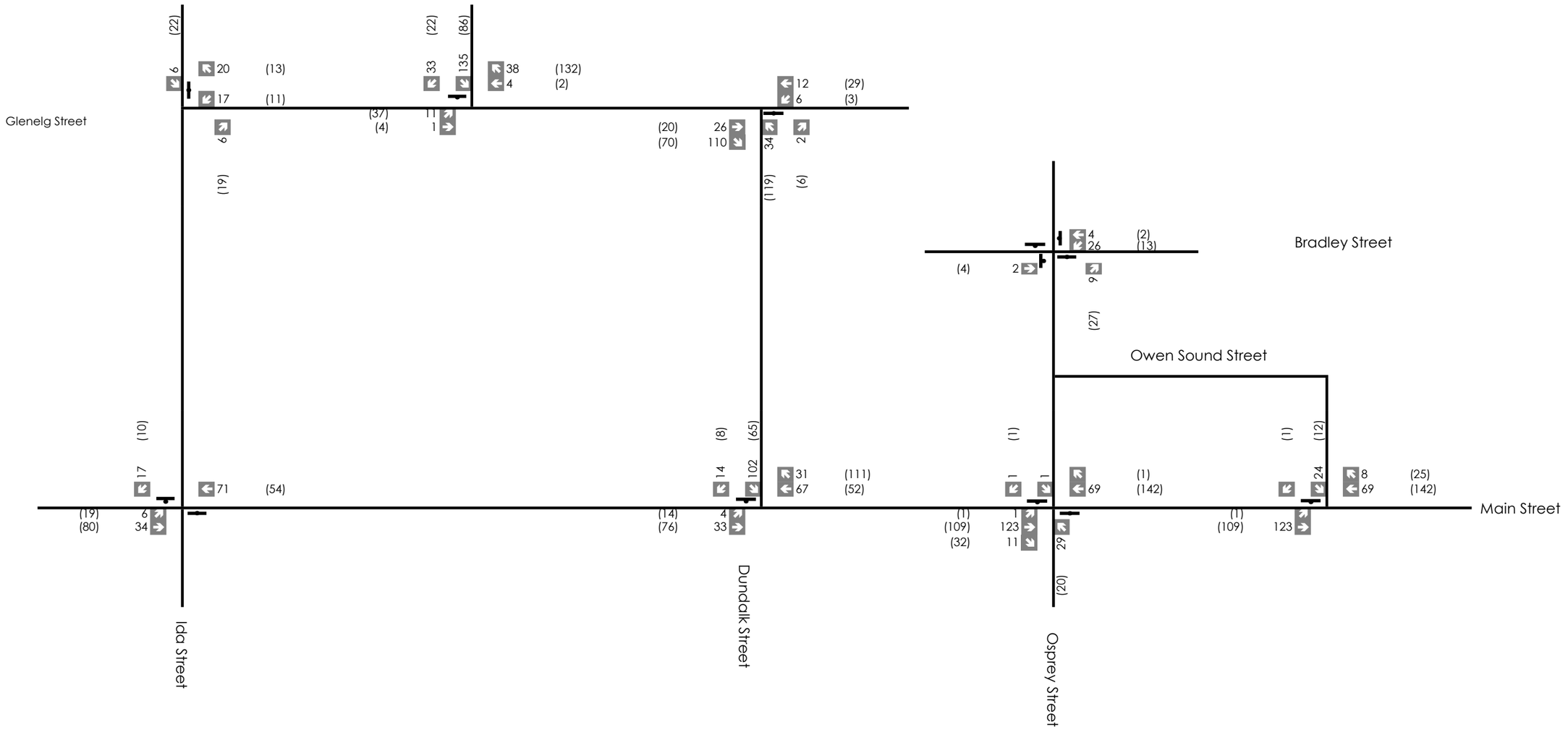
CROZIER CONSULTING ENGINEERS

Figure 9

Project No. 1060-6220

Date. 2022/08/31

Analyst. E.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 10
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Background Development Total Trip Assignment		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.

Legend

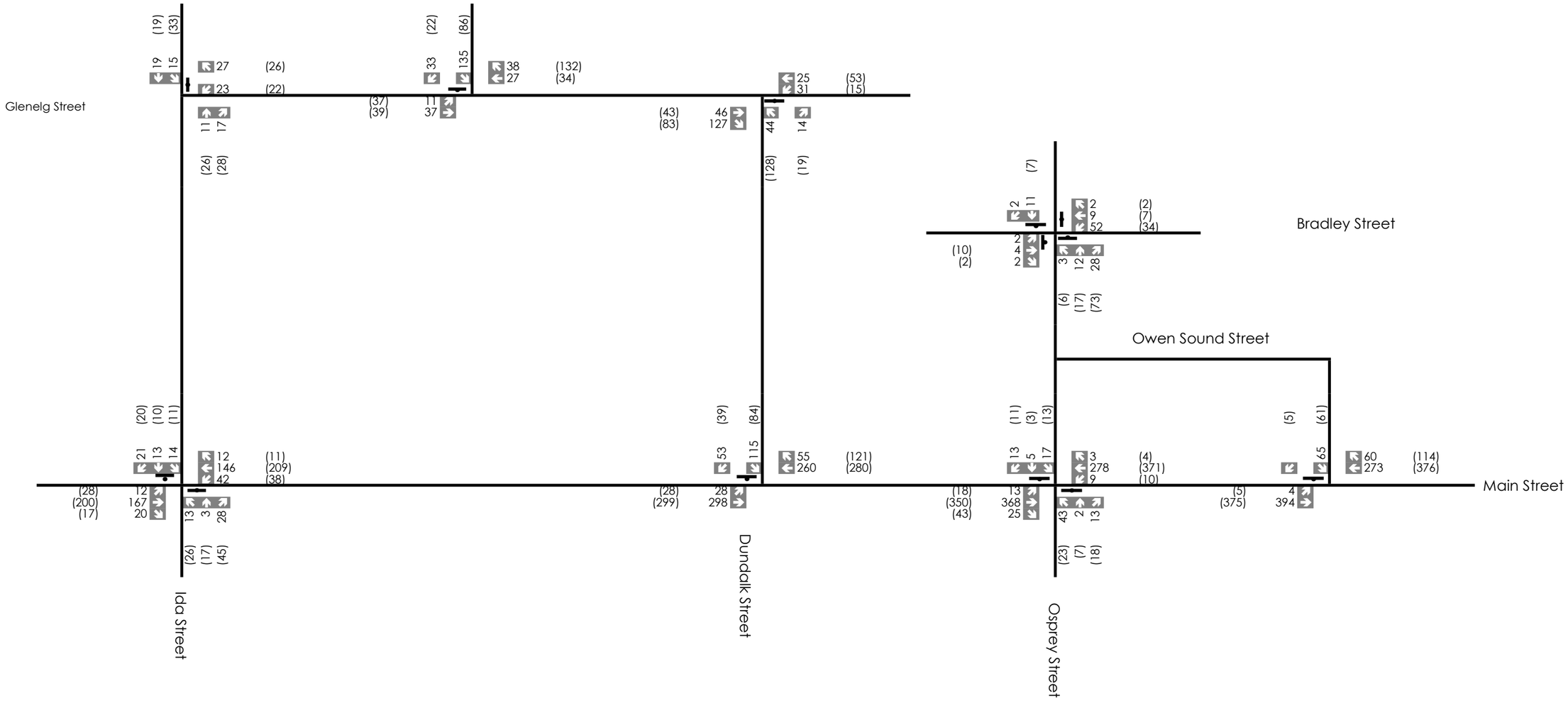
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Background 2027 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 11
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

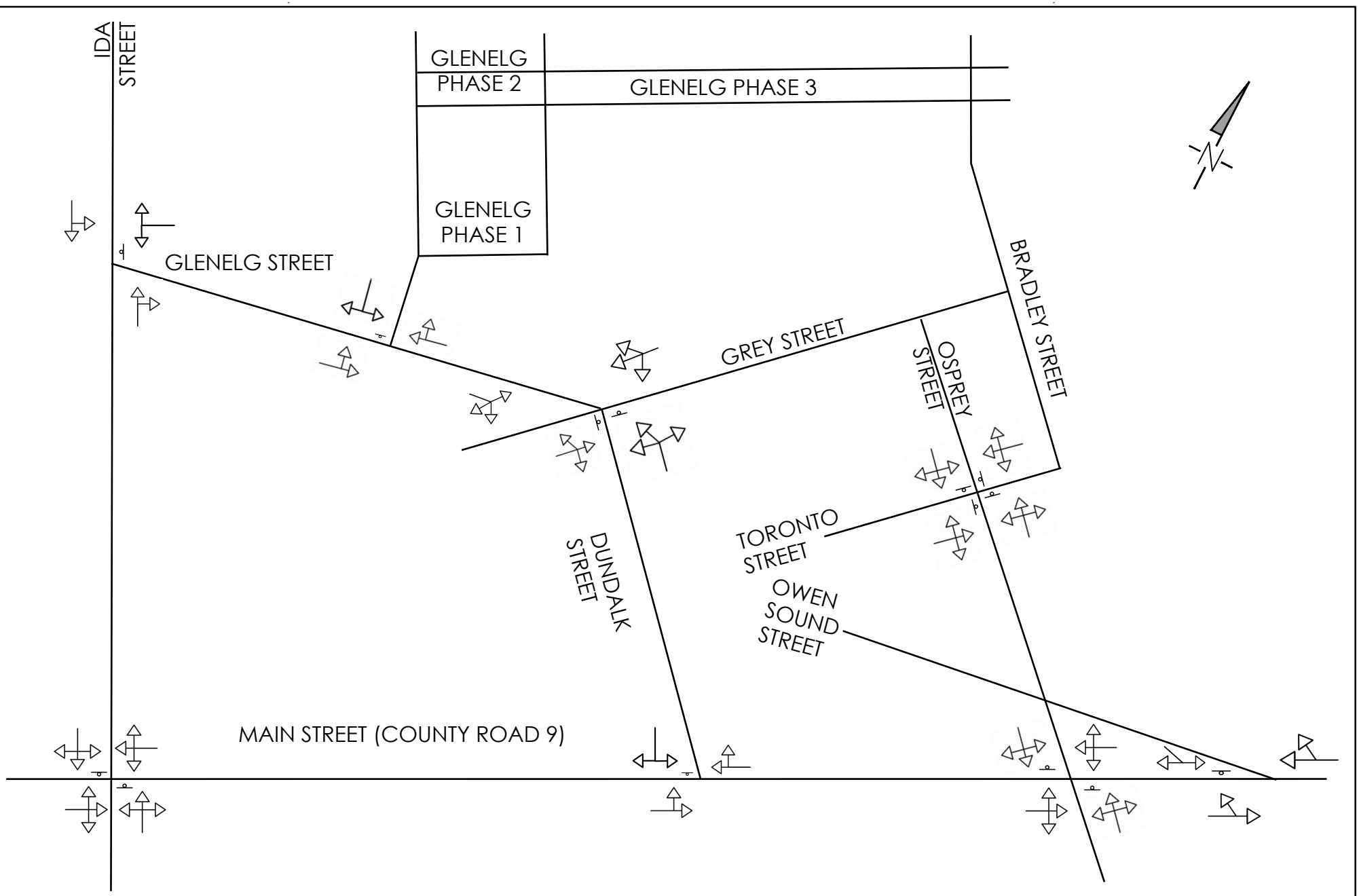
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Background 2032 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 12
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

STOP CONTROL

Project

GLENELG PHASE 3
TOWNSHIP OF SOUTHGATE, COUNTY OF GREY

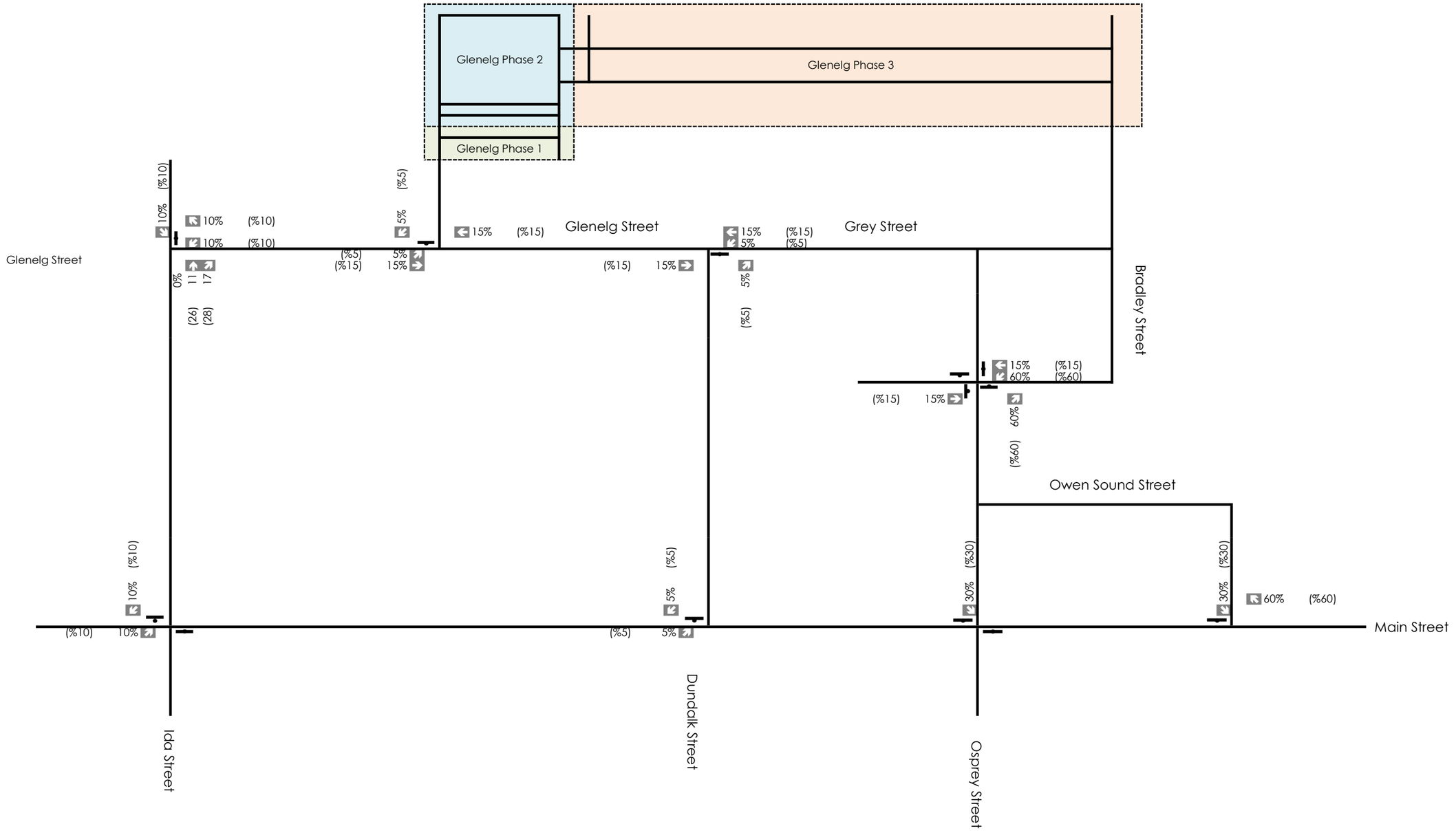
Drawing

FUTURE TRAFFIC CONTROLS AND LANE CONFIGURATION

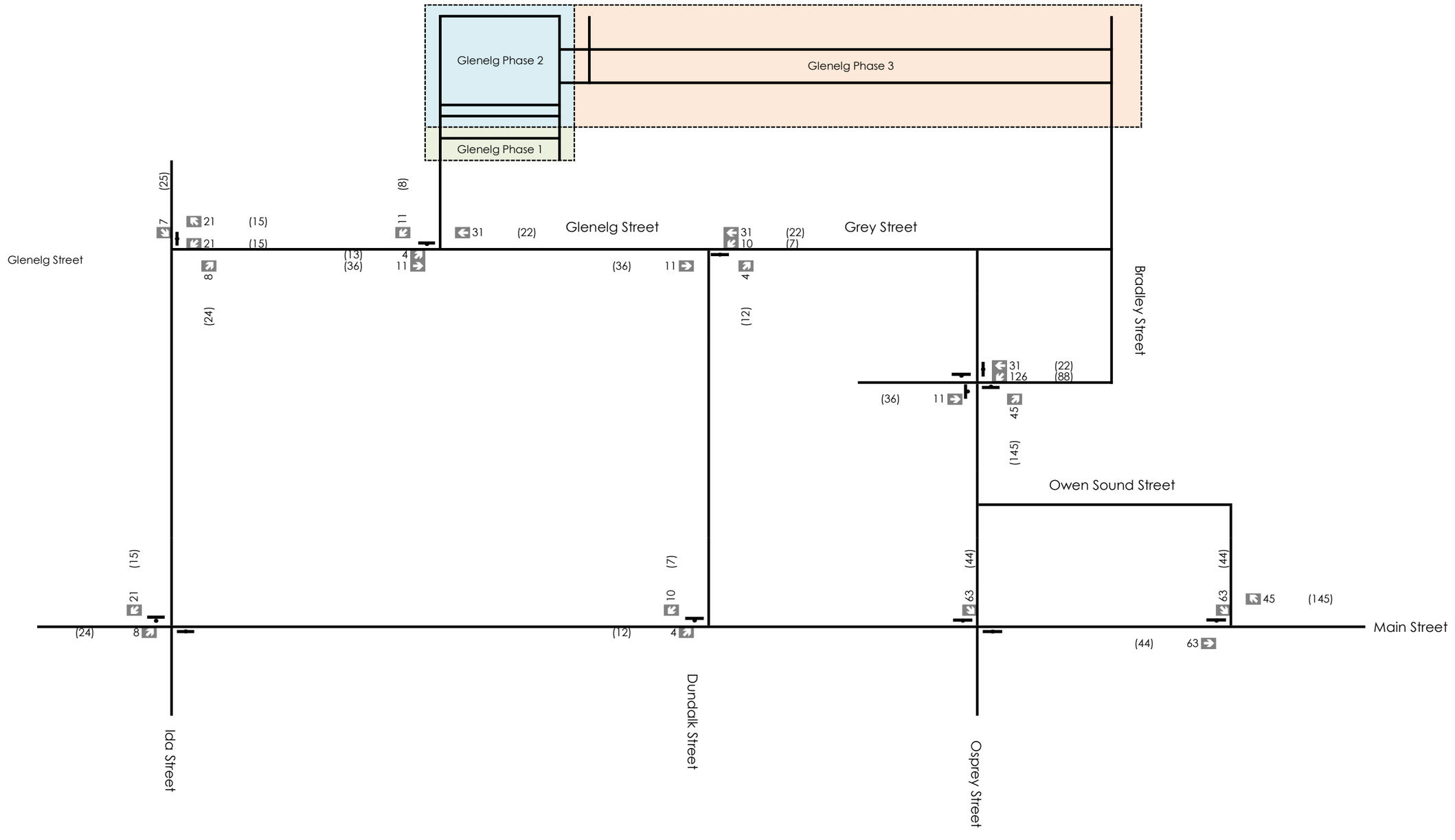
CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
S.H.	S.H.	1060-6220

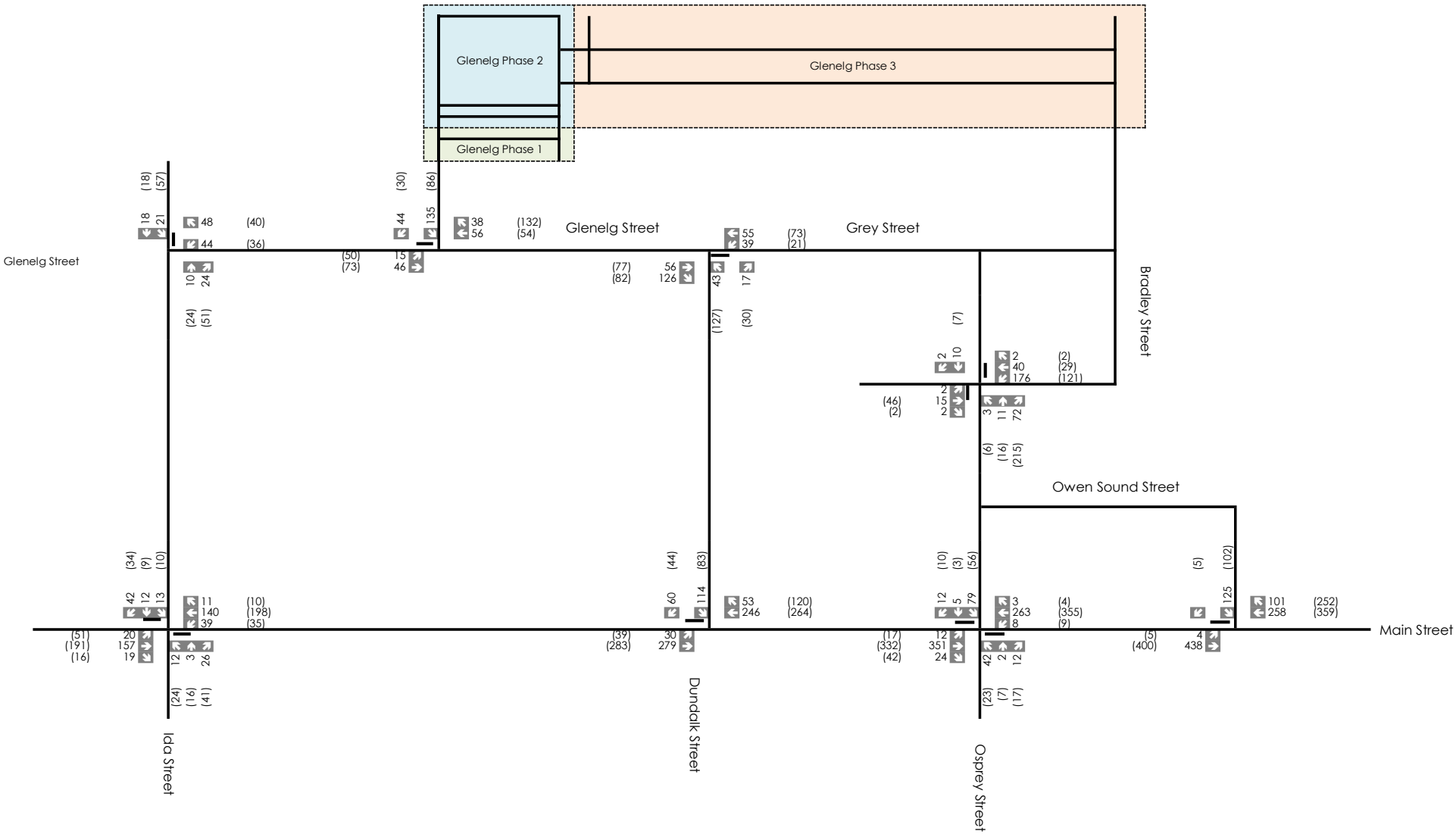
Scale	Date	Check By	Drawing
N.T.S.	2022.03/01	S.H.	FIG.13



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 14
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Site Trip Distribution		Project No. 1060-6220 Date. 2023/03/01 Analyst. E.H.



Legend	Glenelg Phase 3		Figure 15
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Site Trip Assignment	CROZIER CONSULTING ENGINEERS	Project No. 1060-6220 Date. 2023/03/01 Analyst. E.H.



Legend

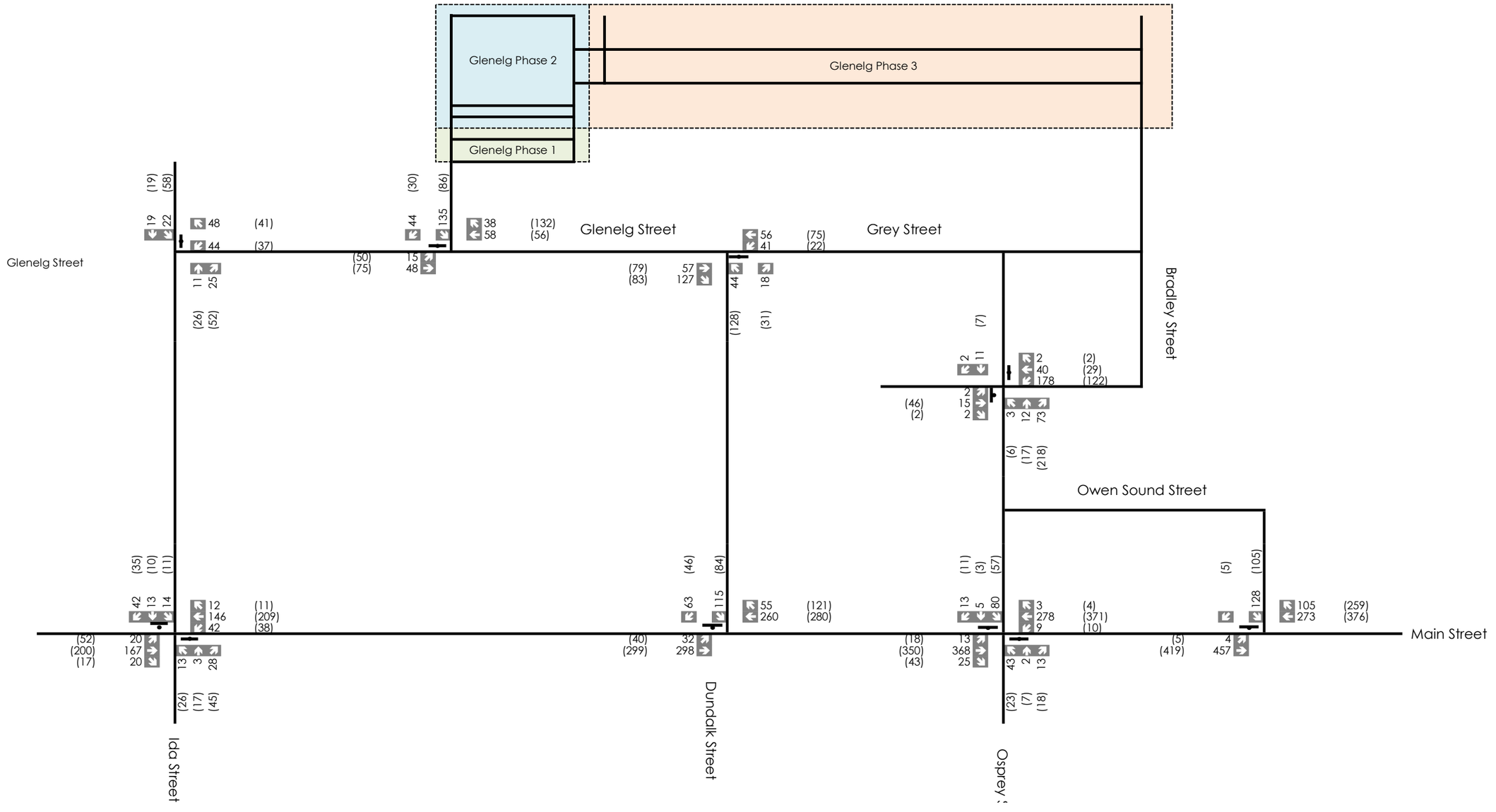
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Total 2027 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 16
Project No. 1060-6220
Date. 2023/03/01
Analyst. E.H.



Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Total 2032 Traffic Volumes

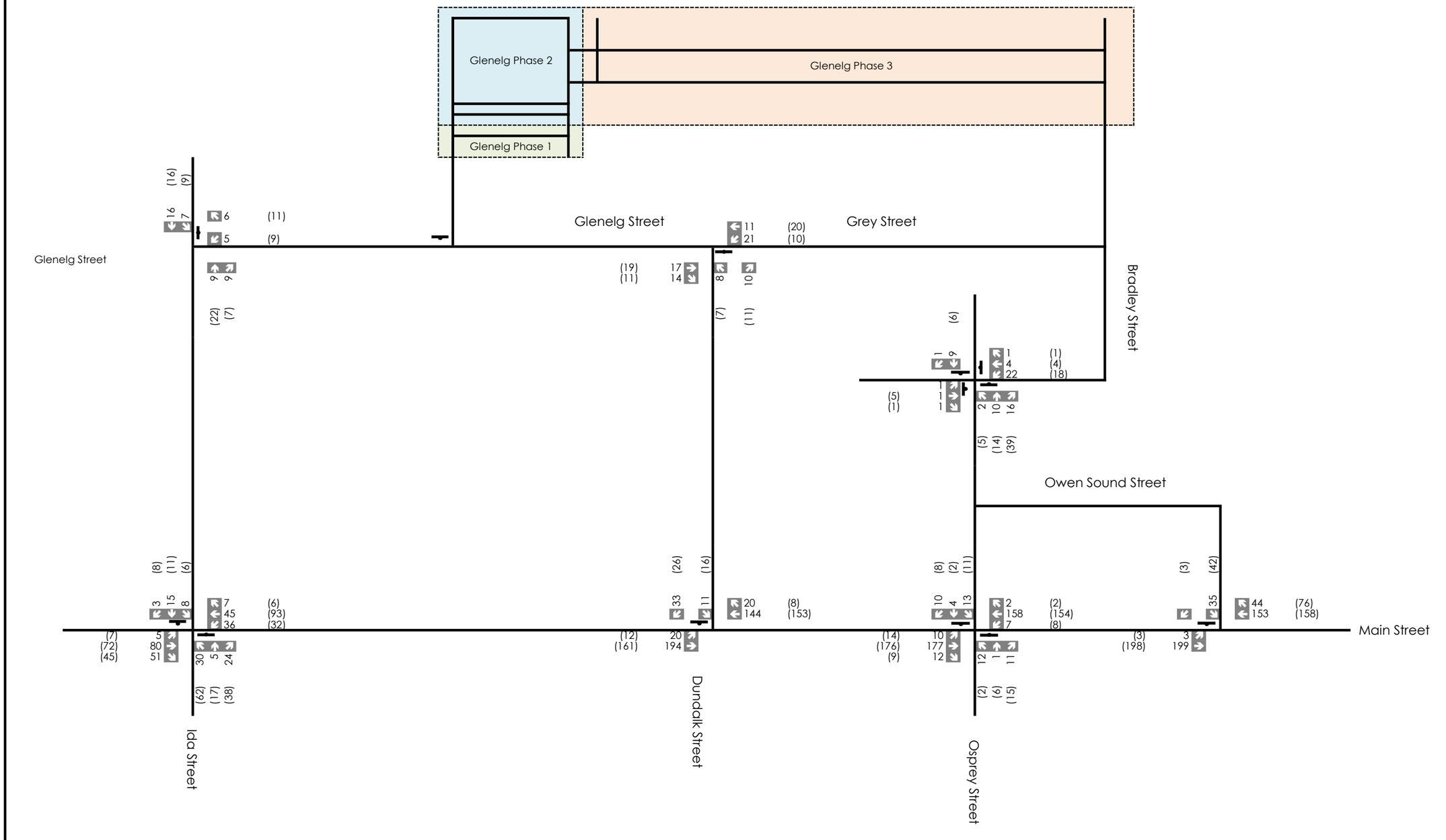
CROZIER CONSULTING ENGINEERS

Figure 17

Project No. 1060-6220

Date. 2023/03/01

Analyst. E.H.



Legend

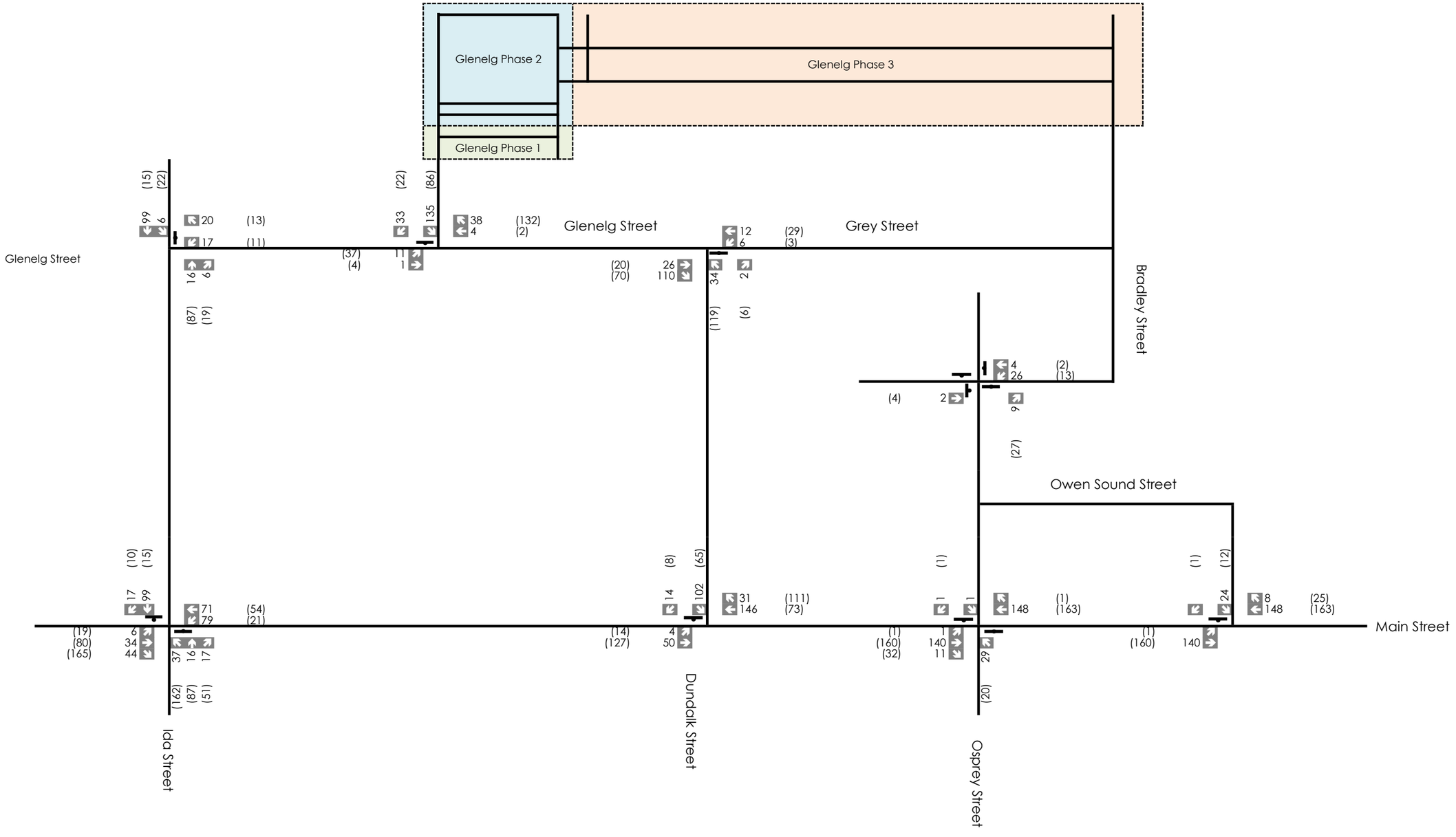
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

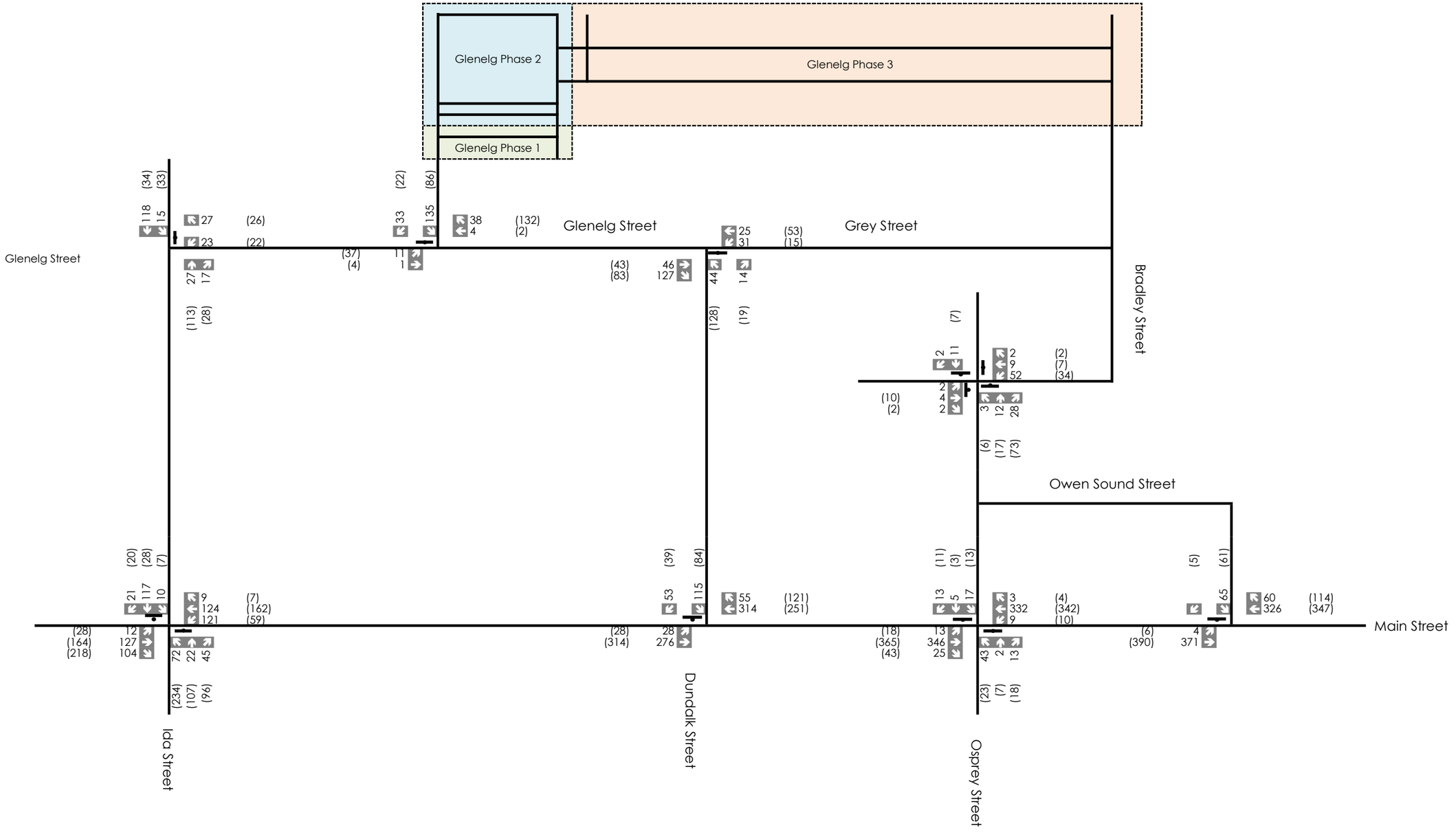
Eco Parkway Scenario Adjusted Existing Total Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 18
Project No. 1060-6220
Date. 2023/03/01
Analyst. S.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 19
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Eco Parkway Industrial Lands Trip Assignment		Project No. 1060-6220 Date. 2023/03/01 Analyst. S.H.



Legend

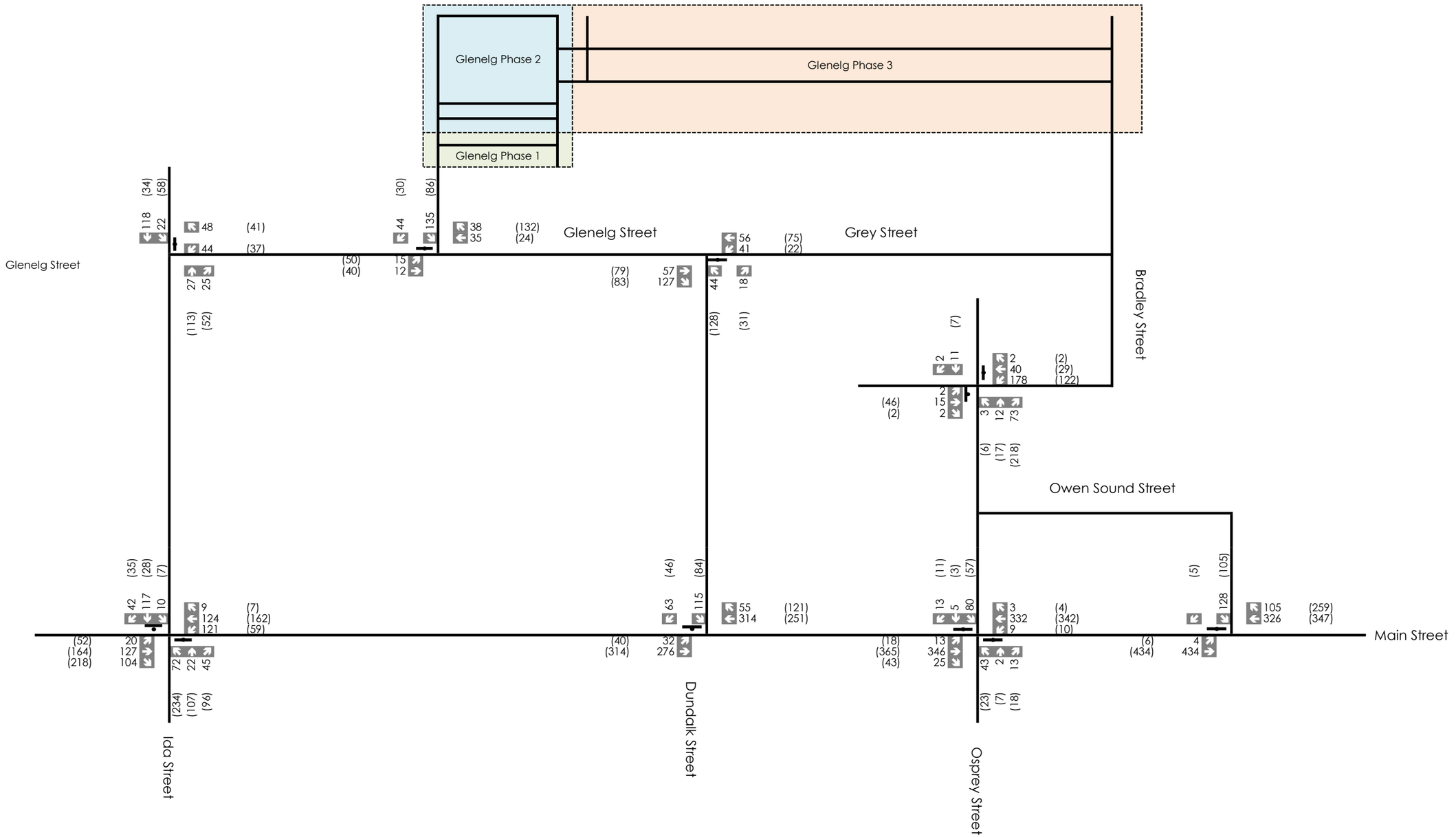
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Eco Parkway Scenario Future Background 2032 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 20
Project No. 1060-6220
Date. 2023/03/01
Analyst. S.H.



Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

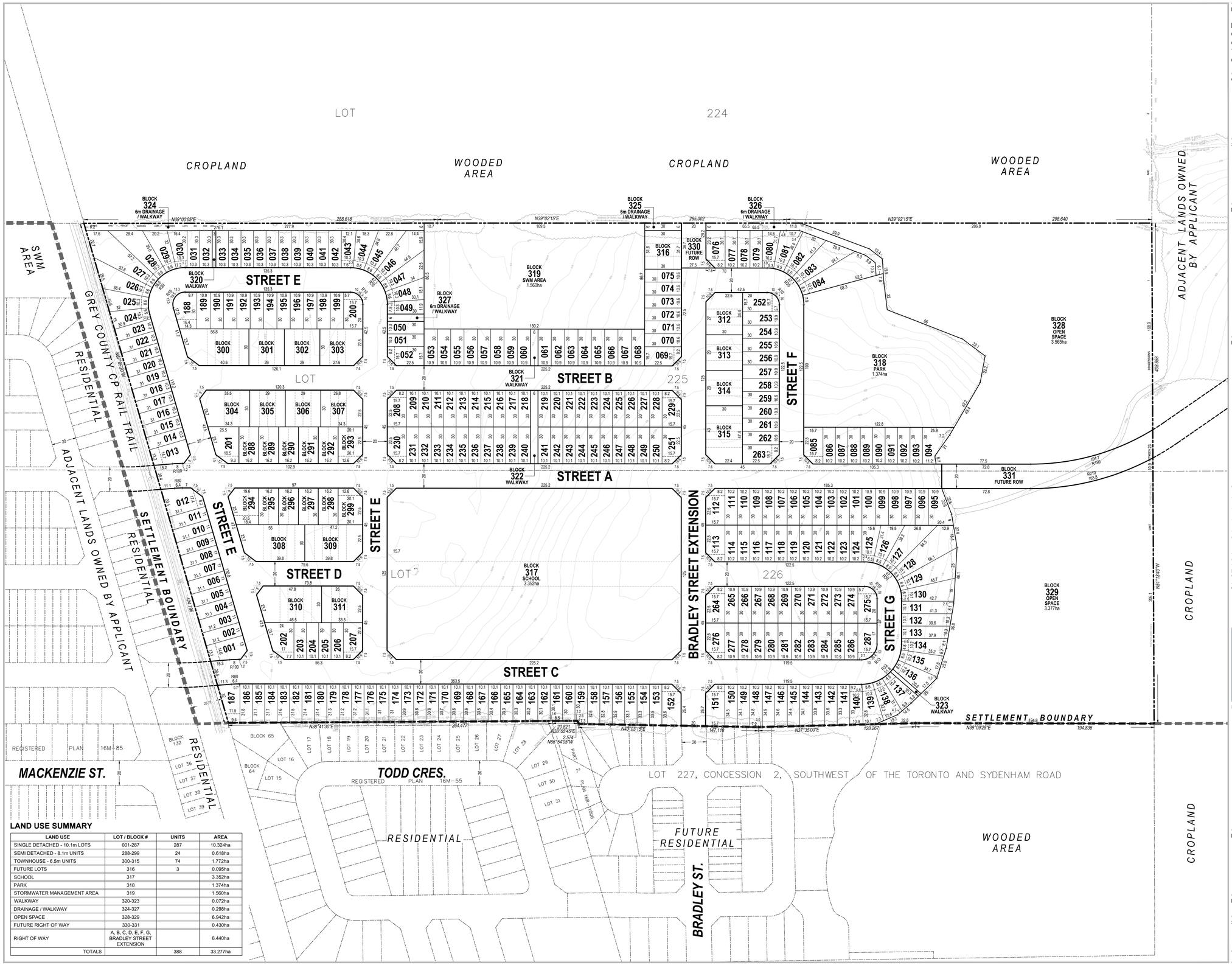
Eco Parkway Scenario Future Total 2032 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 21
Project No. 1060-6220
Date. 2023/03/01
Analyst. S.H.

Attachment C

Draft Plan (MHBC, May 18, 2023)



LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SINGLE DETACHED - 10.1m LOTS	001-287	287	10.324ha
SEMI DETACHED - 8.1m UNITS	288-299	24	0.618ha
TOWNHOUSE - 6.5m UNITS	300-315	74	1.772ha
FUTURE LOTS	316	3	0.095ha
SCHOOL	317		3.352ha
PARK	318		1.374ha
STORMWATER MANAGEMENT AREA	319		1.560ha
WALKWAY	320-323		0.072ha
DRAINAGE / WALKWAY	324-327		0.298ha
OPEN SPACE	328-329		6.942ha
FUTURE RIGHT OF WAY	330-331		0.430ha
RIGHT OF WAY	A, B, C, D, E, F, G, BRADLEY STREET EXTENSION		6.440ha
TOTALS		388	33.277ha

LEGAL DESCRIPTION

PART OF LOTS 225 AND 226
CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____

_____
SHAKIR REHMATULLAH - PRESIDENT
DUNDALK VILLAGE TWO INC.

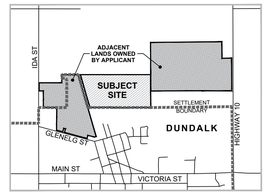
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____

_____
DAN DZALDOV - O.L.S.
SCHAEFFER DZALDOV BENNETT LTD.

KEY PLAN



LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- LOT LINE
- PARCEL FABRIC

REVISION No.	DATE	ISSUED / REVISION	BY
02	MAY 18, 2023	ADD SCHOOL, WALKWAYS, DRAINAGE BLOCKS; REMOVE STREET; CREATE CRESCENT STREET G; REVISE SWM AREA & LOT LAYOUTS	M.M.
01	AUG. 18, 2023	1st SUBMISSION	M.M.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

- **A.** AS SHOWN
- **B.** AS SHOWN
- **C.** AS SHOWN
- **D.** 290 SINGLES, 24 SEMIS, & 74 TOWNHOUSES
- **E.** AS SHOWN
- **F.** AS SHOWN
- **G.** AS SHOWN
- **H.** MUNICIPAL WATER SUPPLY
- **I.** LOAM/SILT LOAM
- **J.** AS SHOWN
- **K.** ALL SERVICES AS REQUIRED (WATER, SANITARY, STORMWATER, HYDRO)
- **L.** AS SHOWN

PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING
113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM

STAMP

DATE	AUG. 18, 2022
FILE No.	15184AT
SCALE	1:1,400 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.C.
OTHER	

PROJECT

GLENELG PHASE 3

DUNDALK VILLAGE TWO INC.
3621 HIGHWAY 7 EAST, SUITE 503
MARKHAM, ON L3R 0G6
P:(905) 479-9292 F:(905) 429-9165
WWW.FLATOGROUP.COM

NORTH

FILE NAME
DRAFT PLAN OF SUBDIVISION

DWG No. 1 of 1

SCALE BAR

0 7 14 21 28 35 52.5 70 105 140m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Southgate\15184AT\Drawings\Draft Plan\CAD\

Attachment D

ITE Trip Generation Manual, 11th Edition

Excerpts

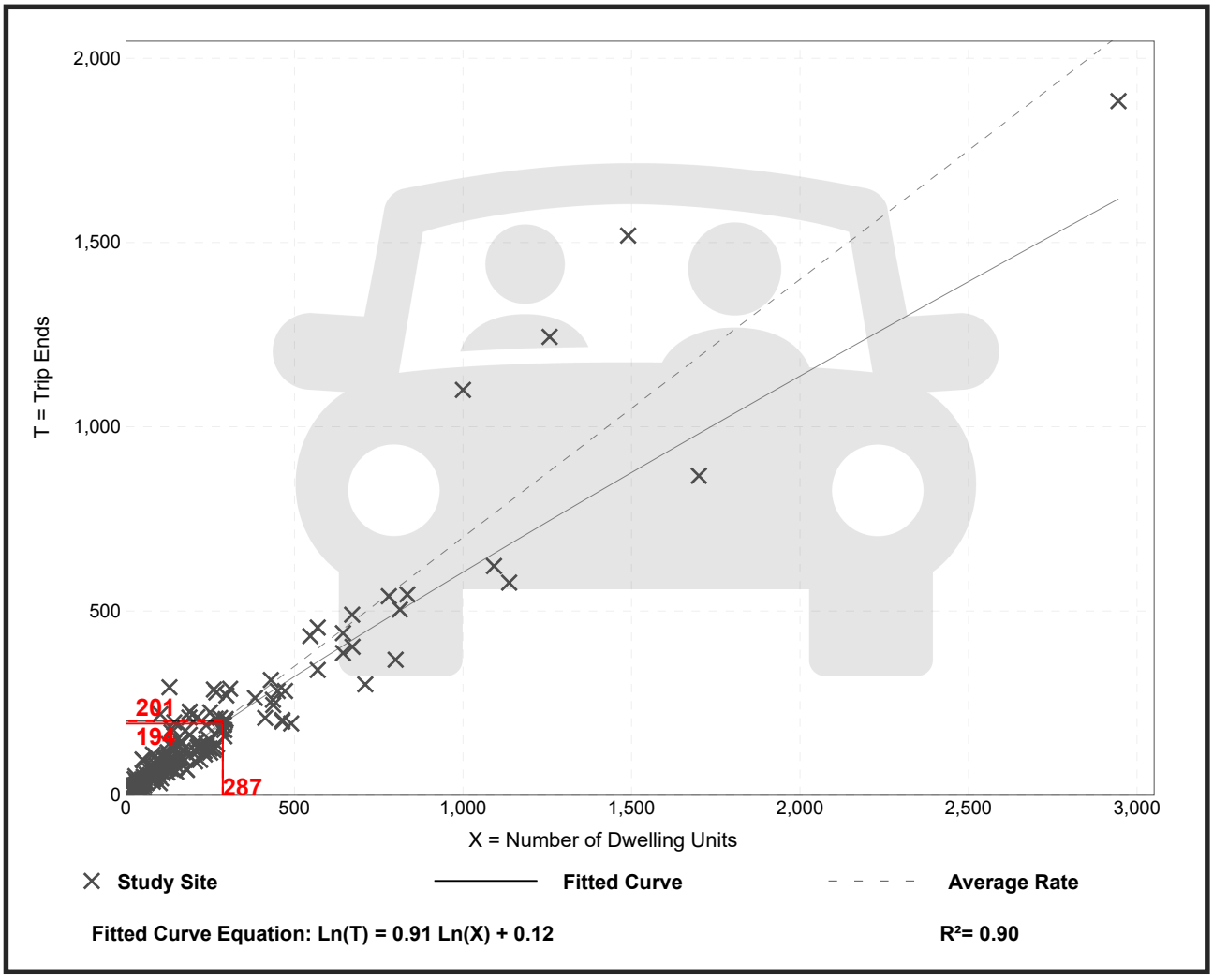
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

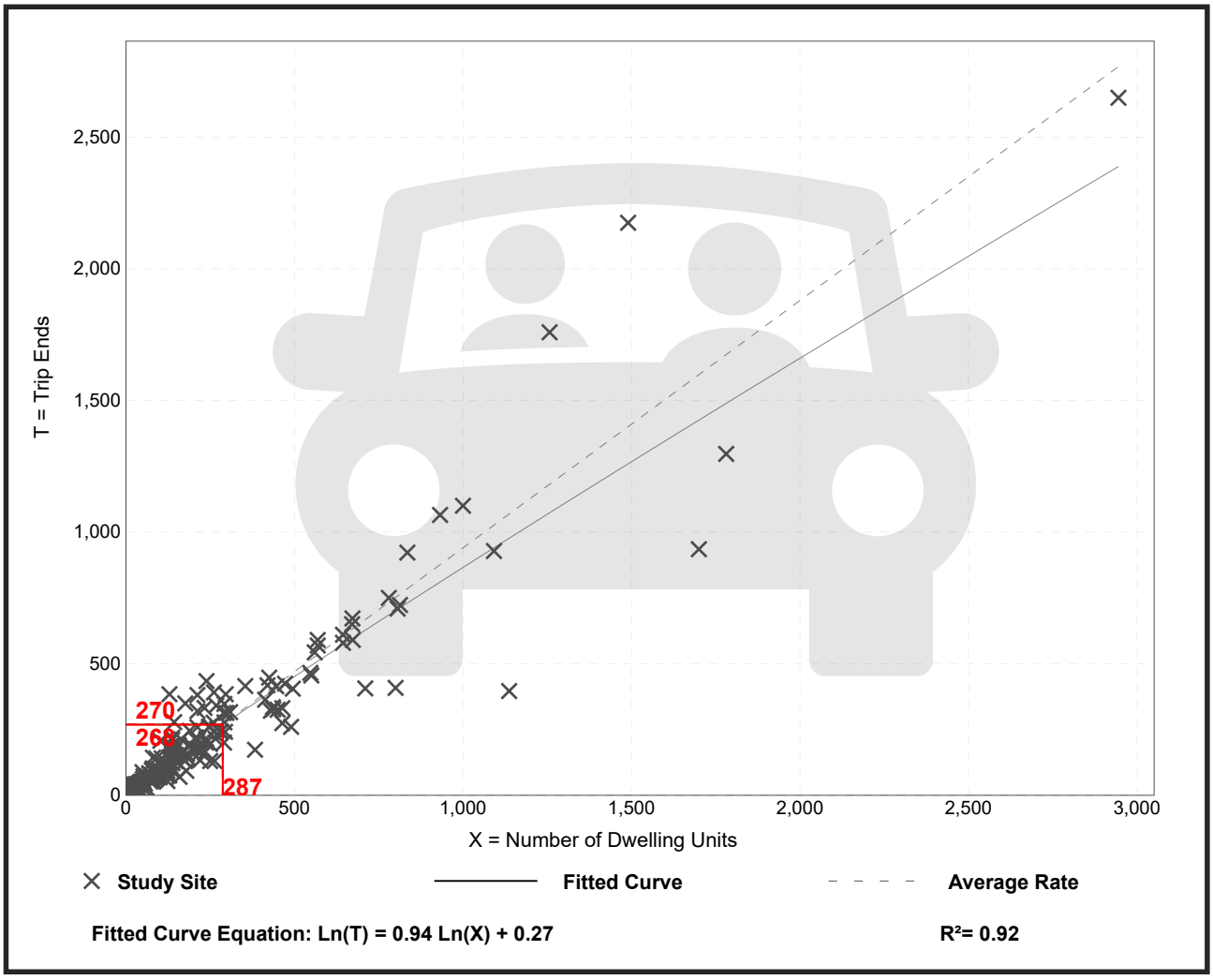
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	208
Avg. Num. of Dwelling Units:	248
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

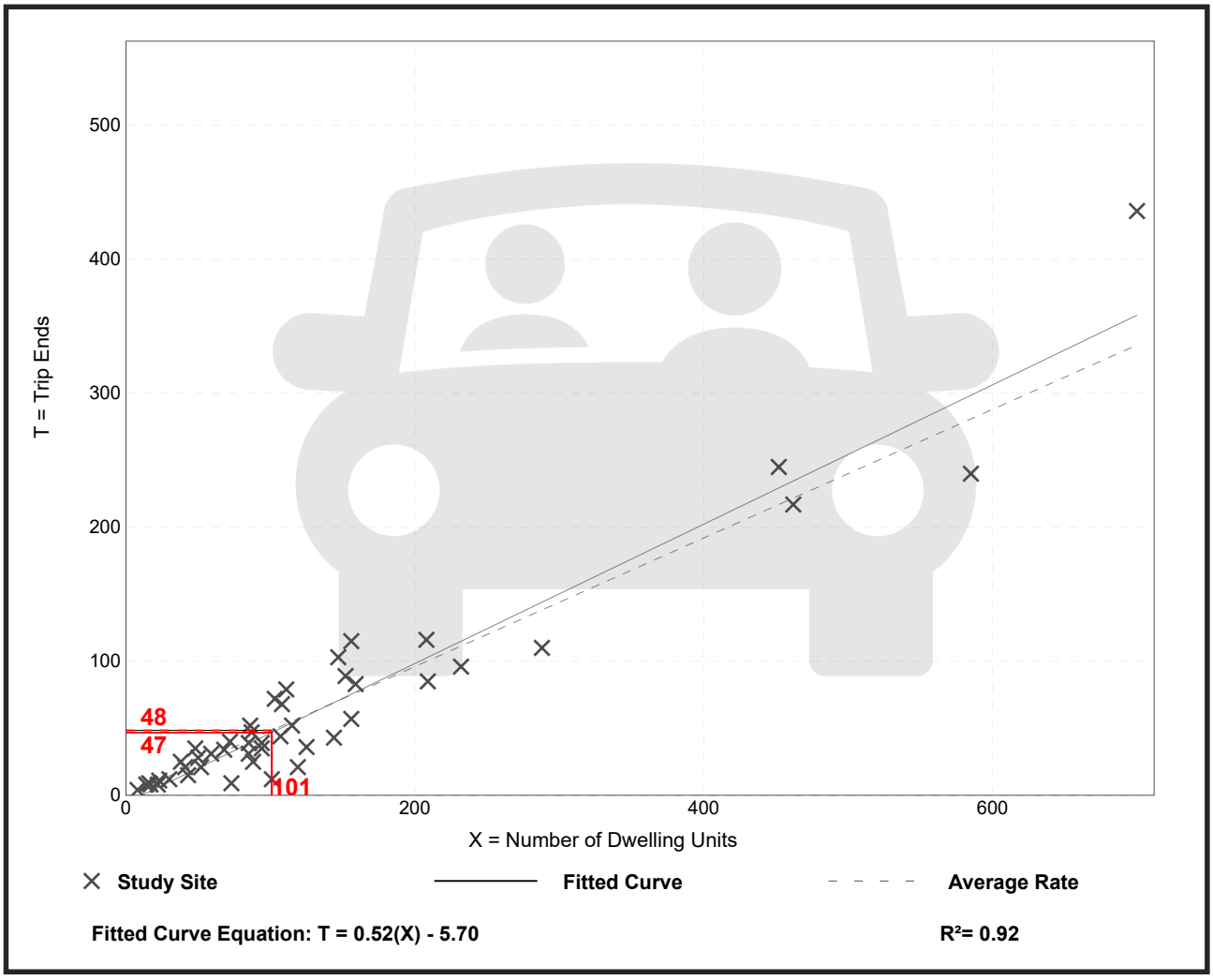
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

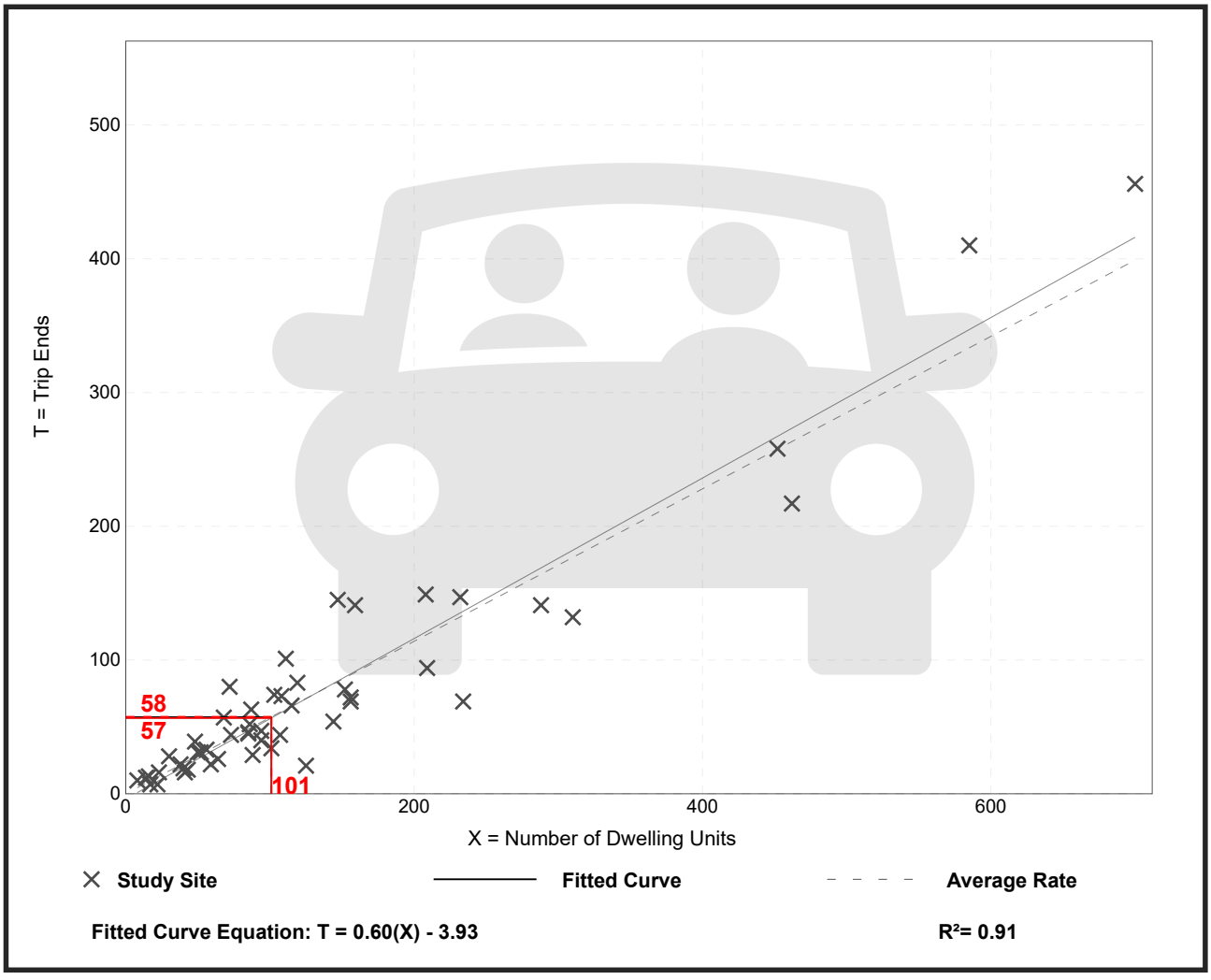
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	51
Avg. Num. of Dwelling Units:	136
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

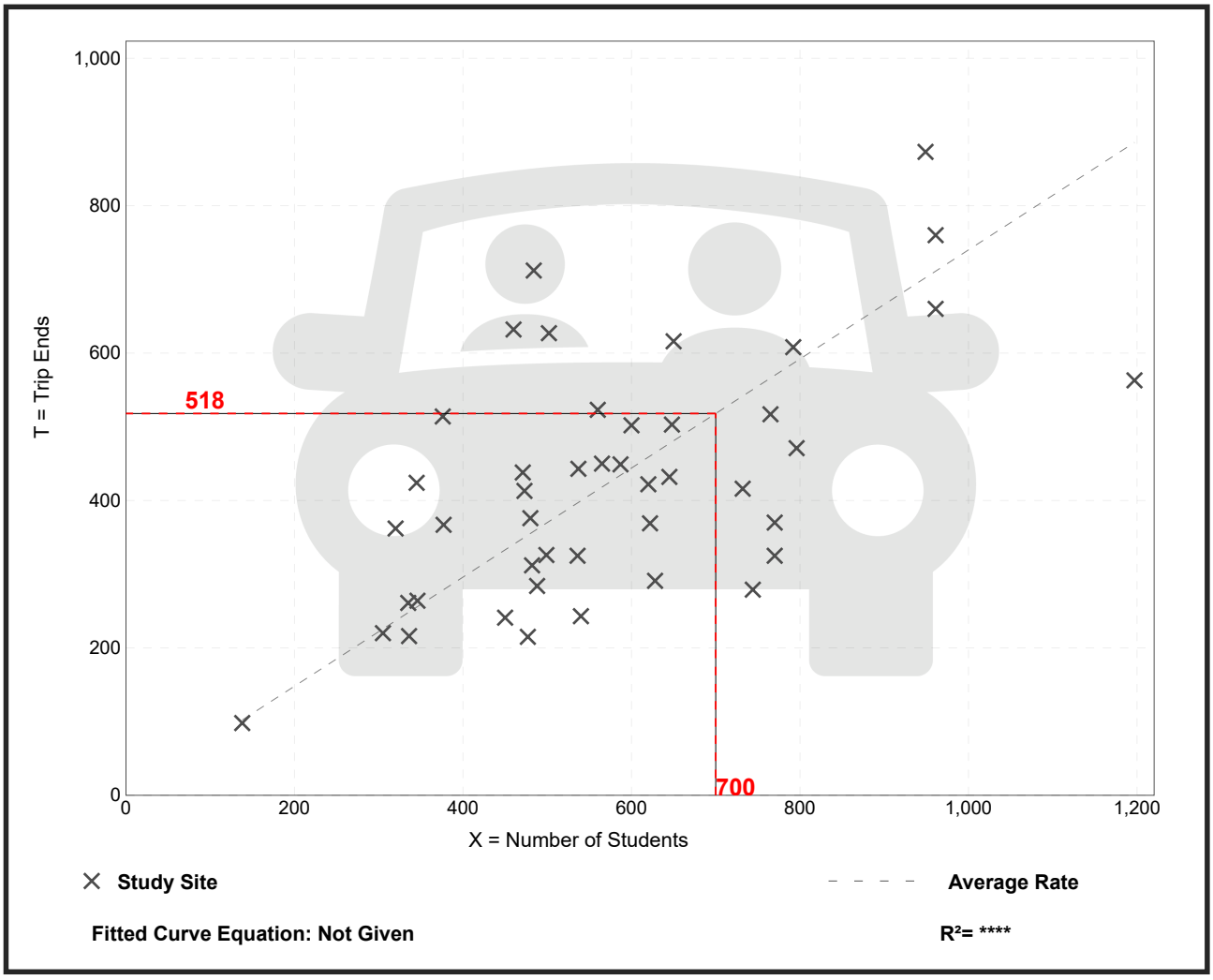
Elementary School
(520)

Vehicle Trip Ends vs: **Students**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 44
Avg. Num. of Students: 575
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.74	0.38 - 1.47	0.25

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

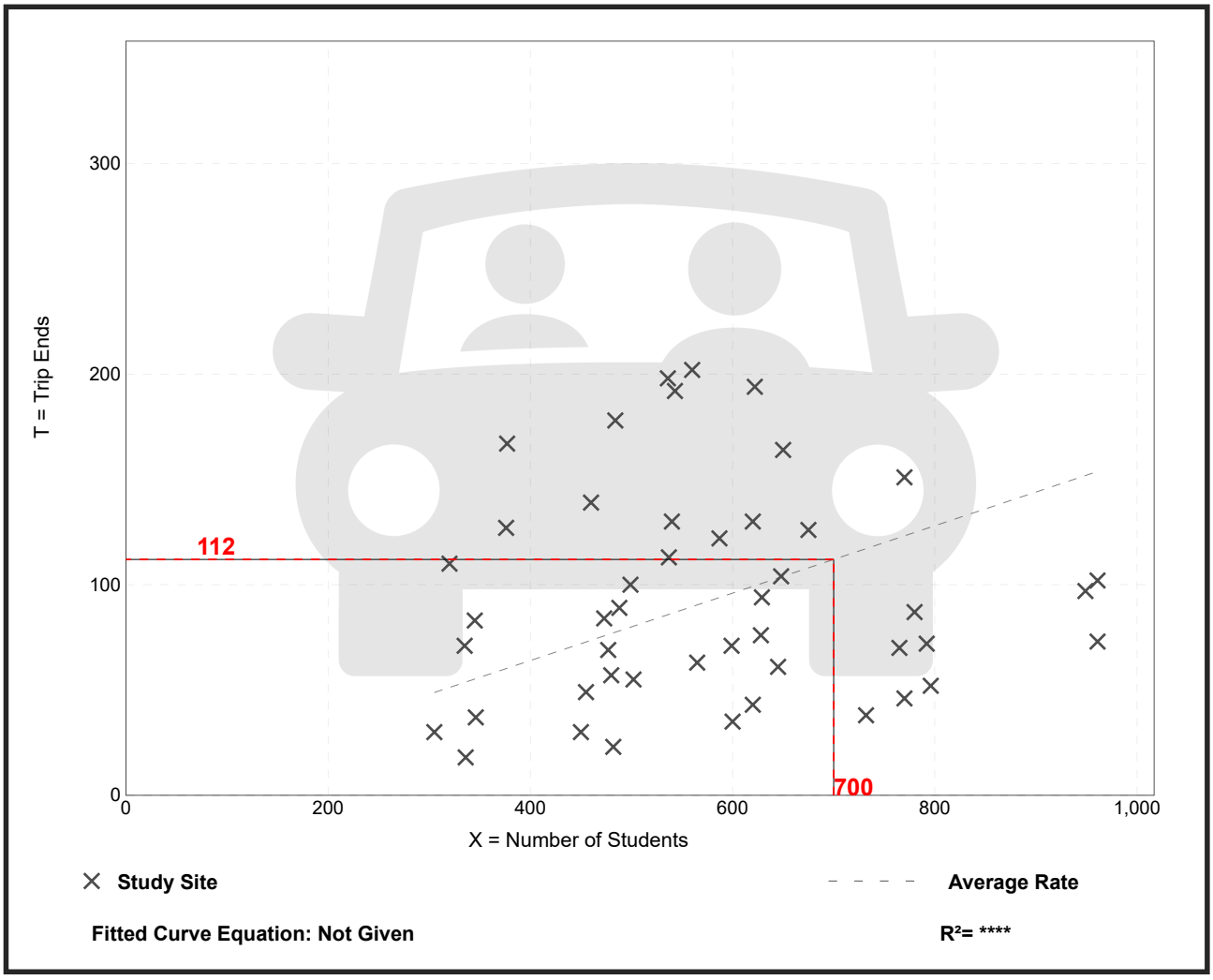
Elementary School
(520)

Vehicle Trip Ends vs: **Students**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 47
Avg. Num. of Students: 576
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.16	0.05 - 0.44	0.10

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

Attachment E

Glenelg Phase 3 TIS (Crozier, August 2022)

TRAFFIC IMPACT STUDY

GLENELG PHASE 3

DUNDALK
GREY COUNTY, ONTARIO

PREPARED FOR:

DUNDALK VILLAGE TWO INC.

PREPARED BY:

C.F. CROZIER AND ASSOCIATES INC.
1 FIRST STREET, SUITE 200
COLLINGWOOD, ONTARIO
L9Y 1A1

1ST SUBMISSION: AUGUST 2022

CFCA FILE NO. 1060-6220

The material in this report reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. C.F. Crozier and Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

CROZIER
CONSULTING ENGINEERS

REVISION NUMBER	DATE	COMMENTS
Rev. 0	August 2022	First submission to Township and County

1.0 Executive Summary

C. F. Crozier and Associates Inc. was retained by Flato Dundalk Meadows Inc. to undertake a Traffic Impact Study (TIS) to support a Draft Plan of Subdivision Application for Glenelg Phase 3, which is located in the north end of the Community of Dundalk, Township of Southgate, County of Grey. The Subject Property is located northeast of Phase 2 of the Glenelg Residential Development.

The proposed Draft Plan prepared by MHBC, August 18th, 2022, consists of 369 single detached dwelling units, 72 townhouse dwelling units, and 18 semi-detached dwelling units.

The residential development is proposed to connect to the boundary road network through one access in the White Rose Phase 3 development (Bradley Street Extension) and two accesses through Glenelg Phase 1. The Subject Property will directly connect to Corbet Street in Glenelg Phase 2 which connects to the two accesses in Glenelg Phase 1.

The TIS analyzes the following intersections:

- Glenelg Street and Ida Street
- Dundalk Street and Glenelg Street
- Ida Street and Main Street
- Dundalk Street and Main Street
- Main Street and Osprey Street
- Main Street and Owen Sound Street
- Osprey Street and Bradley Street

Intersection analysis of the existing traffic volumes indicates that all study intersections are operating at a Level of Service (LOS) "B" or better during the weekday a.m. and p.m. peak hours. The study intersections have capacity for increases in traffic volumes.

Per the agreed upon Terms of Reference, horizon years of 2027 and 2032 were assessed which represent five and ten years from the study date. A growth rate of 1.5 percent compounded annually was used to forecast the future total traffic volumes. Several background developments have been considered for the assessment of the background conditions. These developments include Glenelg Phase 1, Glenelg Phase 2, the unoccupied Edgewood Greens units, and White Rose Phase 3. A sensitivity analysis investigated the impacts of the Eco Parkway extension and associated industrial lands.

Intersection analysis of the 2032 future background traffic volumes indicates the following:

- The southbound movement at the Dundalk Street and Main Street intersection is forecast to operate with a LOS "E" during the weekday a.m. and p.m. peak hours. A maximum volume-to-capacity ratio of 0.70 (SB) and control delay 37.4 seconds are forecast.
- The remaining study intersections are forecast to operate at a LOS "C" or better.

The proposed development is estimated to generate 285 and 389 total two-way primary trips during the weekday a.m. and p.m. peak hours, respectively.

Intersection analysis of the 2032 future total traffic volumes indicates the following:

- The study intersections are forecast to continue operating with a LOS "B" or better in the weekday a.m. and p.m. peak hours under 2032 future background traffic volume conditions,

except for the intersections of: Dundalk Street and Main Street, Osprey Street and Main Street, and Owen Sound Street and Main Street.

- The intersection of Dundalk Street and Main Street is forecast to operate with an LOS "E" or better in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 40.0 seconds, and a maximum volume-to-capacity ratio of 0.73 (SB).
    - When compared to 2032 future background operations, an increase in control delay of 2.6 seconds and the volume-to-capacity ratio is forecast to increase by 0.03.
- The intersection of Osprey Street and Main Street is forecast to operate with an LOS "D" in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 34.8 seconds, and a maximum volume-to-capacity ratio of 0.52 (SB).
    - When compared to 2032 future background operations, an increase in control delay of 9.6 seconds and a maximum change of 0.22 in the volume-to-capacity ratio is forecast.
- The intersection of Owen Sound Street and Main Street is forecast to operate with an LOS "E" or better in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 35.2 seconds and a maximum volume-to-capacity ratio of 0.55 (SB) are forecast.
    - When compared to 2032 future background operations, an increase in control delay of 14.0 seconds and a maximum change of 0.31 in the volume-to-capacity ratio is forecast.

As requested in the Terms of reference, a scenario analyzing the impacts of the Glenelg Phase 3 development with both the Eco Parkway extension and development of surrounding industrial lands was completed. The Eco Parkway extension and the proposed industrial development lands are estimated to produce 1,376 and 1,266 external two-way trips in the a.m. and p.m. peak hours, respectively. The Eco Parkway extension is also anticipated to reroute 30% of traffic volumes on Main Street around downtown Dundalk.

In the future background scenario with the Eco Parkway extension, the following results were established:

- The study intersections are forecast to operate at a LOS "E" or better except for the northbound movement at the Ida Street and Main Street intersection.
- The northbound movement intersection of Ida Street and Main Street is forecast to operate with a LOS "F", 177.0 seconds of delay, and a volume to capacity ratio of 1.28.

With the addition of Glenelg Phase 3 traffic to the Eco Parkway Scenario, the intersection of Ida Street and Main Street is forecast to operate with a maximum of 254.7 seconds of delay and a volume to capacity ratio of 1.46. Signalization is not warranted based on the future total volumes. If the Road Authority decides to implement signalization, the intersection is forecast to operate at LOS "B" with a v/c ratio of less than 0.79 for all movements under future total conditions. If the Road Authority decides to implement a roundabout, it is forecast that a roundabout would operate at LOS "A" with a 95th percentile queue length of 1 vehicle or less under the Eco Parkway future total volumes.

The analysis contained within this report was prepared using the Draft Plan prepared by MHBC on August 18th, 2022. Any minor revisions to the development draft are not expected to affect the conclusions contained in this report.

In conclusion, the proposed development can be supported from a transportation operations and safety perspective, with the noted recommendations.

Table of Contents

List of Tables

List of Appendices

List of Figures

2.0 Introduction

2.1 Background

C. F. Crozier and Associates Inc. (Crozier) was retained by Flato Dundalk Meadows Inc. (Client) to undertake a Traffic Impact Study (TIS) to support a Draft Plan of Subdivision Application for Glenelg Phase 3 (Subject Property) located in the west end of the Community of Dundalk, Township of Southgate, County of Grey. The Subject Property is located northeast of Phase 2 of the Glenelg Residential Development.

2.2 Development Proposal

The most recent Draft Plan for Glenelg Phase 3 includes 369 single detached dwelling units, 72 townhouse dwelling units, and 18 semi-detached dwelling units.

Access to the subject property is proposed by three connections to the external road network; one through the White Rose Phase 3 Development (Bradley Street Extension) and two through Glenelg Phase1. Street A and Street B are proposed to extend westerly from the subject property to Corbett Street in Glenelg Phase 2, which has further connections to the two Glenelg Phase 1 site accesses. Bradley Street is proposed to be extended northerly into the subject property after the construction of the White Rose Phase 3 development.

Figure 1 contains the Draft Plan prepared by MHBC dated August 18th, 2022.

2.3 Purpose and Scope

The purpose of the study is to assess the impacts of the proposed residential development on the boundary road network and to recommend the required remedial measures to mitigate the transportation impacts.

The scope of the study includes:

- Determine and assess the existing, future background, and future total traffic operations of the boundary road network.
- Forecast the trip generation and distribution of the proposed development.
- Assess and if necessary, recommend, changes in intersection traffic control.

The Township of Southgate peer reviewer confirmed the scope and assumptions noted in this report during pre-study consultations. **Appendix A** contains the Terms of Reference correspondence.

3.0 Existing Traffic Conditions

3.1 Development Lands

The subject property is currently vacant and is bound by existing residential land uses to the south, future residential developments to the west, and vacant agricultural land to the east and north. The subject property is approximately 33.27 ha, of which approximately 24.54 ha are proposed to be developed.

Figure 2 illustrates the Site Location Plan.

3.2 Study Intersections

The following intersections have been included in the study area and were analysed under existing, future background, and future total traffic volume conditions:

- Glenelg Street and Ida Street.
- Dundalk Street and Glenelg Street.
- Ida Street and Main Street.
- Dundalk Street and Main Street.
- Main Street and Osprey Street.
- Main Street and Owen Sound Street.
- Osprey Street and Bradley Street.

3.3 Boundary Road Network

Table 1 summarizes the characteristics of the boundary road network as illustrated in the Township of Southgate "Official Plan". For the purposes of this report, Ida Street, Dundalk Street, and Osprey Street are assumed to run north-south while Main Street and Glenelg Street are assumed to run east-west. **Figure 3** illustrates the existing traffic controls and lane configurations of the study intersections.

Table 1: Boundary Road Network

Road	Direction	Lanes	Posted Speed (km/h)	Classification	Jurisdiction	Pedestrian Facilities	Cycling Facilities
Ida Street	North-south	2	40 km/h	Local Road	Township of Southgate	None	None
Glenelg Street	East-west	2	40 km/h	Local Road	Township of Southgate	One side sidewalk	None
Grey Road 9/ Main Street	East-west	2	40 km/h	County Highway	County of Grey	Two side (McDowell to Dundalk Street, one side asphalt mountable curb from Dundalk Street to Ida Street)	Paved Shoulder west of Dundalk Street and east of Artemisia Street
Dundalk Street	North-south	2	Assumed 40 km/h	Local Road	Township of Southgate	None	Grey county CP rail trail to east of road
Grey Street	East-west	2	Assumed 40 km/h	Local Road	Township of Southgate	Sidewalk from Glenelg Street to CP Rail Trail	None
Osprey Street	North-south	2	Assumed 40 km/h	Local Road	Township of Southgate	One side sidewalk (Main Street to Bradley Street)	
Owen Sound Street	Skewed, assumed North-south	2	Assumed 40 km/h	Local Road	Township of Southgate	One side sidewalk	Paved shoulder one side
Bradley Street/ Toronto Street	East-west	2	Assumed 40 km/h	Local Road	Township of Southgate	One side sidewalk (to 70 m east of Osprey Street)	

3.4 Active Transportation

Sidewalk and cycling facilities are summarized in **Table 1**. Grey Bruce Regional Transit operates two peak hour period routes with the nearest stop located at the Dundalk Arena (approximately 1 km east of the site). **Route 1** operates primarily on Highway 10 from Dundalk to Owen Sound. **Route 2** operates on Highway 10 from Dundalk into Orangeville.

3.5 Traffic Data

Turning movement counts at the study intersections were undertaken by Spectrum Traffic Data Inc. from 6:00 a.m. to 10:00 a.m. and from 3:00 p.m. to 7:00 p.m. on Tuesday June 7, 2022. **Appendix B** contains the turning movement count data. **Figure 4** illustrates the existing traffic volumes.

Peak hour factors (PHF) associated with the weekday a.m. and p.m. peak hours were calculated for each study area intersection based on the existing traffic volumes. **Table 2** summarizes the PHFs used at each intersection in the operations analysis. The Synchro default peak hour factor of 0.92 was used for the new intersection of the Site Access and Glenelg Street which is consistent with nearby review agency guidelines for proposed intersections.

Table 2: Peak Hour Factors

Intersection	Peak Hour	Peak Hour Factor
Ida Street and Glenelg Street	Weekday A.M. 7:45 A.M. – 8:45 A.M.	0.76
	Weekday P.M. 4:45 P.M. – 5:45 P.M.	0.80
Dundalk Street and Glenelg/Grey Street	Weekday A.M. 8:15 A.M. – 9:15 A.M.	0.75
	Weekday P.M. 3:00 P.M. – 4:00 P.M.	0.89
Ida Street and Grey Road 9(Main Street)	Weekday A.M. 8:00 A.M. – 9:00 A.M.	0.82
	Weekday P.M. 3:45 P.M. – 4:45 P.M.	0.95
Dundalk Street and Main Street	Weekday A.M. 8:15 A.M. – 9:15 A.M.	0.72
	Weekday P.M. 3:45 P.M. – 4:45 P.M.	0.95
Osprey Street and Main Street	Weekday A.M. 8:15 A.M. – 9:15 A.M.	0.77
	Weekday P.M. 3:00 P.M. – 4:00 P.M.	0.90
Osprey Street and Toronto Street/Bradley Street	Weekday A.M. 8:30 A.M. – 9:30 A.M.	0.65
	Weekday P.M. 3:15 P.M. – 4:15 P.M.	0.70
Owen Sound Street and Main Street	Weekday A.M. 8:30 A.M. – 9:30 A.M.	0.82
	Weekday P.M. 3:15 P.M. – 4:15 P.M.	0.88

3.6 Intersection Operations

The operations of the study intersections were analyzed using existing traffic volumes and Synchro 11. Level of Service (LOS) definitions have been included in **Appendix C**. Detailed capacity analysis worksheets are included in **Appendix D**. **Table 3** summarizes the existing traffic operations.

Table 3: Existing Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay (seconds)	Critical v/c ratio [2]
Ida Street and Glenelg Street	Stop (T-intersection)	A.M.	A	8.8 s	0.02 (WB)
		P.M.	A	8.7 s	0.03 (WB)
Dundalk Street and Glenelg/Grey Street	Stop (T-intersection[3])	A.M.	A	8.6 s	0.02 (NB)
		P.M.	A	8.7 s	0.02 (NB)
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	B	11.7 s	0.06 (NB)
		P.M.	B	11.2 s	0.11 (NB)
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	B	11.3 s	0.10 (SB)
		P.M.	B	10.6 s	0.06 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	B	12.9 s	0.07 (SB)
		P.M.	B	12.5 s	0.05 (SB)
Osprey Street and Toronto Street/Bradley Street	Stop (All-way)	A.M.	A	7.1 s	0.05 (WB)
		P.M.	A	7.1 s	0.08 (NB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	B	12.8 s	0.09 (SB)
		P.M.	B	13.2 s	0.10 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios for movements greater than 0.85 are outlined and highlighted.

Note [3]: To remain consistent with the Glenelg Phase 2 TIS, the volumes on the west approach of Grey Street were shifted so the intersection could be analyzed as a T -intersection. The simulation software cannot assess the existing 4-legged intersection.

To remain consistent with the Glenelg Phase 2 TIS, the traffic volumes to/from the west leg of Grey Street were shifted to Glenelg Street to allow the intersection to assessed using modelling software. The modelling software is unable to interpret an intersection with two free-flow legs on the north side of the intersection and two stop-controlled legs on the south side. It is noted the west leg of Grey Street has very low traffic volumes as it serves a few private residences and a municipal operations yard.

The study area intersections are estimated to operate an acceptable level of service (LOS "B" or better) and no critical movements are noted under existing traffic conditions. The maximum control delay is estimated to be 13.2 seconds (Southbound movement at Owen Sound Street and Main Street) and the largest volume-to-capacity (v/c) ratio is estimated to be 0.11(northbound movement at Ida Street and Grey Road 9). These metrics show that the study intersections have reserve capacity for future increases in traffic volumes.

4.0 Future Background Conditions

4.1 Horizon Years

As confirmed with Township peer reviewer, Triton, during pre-study consultations, horizon years of 2027 and 2032 were assessed which represent five and ten years from the study date.

4.2 Growth Rate

To remain consistent with the Glenelg Phase 1 TIS, the Glenelg Phase 2 TIS, and the Edgewood Greens TIS, a growth rate of 1.5 percent was used to forecast future traffic volumes on the boundary road network.

It is acknowledged that Grey County Transportation Master Plan (Cole Engineering Group and C.C. Tatham & Associates, 2014) used a growth rate of 1.0 percent.

4.3 Boundary Road Network Improvements

Based on a review of Southgate's Development Charges Background Study and published planned roadworks, mostly minor roadworks that would not impact the findings of this report (ie. no changes to lane configurations or traffic control) were listed except for Eco Parkway. Eco Parkway was the only identified improvement that could impact the findings of this report. The impacts of implementing Eco Parkway and the associated development lands were assessed in an additional scenario as requested by Township peer reviewer during pre-study consultation in **Section 7.0** of this study. **Appendix E** contains excerpts from the Eco Parkway TIS titled "Industrial Access Road Grey Road 9 and Ida Street Traffic Impact Study" (Triton Engineering, September 2020).

Based on a review of Grey County's Development Charges, Capital Works Schedule and Transportation Master Plan, the planned urban rehab for Main Street from Ida Street to Artemesia Street scheduled for 2023 was the only identified improvement that may impact the study area road network. It was assumed that this work would not impact the findings of this report (ie. no changes to lane configurations or traffic control).

4.4 Background Developments

The background developments identified for inclusion in this study by the Township peer reviewer during pre-study consultation are summarized in **Table 4**. **Figure 5** to **Figure 9** illustrates the forecast background development traffic for each identified background development. **Figure 10** illustrates the forecast traffic volumes of all background developments.

Table 4: Background Developments

Background Development	Number of Units	Opening Horizon Year of Analysis	Reference
Edgewood Greens	275[1] Single Detached Dwelling Units and 157[1] Townhouse Dwelling Units	Assumed 2027	C. F. Crozier & Associates Inc. (February 2021)
Glenelg Phase 1	118 Single Detached dwelling Units and 65 Townhouse Dwelling Units	Assumed 2027	C. F. Crozier & Associates Inc. (September 2020)
Glenelg Phase 2	89 Single detached dwelling units and 66 Townhouse Dwelling Units	2025	C. F. Crozier & Associates Inc. (September 2020)
White Rose Phase 3	88 Single Family Detached, 66 Townhouse Dwelling Units, and 66 Senior Adult Housing	2025	Triton Engineering Services Limited (September 2020)

Note[1]: The development team identified the number of closed units as these trips are included in the existing traffic volumes.

4.4.1. Edgewood Greens

Edgewood Greens Development is a mixed-use development located southeast of Glenelg Phase 3. The development is still under construction; however, many of the residential units are currently occupied. Updated residential trip generation rates were estimated for the unoccupied units using the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition. The commercial trip generation estimates were copied from the Edgewood Greens TIS update (Crozier, February 2021). The development is assumed to be built-out prior to the 2027 horizon year. **Table 5** summarizes the trip generation estimates.

Table 5: Edgewood Greens Trip Generation

Land Use	Units/GFA	Peak Hour	Trip Type	Trips Generated		
				Inbound	Outbound	Total
LUC 210: Single Family Detached Housing[1]	275 Units	A.M.	Primary	49	138	187
		P.M.		162	95	257
LUC 215: Attached Multifamily Housing [1]	157 Units	A.M.	Primary	24	52	76
		P.M.		51	39	90
LUC 820: Shopping Centre[2]	15,586 ft[2]	A.M.	Primary	10	7	17
			Pass-by	0	0	0
		P.M.	Primary	21	23	44
			Pass-by	11	12	23
Total		**A.M.**	**Primary**	**82**	**198**	**280**
			Pass-by	**0**	**0**	**0**
		P.M.	**Primary**	**55**	**82**	**134**
			Pass-by	**11**	**11**	**12**

Note [1]: The trip generation for the residential units was updated with the fitted curve equations noted in the ITE Trip Generation Manual 11th Edition for the unoccupied unit count.

Note [2]: The trip generation for the commercial block was adopted from the fitted curve equation given in ITE Trip Generation Manual 10th Edition as per the Edgewood Greens, Traffic Impact Study Update (Crozier, January 2020).

The trips generated by the Edgewood Greens development were assigned to the boundary road network based on the distribution described in the Edgewood Greens TIS update (Crozier, February 2021). Most trips are expected to travel to/from Highway 10 with some trips assigned to the west of Dundalk at the intersection of Osprey and Main Street. To extend the trip distribution past Ida Street it was assumed that the trips assigned to Main Street would continue straight on Main Street at the intersection with Ida Street and the intersection with Dundalk Street.

Relevant excerpts from the Edgewood Greens TIS update (Crozier, February 2021) have been included in **Appendix E**. The trip assignment for Edgewood Greens development is illustrated in **Figure 5** and **Figure 6**.

4.4.2. Glenelg Phase 1

Glenelg Phase 1 is a residential development located on to the west side of Glenelg Phase 3. The development is proposed to consist of 118 single detached dwelling units and 65 townhouse dwelling units and access is proposed though two all-move accesses to Glenelg Street. However, it is noted that the traffic study was analyzed with only one full move access. To remain consistent with the Glenelg Phase 1 TIS, the Glenelg Phase 2 TIS and this study assigned the site-generated traffic to the one access. It was assumed the development would be completed prior to the 2027 horizon year. **Table 6** summarizes the trip generation estimates noted in the Glenelg Phase 2 TIS Study (Crozier, September 2020).

Table 6: Glenelg Phase 1 Trip Generation

Development	Unit Type	Number of Units	Roadway Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Glenelg Phase 1	LUC 210: Single Family Detached Housing	118	Weekday A.M.	22	67	89
			Weekday P.M.	75	44	119
	LUC 220: Multifamily Housing (Low-Rise)	65	Weekday A.M.	7	25	32
			Weekday P.M.	25	15	40
Total			**Weekday A.M.**	**29**	**92**	**121**
			Weekday P.M.	**100**	**59**	**159**

The Glenelg Phase 1 trip distribution and trip assignment was taken from the Glenelg Phase 2 TIS (Crozier, September 2020). Traffic volumes were balanced through the study area intersections that were not included in the Glenelg Phase 2 TIS. **Appendix E** contains the Glenelg Phase 2 TIS excerpts. **Appendix E**. The trip assignment for Glenelg Phase 1 is illustrated in **Figure 7**.

4.4.3. Glenelg Phase 2

The Glenelg Phase 2 development is located to the west of Glenelg Phase 3. Glenelg Phase 2 connects to Glenelg Street through Glenelg Phase 1. Based on Glenelg Phase 2 Traffic Impact Study (Crozier, September 2020), the development is proposed to include 89 single detached dwelling units and 66 townhouse dwelling units. It is noted the unit counts are conservative as the number of units has been reduced to allow for the construction of future roadways not illustrated in the draft plan referenced by the Glenelg Phase 2 TIS. The unit count in the Glenelg Phase 2 TIS is overstated by 2 single detached dwelling units and 4 townhouse dwelling units. **Table 7** summarizes the trip generation estimates.

Table 7: Glenelg Phase 2 Trip Generation

Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 210: Single Family Detached Housing (89 Units)	Weekday A.M.	17	51	68
	Weekday P.M.	57	34	91
LUC 220: Multifamily Housing (Low-Rise) (66 Units)	Weekday A.M.	7	25	32
	Weekday P.M.	26	15	41
Total	**Weekday A.M.**	**24**	**76**	**100**
	Weekday P.M.	**83**	**49**	**132**

Note: The trip generation above was adopted from the fitted curve equation given in ITE Trip Generation Manual 10th Edition as per the Glenelg Phase 2 Traffic Impact Study (Crozier, September 2020).

The trip assignment was taken from the Glenelg Phase 2 TIS (Crozier, September 2020). Traffic volumes were balanced through the study area intersections that were not included in the Glenelg Phase 2 TIS. **Figure 8** illustrates the Glenelg Phase 2 trip assignment.

4.4.4. White Rose Phase 3

The White Rose Phase 3 development is located to the south of the subject site. Based on the White Rose Phase 3 Traffic Impact Study (Triton Engineering Services, September 2020), the development is proposed to consist of 33 single detached dwelling units, 24 townhouse dwelling units, and 34 seniors dwelling units. **Table 9** summarizes the trip generation estimates.

Table 9: White Rose Phase 3 Trip Generation

Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 210: Single Family Detached Housing (89 Units)	Weekday A.M.	8	23	31
	Weekday P.M.	23	13	36
LUC 230: Residential Condominium/ Townhouse (66 Units)	Weekday A.M.	3	14	17
	Weekday P.M.	13	6	19
LUC 252: Senior Adult Housing (Attached) (66 Units)	Weekday A.M.	2	3	5
	Weekday P.M.	5	1	6
Total	**Weekday A.M.**	**13**	**40**	**53**
	Weekday P.M.	**41**	**20**	**61**

Note: The trip generation above was adopted from the fitted curve equation given in ITE Trip Generation Manual 10th Edition as per the White Rose Phase 3 TIS (Triton, September 2020).

The trips assignment for the White Rose Phase 3 was taken from the White Rose Phase 3 TIS. Traffic volumes were balanced through the study area intersections that were not included in the White Rose Phase 3 TIS. **Figure 9** illustrates the White Rose Phase 3 trip assignment and **Appendix E** contains White Rose TIS Excerpts.

4.5 Intersection Operations

The operations of the study intersections were analyzed based on the 2027 and 2032 future background traffic volumes. The background volumes, which include the generalized background growth and the identified background developments, are illustrated in **Figure 11** and **Figure 12** for the 2027 and 2032 horizon years, respectively. **Appendix C** contains the Level of Service definitions and **Appendix D** contains the detailed capacity analysis worksheets. **Table 8** and **Table 9** summarize the 2027 and 2032 future background traffic operations, respectively.

Table 8: 2027 Future Background Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Glenelg Street	Stop (T-intersection)	A.M.	A	9.1 s	0.07 (WB)
		P.M.	A	9.1 s	0.06 (WB)
Dundalk Street and Glenelg/Grey Street	Stop (T-intersection)	A.M.	B	11.0 s	0.11 (NB)
		P.M.	B	10.7 s	0.21 (NB)
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	B	12.4 s	0.10 (SB)
		P.M.	B	13.2 s	0.16 (NB)
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	D	31.5 s	0.64 (SB)
		P.M.	C	16.2 s	0.28 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	C	23.1 s	0.27 (NB)
		P.M.	C	20.8 s	0.19 (NB)
Glenelg Street and Glenelg Site Access	Stop (T-intersection)	A.M.	A	10.0 s	0.20 (SB)
		P.M.	B	10.5 s	0.15 (SB)
Osprey Street and Toronto Street/Bradley Street	Stop (All-way)	A.M.	A	7.4 s	0.11 (WB)
		P.M.	A	7.4 s	0.14 (NB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	C	18.4 s	0.22 (SB)
		P.M.	C	20.1 s	0.23 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

Table 9: 2032 Future Background Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Glenelg Street	Stop (T-intersection)	A.M.	A	9.1 s	0.07 (WB)
		P.M.	A	9.2 s	0.07 (WB)
Dundalk Street and Glenelg/Grey Street	Stop (T-intersection)	A.M.	B	11.1 s	0.12 (NB)
		P.M.	B	10.8 s	0.21 (NB)
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	B	12.8 s	0.11 (SB)
		P.M.	B	13.6 s	0.18 (NB)
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	E	37.4 s	0.70 (SB)
		P.M.	C	16.9 s	0.30 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	C	25.2 s	0.30 (NB)
		P.M.	C	21.7 s	0.20 (NB)
Glenelg Street and Glenelg Site Access	Stop (T-intersection)	A.M.	B	10.0 s	0.20 (SB)
		P.M.	B	10.5 s	0.15 (SB)
Osprey Street and Toronto Street/Bradley Street	Stop (All-way)	A.M.	A	7.5 s	0.11 (WB)
		P.M.	A	7.4 s	0.14 (NB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	C	19.6 s	0.24 (SB)
		P.M.	C	21.2 s	0.32 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

The study intersections were forecast to continue operating with a LOS "C" or better in the weekday a.m. and p.m. peak hours under 2032 future background traffic volume conditions, except for the intersection of Dundalk Street and Main Street. The southbound movement on Dundalk Street is considered critical and is forecast to operate at a LOS "E" during the weekday a.m. peak hour. It is noted that existing peak hour factors (PHF) were applied to future traffic conditions, which range from 0.65 to 0.82 during the a.m. peak hour. As traffic volumes increase, the PHF will likely increase. Due to the large number of future nearby background developments that are expected to be constructed, it is recommended the road authority continues to monitor the traffic operations.

The Glenelg Phase 1 Site Access is anticipated to operate with a LOS "B" with a maximum control delay of 10.5 seconds and a maximum v/c ratio of 0.20(SB). The metrics indicate that the site access has reserve capacity for increases in traffic volumes.

5.0 Site Generated Traffic

5.1 Trip Generation

Development of the subject property will result in additional vehicles on the boundary road network above background conditions. The trip generation of the development was forecast using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. Per the most recent draft plan, the development is proposed to consist of 369 single detached dwelling units, 72 townhouse dwelling units, and 18 semi-detached dwelling. Accordingly, LUC 210 "Single-Family Detached Housing", and LUC 215 "Single Family Attached Housing" were used to forecast trips generated by the site. **Table 10** summarizes the residential trip generation of the subject property. **Appendix F** contains relevant excerpts from the ITE Trip Generation Manual.

Table 10: Site Trip Generation

	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 210 'Single Family Homes' (369 Units)	Weekday A.M.	63	181	244
	Weekday P.M.	214	125	339
LUC 215 'Single Family Attached Housing' (90 Units)	Weekday A.M.	13	28	41
	Weekday P.M.	28	22	50
TOTAL	**Weekday A.M.**	**76**	**209**	**285**
	Weekday P.M.	**242**	**147**	**389**

5.2 Trip Distribution and Assignment

Trips generated by Glenelg Phase 3 were distributed to the boundary road network similar to what was applied in the Glenelg Phase 1 TIS and Glenelg Phase 2 TIS. The trip distribution was based on Transportation Tomorrow Survey (TTS) data. The TTS is a comprehensive survey of transportation characteristics in the Golden Horseshoe, and Simcoe County areas. TTS data is unavailable for the Community of Dundalk; however, data was available for the Township of Melancthon which is adjacent to Dundalk. This data is considered representative of the subject area.

TTS Data has been included in **Appendix J**. The trip distribution is as follows:

- 10 % to/from the north on Ida Street
  - 5 % Via Glenelg Phase 1 Site Access
  - 5 % Via Grey Street
- 10 % to/from the west on Grey Road 9 (Main Street) via Ida Street and via Grey Street
- 60 % to/from the south on Highway 10 via Bradley Street
  - 60 % westbound right movements at Owen Sound Street
  - 30 % southbound left movements at Owen Sound Street and 30% southbound left
- 20 % to/from Dundalk (downtown)
  - 15 % to/from the west on Toronto Street
  - 5 % to/from the west on Main Street at Dundalk Street

It is noted that 20% of the site-generated traffic volumes are expected to travel through the community outside of the study area road network.

The Subject Property is proposed to connect to the boundary road network through the Bradley Street extension and two accesses through Glenelg Phase 1. The Subject Property will directly

connect to Glenelg Phase 2 which then connects to the Glenelg Phase 1 accesses. Glenelg Phase 3 was analyzed with the Bradley Street extension and one access through Glenelg Phase 1. This provides a conservative analysis as two accesses have already been constructed for Glenelg Phase 1.

The trips generated by the proposed development were assigned to the boundary road network per the distributions illustrated in **Figure 13**. **Figure 14** illustrates the site-generated trip assignment.

6.0 Total Future Conditions

6.1 Basis of Assessment

The total traffic volumes consist of the site-generated and background traffic volumes. **Figure 15** and **Figure 16** illustrate the 2027 and 2032 total traffic weekday a.m. and p.m. traffic volumes, respectively.

6.2 Signal Justification

A signal warrant analysis was undertaken for the Dundalk Street and Main Street intersection and at the Owen Sound Street and Main Street intersection using the 2032 future total traffic volumes. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12" (OTM Book 12), March 2012 for Justification 1 (Minimum Vehicle Volume), Justification 2 (Delay to Cross Traffic), and Justification 3 (Volume/Delay Combination). The future total peak hour volumes were assigned to the 8-hours based on the percentage of the peak hour traffic volumes established from the existing 8-hour traffic data.

The results of the signal warrant analyses are summarized in **Table 11** and **Table 12** the warrant sheets have been included in **Appendix G**.

Table 11: Dundalk Street - Signal Warrant Analysis Results

Justification		Section Percent	Signal Justified
1. Minimum Vehicular Volume	A. Total Volume	48%	No
	B. Crossing volume	12%	
2. Delay to Cross Traffic	A. Main Road	44%	No
	B. Crossing Road	27%	
3. Combination	A. Justification 1	12%	No
	B. Justification 2	27%	

Note[1]: Dundalk Street and Main Street is a "T" intersection which requires the minimum section percentage requirements to be increased by 50%.

Table 12: Owen Sound Street - Signal Warrant Analysis Results

Justification		Section Percent	Signal Justified
1. Minimum Vehicular Volume	A. Total Volume	95%	No
	B. Crossing volume	36%	
2. Delay to Cross Traffic	A. Main Road	93%	No
	B. Crossing Road	99%	
3. Combination	A. Justification 1	36%	No
	B. Justification 2	93%	

Note[1]: Owen Sound Street and Main Street is a "T" intersection which requires the minimum section percentage requirements to be increased by 50%.

The results indicate that the Dundalk Street and Main Street intersection and the Owen Sound Street and Main Street intersection do not meet the OTM Book 12 signal warrant requirements.

6.3 Intersection Operations

The operations of the study intersections were analyzed based on the 2027 and 2032 total traffic volumes illustrated in **Figures 15** and **Figure 16**. **Table 13** and **Table 14** outline the 2027 and 2032 horizon year future total traffic Levels of Service, respectively. Level of Service definitions have been included in **Appendix C** and detailed capacity analyses worksheets are included in **Appendix D.**

Table 13: 2027 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Glenelg Street	Stop (T-intersection)	A.M.	A	9.5 s	0.13 (WB)
		P.M.	A	9.7 s	0.11 (WB)
Dundalk Street and Glenelg/Grey Street	Stop (T-intersection)	A.M.	B	11.7 s	0.13 (NB)
		P.M.	B	11.6 s	0.24 (NB)
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	B	12.2 s	0.14 (SB)
		P.M.	B	14.0 s	0.18 (NB)
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	D	33.5 s	0.67 (SB)
		P.M.	C	16.8 s	0.30 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	D	30.6 s	0.48 (SB)
		P.M.	C	24.6 s	0.29 (SB)
Glenelg Street and Glenelg Site Access	Stop (T-intersection)	A.M.	B	10.5 s	0.23 (SB)
		P.M.	B	11.2 s	0.18 (SB)
Osprey Street and Toronto Street/Bradley Street	Stop (All-way)	A.M.	A	9.7 s	0.41 (WB)
		P.M.	A	9.6 s	0.39 (NB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	D	29.0 s	0.51 (SB)
		P.M.	D	31.4 s	0.48 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

Table 14: 2032 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Glenelg Street	Stop (T-intersection)	A.M.	A	9.5 s	0.13 (WB)
		P.M.	A	9.8 s	0.11 (WB)
Dundalk Street and Glenelg/Grey Street	Stop (T-intersection)	A.M.	B	11.8 s	0.14 (NB)
		P.M.	B	11.7 s	0.25 (NB)
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	B	12.5 s	0.15 (SB)
		P.M.	B	14.6 s	0.20 (NB)
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	E	40.0 s	0.73 (SB)
		P.M.	C	17.6 s	0.32 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	D	34.8 s	0.52 (SB)
		P.M.	D	26.7 s	0.32 (SB)
Glenelg Street and Glenelg Site Access	Stop (T-intersection)	A.M.	B	10.5 s	0.23 (SB)
		P.M.	B	11.3 s	0.18 (SB)
Osprey Street and Toronto Street/Bradley Street	Stop (All-way)	A.M.	A	9.7 s	0.42 (WB)
		P.M.	A	9.7 s	0.30 (WB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	D	32.7 s	0.55 (SB)
		P.M.	E	35.2 s	0.52 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

The intersections are generally forecast to operate at acceptable levels of service during the weekday a.m. and p.m. peak hours with minor increases in delay and v/c ratios noted with the addition of site-generated traffic volumes. The following critical movements are noted:

- Dundalk Street and Main Street: Southbound approach.
- Owen Sound Street and Main Street: Southbound approach.

The southbound approach at the Dundalk Street and Main Street intersection is forecast to operate at LOS "E" during the weekday a.m. peak hour. The critical southbound movement is forecast to experience an increase in control delay of up to 2.6 seconds and an increase in v/c ratio of up to 0.03 over future background conditions. As previously noted, traffic signals are not warranted at the study area intersections and poor operations are forecast under background conditions. Due to multiple proposed developments in the area, it is recommended that the road authority continue to monitor the operations of the intersection.

The southbound approach at the Owen Sound Street and Main Street intersection is forecast to operate at LOS "E" during the weekday p.m. peak hour. The critical southbound movement is

forecast to experience an increase in the control delay of up to 14.0 seconds and an increase in the v/c ratio of up to 0.31 when compared to the future background operations. Due to multiple proposed developments in the area, it is recommended that the road authority continue to monitor the operations of the intersection.

The Glenelg Site Access intersection with Glenelg Street is forecast to operate at LOS "B" during the weekday a.m. and p.m. peak hours. The maximum control delay is anticipated to increase by 0.8 s and the maximum volume to capacity ratio is expected to increase by 0.03 with the addition of site-generated traffic volumes when compared to the future background operations.

6.4 Qualitative Impacts on Connecting Roadways

After development of Glenelg Phase 3, Bradley Street and Grey Street are forecast to operate well within the capacities of a local roadway. The forecast total traffic volumes on Bradley Street are between 150-200 and the forecast total traffic volumes on Grey Street are between 85-100. Local roadways typically operate with 400 vehicles hour per lane or less during the a.m. and p.m. peak hours.

Residents of Glenelg Phase 3 will be able to access Main Street using non-vehicular methods of travel by at least one of the nearby existing roadways. It is assumed that the proposed roadways that are part of White Rose Phase 3 and Glenelg Phase 3 will provide sidewalk connections to existing sidewalks on Tod Crescent, Artemisia Street, and Corbett Street. As many of the existing roadways near the subject property do not have existing continuous sidewalks, such as on Bradley Street, it is recommended that the Township includes sidewalks on at least one side of the road during future reconstruction projects.

Corbett Street (formerly Street A) will be classified as a local roadway. Corbett Street is planned to provide a sidewalk connection to the recently constructed sidewalks in Glenelg Phase 1. It is assumed that Glenelg Phase 3 will provide sidewalk connections from the proposed residential units to Corbett Street. It is anticipated that the proposed development will result in 15 and 18 additional two-way trips on Corbet Street in the a.m. and p.m. peak hours, respectively. This is anticipated to have negligible impacts on the neighbourhood.

7.0 Scenario: Eco Parkway

The Eco Parkway extension is an industrial access road running east-west parallel to Main Street from Highway 10 to Ida Street. The industrial access road will be classed as an arterial roadway. The lands on both sides of Eco Parkway have been designated for industrial use. A Traffic Impact Study for the Eco Parkway (formally Industrial Access Road) was completed by Triton Engineering as part of the environmental assessment (September 2017). **Attachment F** contains the Eco Parkway TIS excerpts. It is recognized that the TIS referred to the proposed roadway as Industrial Access Road however the most recent naming is Eco Parkway.

7.1 Redistribution of Existing Volumes

Construction of the Eco Parkway extension will provide a bypass to Dundalk and is expected to reroute existing traffic. For the purposes of their study and to remain consistent with the environmental assessment, this study and Triton engineering assumed that 30% of the traffic on Grey Road 9 through Dundalk would use Eco Parkway to bypass the community. Triton also assumed that truck traffic currently going through Dundalk would use Eco Parkway to bypass Main Street or access the industrial lands.

To remain consistent with the Triton Industrial Road TIS, existing traffic volumes, which includes background traffic growth, were redistributed as follows:

- 30 % of southbound left vehicles will complete southbound through movements
- 30 % of eastbound through vehicles will complete eastbound right movements
- 30 % of westbound through vehicles will complete northbound left movements
- 30 % of westbound right vehicles will complete northbound through movements

Trips from the background developments were not re-distributed based on the Eco Parkway construction because most of the developments are located to the east of Eco Parkway and would use Main Street. It should be noted that most new developments are residential while the proposed site is industrial, therefore some synergies will most likely occur however this was not investigated. Trips may have been counted in both the industrial site generated trips and background development generated trips this was done to ensure a conservative analysis. **Figure 17** illustrates the combined adjusted vehicular volumes.

7.2 Eco Parkway Site Generated Trips

The development of the industrial area serviced by the Eco Parkway extension is anticipated to result in new trips to the boundary road network. The full build out of the Eco Parkway extension industrial lands was assumed to be completed prior to the 2032 horizon year, so the trip generation associated with full build-out has been used in this analysis.

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition (ITE code 130 - Industrial Park) was used in the Tritons TIS (September 2017). ITE Code 130 - Industrial Park provided a conservative trip generation for the unknown types of development surrounding the Eco Parkway Extension and is consistent with the Eco Parkway TIS. The trips were estimated using an area of 259.75 acres and Triton Engineering assumed that all trips generated were primary trips.

Table 15 summarizes the trip generation of the site. The trip generation identified in the Eco Parkway TIS was used in this analysis. **Appendix E** contains relevant excerpts from the Triton Engineering Industrial Eco Parkway TIS (September 2017).

Table 15: Eco Parkway Industrial Lands Trip Generation

Peak Hour	Number of Trips		
	Inbound	Outbound	Total
Weekday A.M.	1,142	234	1,376
Weekday P.M.	266	1,000	1,266

The development of the industrial lands surrounding the Eco Parkway extension is estimated to generate approximately 1,376 and 1,266 two-way trips in the a.m. and p.m. peak hours, respectively. The trips were assigned to the road network consistent with the Triton TIS. In the Industrial Eco Parkway TIS, Triton assumed 70% of trips would travel towards Highway 10 on the Eco Parkway extension and the remainder would travel into Dundalk. **Figure 18** contains the Eco Parkway Industrial Lands Site Generated Traffic.

7.3 Eco Parkway Future Background Scenario

The operations of the study intersections were analyzed based on the 2032 future background traffic volumes illustrated in **Figure 19**. **Appendix C** contains the Level of Service definitions and **Appendix D** contains the detailed capacity analysis worksheets. **Table 16** outlines the 2032 future background

traffic operations.

Table 16: Eco Parkway Scenario - 2032 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	F	55.3 s	0.74 (NB)
		P.M.	F	177.0 s	**1.28 (NB)**
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	E	44.4 s	0.75 (SB)
		P.M.	C	16.6 s	0.29 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	C	21.6 s	0.32 (NB)
		P.M.	C	22.0 s	0.20 (NB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	C	20.6 s	0.26 (SB)
		P.M.	C	21.1 s	0.25 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

The study intersections are forecast to operate with a LOS "E" or better in the weekday a.m. and p.m. peak hours under 2032 future background traffic volumes conditions, except for the intersection of Ida Street and Main Street which is expected to operate at a LOS "F" during the weekday peak hours. The construction of the Eco Parkway extension is anticipated to detour traffic volumes from Main Street to Ida Street. The detoured traffic is forecast to slightly improves the p.m. peak hour operations and slightly reduces the a.m. peak hour operations at the intersections of Main Street with Dundalk Street, Osprey Street, and Owen Sound Street compared to general future background conditions.

The stop-controlled intersection of Ida Street and Main Street is expected to have a maximum control delay of 177.0 seconds (NB) and a maximum volume-to-capacity ratio of 1.28 (NB). When compared to the future background operations, this is a 163.4 second increase in delay which is caused by the increase in traffic from the proposed Eco Parkway extension and industrial lands. Potential mitigation measures are further discussed later in the report.

These metrics indicate that the boundary road network, with the exception of the Ida Street and Main Street intersection, have reserve capacity for increases in traffic volumes.

7.4 Eco Parkway Future Total Scenario

The operations of the study intersections were analyzed based on the 2032 total traffic volumes illustrated in **Figure 20**, which is based on the combined traffic volumes in **Figure 19** with the site generated traffic illustrated in **Figure 14**. **Table 18** outlines the 2032 horizon year future total traffic Levels of Service. Levels of Service definitions have been included in **Appendix C** and detailed capacity analyses worksheets are included in **Appendix D.**

Table 17: Eco Parkway Scenario - 2032 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]
Ida Street and Grey Road 9 (Main Street)	Stop (Two-way)	A.M.	F	71.9 s	0.82 (NB)
		P.M.	F	254.7 s	**1.46 (NB)**
Dundalk Street and Main Street	Stop (T-intersection)	A.M.	E	48.1s	0.79 (SB)
		P.M.	C	17.1 s	0.32 (SB)
Osprey Street and Main Street	Stop (Two-way)	A.M.	E	38.9 s	0.56 (SB)
		P.M.	D	26.0 s	0.31 (SB)
Owen Sound Street and Main Street	Stop (T-intersection)	A.M.	E	35.8 s	0.58 (SB)
		P.M.	D	34.1 s	0.51 (SB)

Note [1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000). The Level of Service of all-way stop-controlled intersection is based on the average delay per vehicle.

Note [2]: The critical v/c ratio is the maximum v/c ratio for movements at the intersection. All v/c ratios for movements greater than 0.85 are outlined and highlighted.

The intersections are forecast to operate with a LOS "E" or better in the weekday a.m. and p.m. peak hours under 2032 future total traffic volume conditions, except for the intersection of Ida Street and Main Street. The northbound movement is forecast to operate at a LOS "F" during the weekday peak hours. Traffic signals are not warranted, and poor operations are forecast under future background conditions of the Eco Parkway Scenario as well. With multiple background developments proposed in the area, it is recommended that the road authority continue to monitor the operations at this intersection.

The southbound approach at the Dundalk Street and Main Street intersection is forecast to operate at a LOS "E" under future background conditions with and without the proposed Eco Parkway extension. A maximum volume to capacity ratio of 0.79 is forecast for the southbound movements which represents an increase of 0.04 when compared to the scenario's future background operations. Due to multiple proposed developments in the area, it is recommended that the road authority continue to monitor the operations of the intersection.

The southbound approach at the Osprey Street and Main Street intersection is forecast to operate at a LOS "E" under future total conditions with the proposed Eco Parkway extension. A maximum volume to capacity ratio of 0.56 is forecast for the southbound movements which represents an increase of 0.24 when compared to the scenario's future background operations. Due to multiple proposed developments in the area, it is recommended that the road authority continue to monitor the operations of the intersection.

The southbound approach at the Owen Sound Street and Main Street intersection is forecast to operate at a LOS "E" or better under future total conditions with and without the proposed Eco Parkway extension. It is noted that with the addition of the industrial developments adjacent to the Eco Parkway extension, the maximum volume to capacity ratio is forecast to be 0.58. This represents an increase of the v/c ratio by a maximum of 0.03 when compared to the scenario's future background operations. Due to multiple proposed developments in the area, it is recommended that the road authority continue to monitor the operations of the intersection.

7.4.1. Eco Parkway Future Total Scenario – Potential Improvement Measures

With the introduction of the Eco Parkway extension and full build-out of the industrial lands, the intersection of Ida Street and Main Street is forecast to operate at a LOS "F" under 2032 future background conditions. It is acknowledged that these metrics are associated with assumptions relating to 10 years of growth, multiple background developments, and expected trip distributions.

Consideration was given to implementing a roundabout at the Ida Street and Main Street intersection to alleviate poor operations. Township staff indicated a roundabout was preferred over signalization to mitigate poor intersection operations at this location. Using Arcady analysis software, it is forecast that a roundabout would operate at a LOS "A" with a 95th percentile queue length of 1 vehicle or less. **Attachment H** contains an overlay of a potential roundabout over the existing Ida Street and County Road 9 intersection. It is noted that additional land will be required to accommodate the roundabout and is presented as conceptual at this time.

Traffic signal warrants indicate that signalization of the intersection of Ida Street and Main Street is not warranted. However, improvements may be needed to address poor operations with the build-out of the Eco Parkway extension and industrial lands. Should the road authority proceed with signalizing the intersection, the intersection is forecast to operate at a LOS "B" with a v/c of less than 0.82 for all movements. In the signalized Eco Parkway scenario, no critical movements are noted with the addition of the Glenelg Phase 3 site generated traffic.

8.0 Conclusions

The detailed analysis contained within this report resulted in the following key findings:

- Intersection analysis of the existing traffic volumes indicates that all study intersections are operating at a Level of Service (LOS) "B" or better during the weekday a.m. and p.m. peak hours. The study intersections have capacity for increases in traffic volumes.

- Several background developments have been considered for the assessment of the background conditions. These developments include Glenelg Phase 1, Glenelg Phase 2, the unoccupied Edgewood Greens units, and White Rose Phase 3. Consideration was also given to the development of the industrial lands surrounding the proposed Eco Parkway extension in a Scenario, the findings will be summarized later in the conclusions.

- Intersection analysis of the 2032 future background traffic volumes indicates the following:

    - The southbound movement at the Dundalk Street and Main Street intersection is forecast to operate with a LOS "E" during the weekday a.m. and p.m. peak hours.
        - A maximum volume-to-capacity ratio of 0.70 (SB) and control delay 37.4 seconds are forecast.
    - The remaining study intersections are forecast to operate at a LOS "C" or better.

- The proposed development is estimated to generate 285 and 389 total two-way primary trips during the weekday a.m. and p.m. peak hours, respectively.

- Intersection analysis of the 2032 future total traffic volumes indicates the following:

    - The study intersections are forecast to continue operating with a LOS "B" or better in the weekday a.m. and p.m. peak hours under 2032 future background traffic volume conditions, except for the intersections of: Dundalk Street and Main Street, Osprey

Street and Main Street, and Owen Sound Street and Main Street. The intersection of Dundalk Street and Main Street is forecast to operate with an LOS "E" or better in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 40.0 seconds, and a maximum volume-to-capacity ratio of 0.73 (SB).
    - When compared to 2032 future background operations, an increase in control delay of 2.6 seconds and the volume-to-capacity ratio is forecast to increase by 0.03.
  - The intersection of Osprey Street and Main Street is forecast to operate with an LOS "D" in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 34.8 seconds, and a maximum volume-to-capacity ratio of 0.52 (SB).
    - When compared to 2032 future background operations, an increase in control delay of 9.6 seconds and a maximum change of 0.22 in the volume-to-capacity ratio is forecast.
  - The intersection of Owen Sound Street and Main Street is forecast to operate with an LOS "E" or better in the weekday a.m. and p.m. peak periods, respectively. A maximum control delay of 35.2 seconds and a maximum volume-to-capacity ratio of 0.55 (SB) are forecast.
    - When compared to 2032 future background operations, an increase in control delay of 14.0 seconds and a maximum change of 0.31 in the volume-to-capacity ratio is forecast.

- As requested in the Terms of Reference, a scenario analyzing the impacts of the Glenelg Phase 3 development with both the Eco Parkway extension and development of surrounding industrial lands was completed. The Scenario with the Eco Parkway extension and the proposed industrial development lands are estimated to produce 1376 and 1266 external two-way trips in the a.m. and p.m. peak hours, respectively. The Eco Parkway extension is also anticipated to reroute 30% of volumes on Main Street around downtown Dundalk.

- In the scenario with the Eco Parkway extension that excludes the Glenelg Phase 3 Land site generated traffic:

  - The study intersections are forecast to operate at a LOS "E" or better except for the northbound movement at the Ida Street and Main Street intersection.
  - The northbound movement intersection of Ida Street and Main Street is forecast to operate with a LOS "F", 177.0 seconds of delay, and a volume to capacity ratio of 1.28.

- With the addition of Glenelg Phase 3 traffic to the Eco Parkway Scenario:
  - The intersection of Ida Street and Main Street is forecast to operate with 254.7 seconds of delay and a volume to capacity ratio of 1.46.
    - Signalization is not warranted based on the future total volumes.
    - If the Road Authority decides to implement signalization, the intersection is forecast to operate at LOS "B" with a v/c ratio of less than 0.79 for all movements under future total conditions. In the signalized Eco Parkway scenario, there is no change in the critical volume-to-capacity ratio with the addition of the Glenelg Phase 3 site generated traffic.
    - Consideration was given to implementing a roundabout, it is forecast that a roundabout would operate at LOS "A" with a 95th percentile queue length of 1 vehicle or less under the Eco Parkway future total volumes.

The analysis contained within this report was prepared using the Draft Plan prepared by MHBC August 18th, 2022. Any minor revisions to the development draft is not expected to affect the conclusions contained in this report.

In conclusion, the proposed development can be supported from a transportation operations and safety perspective with the noted recommendations.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Emma Howlett, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Madeleine Ferguson, P.Eng.
Manager of Transportation

C.F. CROZIER & ASSOCIATES INC.

Stefan Hajgato, P.Eng.
Project Engineer, Transportation

MF/sh.eh

J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Reports\Traffic\6220_TIS.docx

APPENDIX A

Terms of Reference

Emma Howlett

From: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Sent: June 27, 2022 8:29 AM
To: Emma Howlett
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Emma,

That 2017 TIS you have referenced is the most recent. Essentially, they were done at the same time. Since the EA was schedule B, there is no ESR however the TIS is part of the Project File and contains all traffic work.

Thanks,
Dustin Lyttle

From: Emma Howlett <ehowlett@cfcrozier.ca>
Sent: June 23, 2022 3:50 PM
To: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Hi Dustin,

Thank you for your quick response.

We will look into a scenario for Eco park way completion, I found the 2017 Eco Parkway (Dundalk Industrial) TIS.

I understand the EA was completed after the TIS, would you have a copy of the EA or a more recent study that we should reference?

Cheers,

Emma Howlett, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

Crozier Connections:

Read our latest news and announcements here.

From: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Sent: June 23, 2022 7:58 AM
To: Emma Howlett <ehowlett@cfcrozier.ca>
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Hi Emma,

No problem, please see attached TIS for White Rose Phase 3.

If you need anything else, please let me know.

Thanks,
Dustin Lyttle

From: Emma Howlett <ehowlett@cfcrozier.ca>
Sent: June 22, 2022 2:20 PM
To: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Hi Dustin,

Thank you for your quick response we have collected traffic data.

Would you have happen to have the Traffic Impact Study for White Rose Phase 3?

If not we have the site plan for our SWM works, I can use the associated trip generation and our distribution to include this in our analysis.

Cheers,

Emma Howlett, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

Crozier Connections:

Read our latest news and announcements here.

From: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Sent: May 31, 2022 1:36 PM

To: Emma Howlett <ehowlett@cfcrozier.ca>
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Hi Emma,

See comments below for your consideration.

If you have any questions please let me know.

Thanks,
Dustin Lyttle

From: Emma Howlett <ehowlett@cfcrozier.ca>
Sent: May 30, 2022 12:26 PM
To: Dustin Lyttle <dlyttle@tritoneng.on.ca>
Subject: RE: Glenelg Phase 3 - Dundalk North Subdivision

Hello Dustin,

We would like to commission traffic counts this week if possible (so the counts are completed before school lets out for the summer).

Would you be able to confirm the study locations?

Thank you,

Emma Howlett, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

Crozier Connections:

Read our latest news and announcements here.

From: Emma Howlett
Sent: May 26, 2022 4:02 PM
To: dlyttle@tritoneng.on.ca
Cc: Kerianne Hagan <khagan@cfcrozier.ca>; Dina Al-Rubaye <dal-Rubaye@cfcrozier.ca>
Subject: FW: Glenelg Phase 3

Good Afternoon Dustin,

C.F. Crozier & Associates has been retained to prepare a Traffic Impact Study (TIS) to review the traffic impacts and potential mitigations required to support the Dundalk North Subdivision in the Village of Dundalk, Township of Southgate, County of Grey. The site is proposed to connect to Glenelg Phase 2 and the future Bradley Street extension.

The Terms of Reference are as follows:

Traffic Data/Study Intersections

Now that Covid-19 restrictions have been lifted, traffic counts will be collected at the following intersections:

- Glenelg Street and Ida Street
- Dundalk Street and Glenelg Street
- Ida Street and Main Street
- Dundalk Street and Main Street
- Main Street and Osprey Street ***[DCL] The eastbound traffic from Osprey Street is known to use Owen Sound Street. Therefore, Main St / Owen Sound St should also be counted.***
- ***[DCL] Bradley Street and Osprey Street***

Analysis Periods and Scenarios

Analysis of weekday a.m. and p.m. peak hours will be used to capture the peak hours associated with the residential development.***[DCL] OK***

IT has been assumed that the proposed development will be completed within 5 years. Accordingly, the horizon years of 2023 and 2028 will be analyzed, representing 5 and 10 years from the study date***[DCL] OK***

Background Growth

A growth rate of 1.5% per year will be applied to the boundary road network as consistent with previous studies undertaken in Dundalk. ***[DCL] OK***

Background Developments

There are several ongoing developments within the Village of Dundalk. Unoccupied units from Flato's developments of Dundalk North and East ("Edgewood Greens") as well as Glenelg Phase 1 and 2 will be considered as background developments.***[DCL] This should also consider White Rose Phase 3.***

Trip Generation

Trip generation will be established based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition.***[DCL] OK***

Trip Distribution

Trips will be distributed to the boundary road network based on a review of the Transportation Tomorrow Survey data from 2016 from the abutting Township of Melancthon, a review of existing travel patterns, and a review of previously assumed distributions. ***[DCL] We ask that two scenarios be considered; with and without the Industrial Road (Eco Parkway) extension to Hwy 10.***

[DCL] In addition to the above comments we ask the impact on the existing streets be considered:

Impact on Existing Connecting Streets

Report to fully address the impact on connecting streets including Bradley Street. This includes capacity, standards, pedestrian safety, and neighbourhood impacts.

We trust that the above is acceptable.
Should you have any questions or concerns, please feel free to contact us.

APPENDIX B

Traffic Data

Spectrum

Turning Movement Count
Location Name: DUNDALK ST & GLENELG ST
Date: Tue, Jun 07, 2022 Deployment Lead: Tasos Issaaakidis

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (2 . DUNDALK ST & GLENELG ST)

Start Time	N Approach GLENELG ST						E Approach GREY ST S						S Approach DUNDALK ST						W Approach GREY ST S						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
06:15:00	0	2	0	0	0	2	0	1	1	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	5	
06:30:00	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	2	
06:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	0	3	10
07:00:00	0	3	0	0	1	3	3	0	0	0	0	3	0	4	1	0	0	5	0	0	0	0	1	0	11	21
07:15:00	0	0	1	0	0	1	6	0	1	0	0	7	0	1	0	0	0	1	0	0	1	0	0	1	10	26
07:30:00	0	1	1	0	0	2	5	0	1	0	0	6	1	5	0	0	0	6	0	0	0	0	0	0	14	38
07:45:00	1	3	2	0	0	6	4	0	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	11	46
08:00:00	0	0	1	0	0	1	3	0	2	0	0	5	1	1	0	0	0	2	0	0	1	0	0	1	9	44
08:15:00	0	3	7	0	0	10	2	1	0	0	0	3	1	1	1	0	0	3	1	0	0	0	0	1	17	51
08:30:00	0	4	4	0	0	8	4	0	7	0	0	11	2	2	1	0	0	5	2	0	0	0	0	2	26	63
08:45:00	1	2	2	0	0	5	2	0	12	0	0	14	6	1	0	0	0	7	1	0	0	0	0	1	27	79
09:00:00	0	0	4	0	0	4	2	0	2	0	0	4	1	1	0	0	0	2	0	0	1	0	0	1	11	81
09:15:00	0	0	3	0	0	3	4	0	0	0	0	4	1	0	0	0	0	1	0	0	0	0	0	0	8	72
09:30:00	0	1	5	0	0	6	5	0	0	0	0	5	0	0	1	0	0	1	0	1	0	0	0	1	13	59
09:45:00	0	4	6	0	0	10	3	0	0	0	0	3	0	0	0	1	0	1	0	0	0	0	0	0	14	46
BREAK																										
15:00:00	0	1	3	0	0	4	3	0	6	0	0	9	4	5	0	0	0	9	0	0	0	0	0	0	22	
15:15:00	0	2	6	0	3	8	5	0	3	0	0	8	3	0	0	0	0	3	0	0	0	0	0	0	19	
15:30:00	0	2	5	0	0	7	6	1	0	0	0	7	3	1	0	0	0	4	2	0	0	0	0	2	20	
15:45:00	0	4	5	0	0	9	5	0	1	0	0	6	1	1	0	0	0	2	0	0	0	0	0	0	17	78
16:00:00	0	2	2	0	0	4	5	1	0	0	0	6	0	1	0	0	0	1	1	0	0	0	1	1	12	68
16:15:00	0	0	1	0	0	1	3	0	0	0	0	3	2	1	0	0	0	3	0	0	0	0	0	0	7	56
16:30:00	0	1	2	0	0	3	6	0	0	0	0	6	0	3	1	0	1	4	2	0	0	0	0	2	15	51
16:45:00	0	1	1	0	0	2	4	0	0	1	0	5	0	2	0	0	0	2	0	0	0	0	0	0	9	43
17:00:00	0	2	7	0	0	9	6	0	2	0	0	8	1	2	0	0	0	3	0	0	0	0	0	0	20	51
17:15:00	0	0	7	0	0	7	4	0	0	0	0	4	3	0	0	0	0	3	0	0	0	0	0	0	14	58
17:30:00	0	1	2	0	0	3	3	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0	7	50
17:45:00	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	43
18:00:00	0	0	1	0	0	1	1	1	0	0	0	2	0	1	1	0	0	2	0	0	0	0	0	0	5	28
18:15:00	0	0	1	0	0	1	1	0	0	0	2	1	0	3	1	0	2	4	0	0	0	0	0	0	6	20
18:30:00	0	1	3	0	0	4	2	0	1	0	0	3	1	0	0	0	0	1	1	0	0	0	0	1	9	22
18:45:00	0	1	2	0	0	3	1	0	2	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0	7	27
Grand Total	2	42	84	0	4	128	100	5	42	1	2	148	31	41	8	1	3	81	11	1	3	0	2	15	**372**	-
Approach%	1.6%	32.8%	65.6%	0%		-	67.6%	3.4%	28.4%	0.7%		-	38.3%	50.6%	9.9%	1.2%		-	73.3%	6.7%	20%	0%		-	-	-
Totals %	0.5%	11.3%	22.6%	0%		34.4%	26.9%	1.3%	11.3%	0.3%		39.8%	8.3%	11%	2.2%	0.3%		21.8%	3%	0.3%	0.8%	0%		4%	-	-
Heavy	2	2	5	0		-	3	0	0	0		-	0	3	3	0		-	0	0	3	0		-	-	-
Heavy %	100%	4.8%	6%	0%		-	3%	0%	0%	0%		-	0%	7.3%	37.5%	0%		-	0%	0%	100%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (16.73 °C)

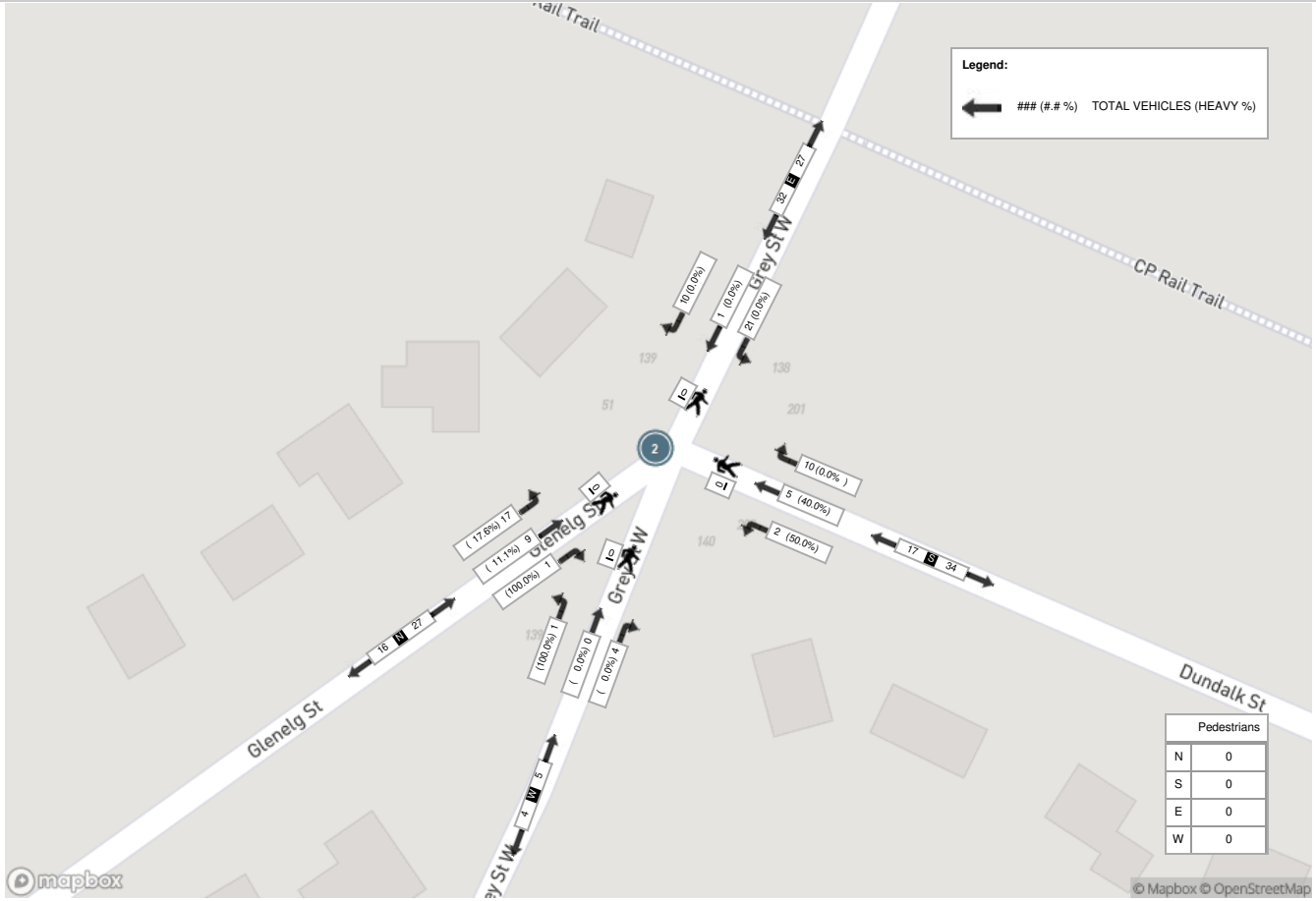
Start Time	N Approach GLENELG ST						E Approach GREY ST S						S Approach DUNDALK ST						W Approach GREY ST S						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	0	3	7	0	0	10	2	1	0	0	0	3	1	1	1	0	0	3	1	0	0	0	0	1	17
08:30:00	0	4	4	0	0	8	4	0	7	0	0	11	2	2	1	0	0	5	2	0	0	0	0	2	26
08:45:00	1	2	2	0	0	5	2	0	12	0	0	14	6	1	0	0	0	7	1	0	0	0	0	1	27
09:00:00	0	0	4	0	0	4	2	0	2	0	0	4	1	1	0	0	0	2	0	0	1	0	0	1	11
Grand Total	1	9	17	0	0	27	10	1	21	0	0	32	10	5	2	0	0	17	4	0	1	0	0	5	**81**
Approach%	3.7%	33.3%	63%	0%		-	31.3%	3.1%	65.6%	0%		-	58.8%	29.4%	11.8%	0%		-	80%	0%	20%	0%		-	**-**
Totals %	1.2%	11.1%	21%	0%		33.3%	12.3%	1.2%	25.9%	0%		39.5%	12.3%	6.2%	2.5%	0%		21%	4.9%	0%	1.2%	0%		6.2%	**-**
PHF	0.25	0.56	0.61	0		0.68	0.63	0.25	0.44	0		0.57	0.42	0.63	0.5	0		0.61	0.5	0	0.25	0		0.63	**-**
Heavy	1	1	3	0		5	0	0	0	0		0	0	2	1	0		3	0	0	1	0		1	**-**
Heavy %	100%	11.1%	17.6%	0%		18.5%	0%	0%	0%	0%		0%	0%	40%	50%	0%		17.6%	0%	0%	100%	0%		20%	**-**
Lights	0	8	14	0		22	10	1	21	0		32	10	3	1	0		14	4	0	0	0		4	**-**
Lights %	0%	88.9%	82.4%	0%		81.5%	100%	100%	100%	0%		100%	100%	60%	50%	0%		82.4%	100%	0%	0%	0%		80%	**-**
Single-Unit Trucks	1	1	0	0		2	0	0	0	0		0	0	2	1	0		3	0	0	1	0		1	**-**
Single-Unit Trucks %	100%	11.1%	0%	0%		7.4%	0%	0%	0%	0%		0%	0%	40%	50%	0%		17.6%	0%	0%	100%	0%		20%	**-**
Buses	0	0	3	0		3	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	17.6%	0%		11.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

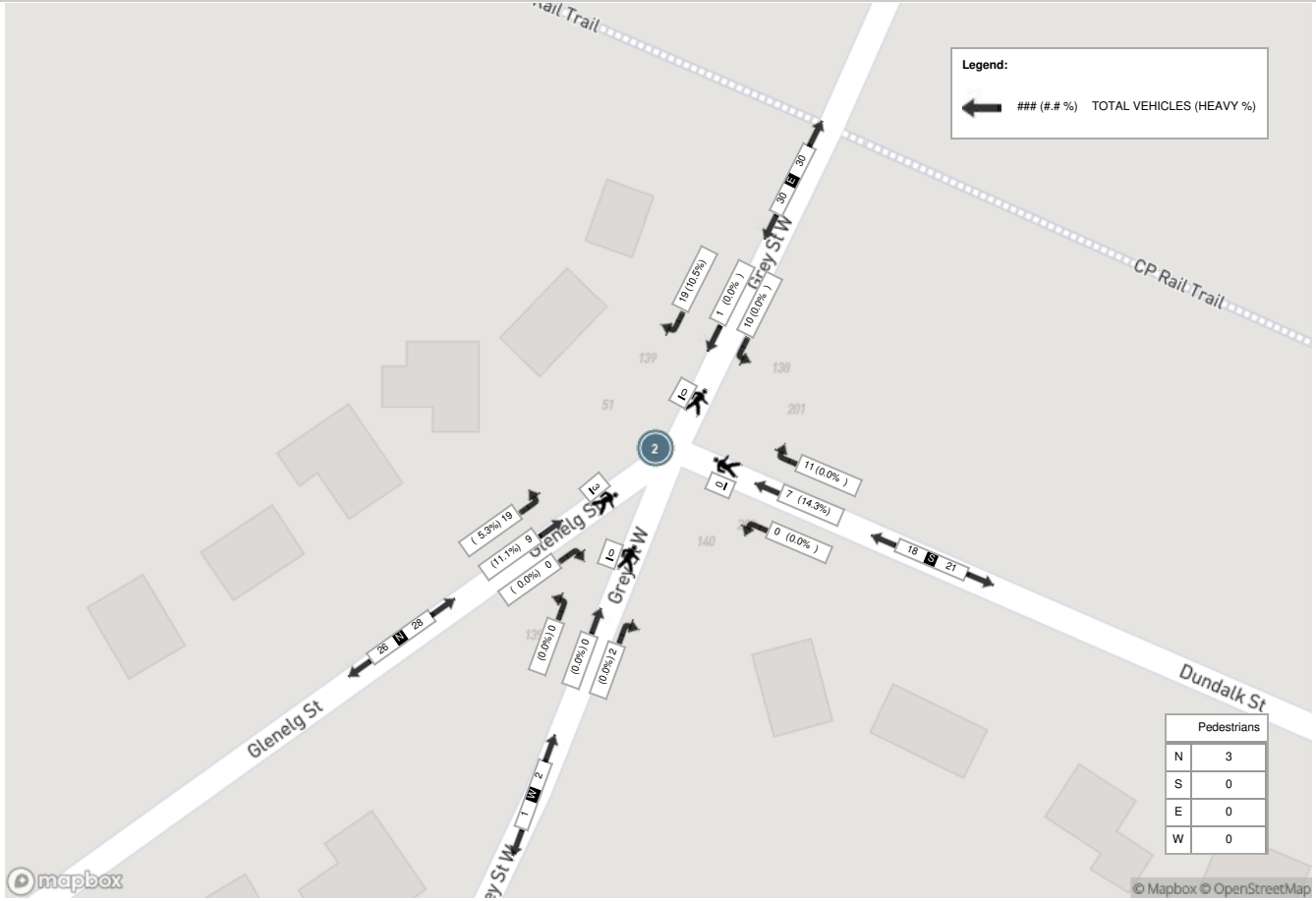
Peak Hour: 03:00 PM - 04:00 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach GLENELG ST						E Approach GREY ST S						S Approach DUNDALK ST						W Approach GREY ST S						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:00:00	0	1	3	0	0	4	3	0	6	0	0	9	4	5	0	0	0	9	0	0	0	0	0	0	22
15:15:00	0	2	6	0	3	8	5	0	3	0	0	8	3	0	0	0	0	3	0	0	0	0	0	0	19
15:30:00	0	2	5	0	0	7	6	1	0	0	0	7	3	1	0	0	0	4	2	0	0	0	0	2	20
15:45:00	0	4	5	0	0	9	5	0	1	0	0	6	1	1	0	0	0	2	0	0	0	0	0	0	17
Grand Total	0	9	19	0	3	28	19	1	10	0	0	30	11	7	0	0	0	18	2	0	0	0	0	2	**78**
Approach%	0%	32.1%	67.9%	0%		-	63.3%	3.3%	33.3%	0%		-	61.1%	38.9%	0%	0%		-	100%	0%	0%	0%		-	**-**
Totals %	0%	11.5%	24.4%	0%		35.9%	24.4%	1.3%	12.8%	0%		38.5%	14.1%	9%	0%	0%		23.1%	2.6%	0%	0%	0%		2.6%	**-**
PHF	0	0.56	0.79	0		0.78	0.79	0.25	0.42	0		0.83	0.69	0.35	0	0		0.5	0.25	0	0	0		0.25	**-**
Heavy	0	1	1	0		2	2	0	0	0		2	0	1	0	0		1	0	0	0	0		0	**-**
Heavy %	0%	11.1%	5.3%	0%		7.1%	10.5%	0%	0%	0%		6.7%	0%	14.3%	0%	0%		5.6%	0%	0%	0%	0%		0%	**-**
Lights	0	8	18	0		26	17	1	10	0		28	11	6	0	0		17	2	0	0	0		2	**-**
Lights %	0%	88.9%	94.7%	0%		92.9%	89.5%	100%	100%	0%		93.3%	100%	85.7%	0%	0%		94.4%	100%	0%	0%	0%		100%	**-**
Single-Unit Trucks	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	11.1%	0%	0%		3.6%	0%	0%	0%	0%		0%	0%	14.3%	0%	0%		5.6%	0%	0%	0%	0%		0%	**-**
Buses	0	0	0	0		0	2	0	0	0		2	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	10.5%	0%	0%	0%		6.7%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	1	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	5.3%	0%		3.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:15 AM - 09:15 AM **Weather: Overcast Clouds (16.73 °C)**



Peak Hour: 03:00 PM - 04:00 PM Weather: Overcast Clouds (12.76 °C)



Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (4 . DUNDALK ST & MAIN ST)

Start Time	N Approach DUNDALK ST					E Approach MAIN ST (GREY RD 9)					W Approach MAIN ST (GREY RD 9)					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	0	0	0	0	0	18	0	0	18	25	0	0	0	25	43	
06:15:00	1	1	0	0	2	4	26	0	0	30	16	0	0	0	16	48	
06:30:00	0	1	0	0	1	1	25	0	0	26	28	0	0	0	28	55	
06:45:00	1	2	0	0	3	5	18	0	0	23	29	0	0	0	29	55	201
07:00:00	3	3	0	1	6	2	21	0	0	23	24	1	0	0	25	54	212
07:15:00	1	0	0	0	1	1	30	0	0	31	40	1	0	0	41	73	237
07:30:00	3	2	0	0	5	6	24	0	0	30	34	2	0	0	36	71	253
07:45:00	2	3	0	1	5	0	29	0	0	29	36	3	0	0	39	73	271
08:00:00	4	1	0	0	5	3	24	0	2	27	34	3	0	0	37	69	286
08:15:00	4	3	0	4	7	8	33	0	0	41	38	5	0	1	43	91	304
08:30:00	6	5	0	5	11	4	54	0	0	58	52	4	0	0	56	125	358
08:45:00	17	1	0	1	18	6	44	0	1	50	89	9	0	0	98	166	451
09:00:00	6	2	0	0	8	2	35	0	0	37	49	2	0	0	51	96	478
09:15:00	1	2	0	1	3	1	21	0	0	22	33	2	0	0	35	60	447
09:30:00	3	2	0	1	5	6	25	0	1	31	38	0	0	0	38	74	396
09:45:00	2	4	0	0	6	4	30	0	1	34	38	5	0	0	43	83	313
BREAK																	
15:00:00	9	5	0	0	14	2	45	0	0	47	47	8	0	0	55	116	
15:15:00	3	2	0	24	5	2	39	1	0	42	67	8	0	0	75	122	
15:30:00	0	8	0	6	8	3	30	0	0	33	40	2	0	0	42	83	
15:45:00	5	6	0	1	11	1	49	0	0	50	40	4	0	0	44	105	426
16:00:00	11	3	0	1	14	1	41	0	2	42	57	2	0	0	59	115	425
16:15:00	4	1	0	4	5	2	57	0	0	59	51	3	0	2	54	118	421
16:30:00	6	6	0	0	12	4	49	0	0	53	44	3	0	0	47	112	450
16:45:00	4	4	0	1	8	5	40	0	0	45	46	1	0	0	47	100	445
17:00:00	7	5	0	2	12	3	44	0	0	47	44	0	0	0	44	103	433
17:15:00	9	1	0	1	10	5	40	0	0	45	53	1	0	1	54	109	424
17:30:00	3	2	0	3	5	1	37	0	0	38	46	2	0	0	48	91	403
17:45:00	0	5	0	0	5	0	42	0	0	42	36	3	0	0	39	86	389
18:00:00	4	0	0	1	4	3	25	0	0	28	30	0	0	0	30	62	348
18:15:00	0	2	0	3	2	4	13	0	0	17	33	0	0	0	33	52	291
18:30:00	1	4	0	1	5	5	27	0	0	32	28	5	0	0	33	70	270
18:45:00	1	5	0	1	6	5	22	0	0	27	32	5	0	1	37	70	254

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Grand Total	121	91	0	63	212	99	1057	1	7	1157	1297	84	0	5	1381	**2750**	-
Approach%	57.1%	42.9%	0%		-	8.6%	91.4%	0.1%		-	93.9%	6.1%	0%		-	**-**	-
Totals %	4.4%	3.3%	0%		7.7%	3.6%	38.4%	0%		42.1%	47.2%	3.1%	0%		50.2%	**-**	-
Heavy	5	5	0		-	3	114	0		-	125	5	0		-	**-**	-
Heavy %	4.1%	5.5%	0%		-	3%	10.8%	0%		-	9.6%	6%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (16.73 °C)

Start Time	N Approach DUNDALK ST					E Approach MAIN ST (GREY RD 9)					W Approach MAIN ST (GREY RD 9)					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	4	3	0	4	7	8	33	0	0	41	38	5	0	1	43	91
08:30:00	6	5	0	5	11	4	54	0	0	58	52	4	0	0	56	125
08:45:00	17	1	0	1	18	6	44	0	1	50	89	9	0	0	98	166
09:00:00	6	2	0	0	8	2	35	0	0	37	49	2	0	0	51	96
Grand Total	33	11	0	10	44	20	166	0	1	186	228	20	0	1	248	**478**
Approach%	75%	25%	0%		-	10.8%	89.2%	0%		-	91.9%	8.1%	0%		-	**-**
Totals %	6.9%	2.3%	0%		9.2%	4.2%	34.7%	0%		38.9%	47.7%	4.2%	0%		51.9%	**-**
PHF	0.49	0.55	0		0.61	0.63	0.77	0		0.8	0.64	0.56	0		0.63	**-**
Heavy	1	2	0		3	3	24	0		27	26	2	0		28	**-**
Heavy %	3%	18.2%	0%		6.8%	15%	14.5%	0%		14.5%	11.4%	10%	0%		11.3%	**-**
Lights	32	9	0		41	17	142	0		159	202	18	0		220	**-**
Lights %	97%	81.8%	0%		93.2%	85%	85.5%	0%		85.5%	88.6%	90%	0%		88.7%	**-**
Single-Unit Trucks	0	1	0		1	3	8	0		11	19	2	0		21	**-**
Single-Unit Trucks %	0%	9.1%	0%		2.3%	15%	4.8%	0%		5.9%	8.3%	10%	0%		8.5%	**-**
Buses	1	0	0		1	0	7	0		7	4	0	0		4	**-**
Buses %	3%	0%	0%		2.3%	0%	4.2%	0%		3.8%	1.8%	0%	0%		1.6%	**-**
Articulated Trucks	0	1	0		1	0	9	0		9	3	0	0		3	**-**
Articulated Trucks %	0%	9.1%	0%		2.3%	0%	5.4%	0%		4.8%	1.3%	0%	0%		1.2%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	8	-	-	-	-	1	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	66.7%		-	-	-	8.3%		-	-	-	8.3%		**-**
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	16.7%		-	-	-	0%		-	-	-	0%		**-**

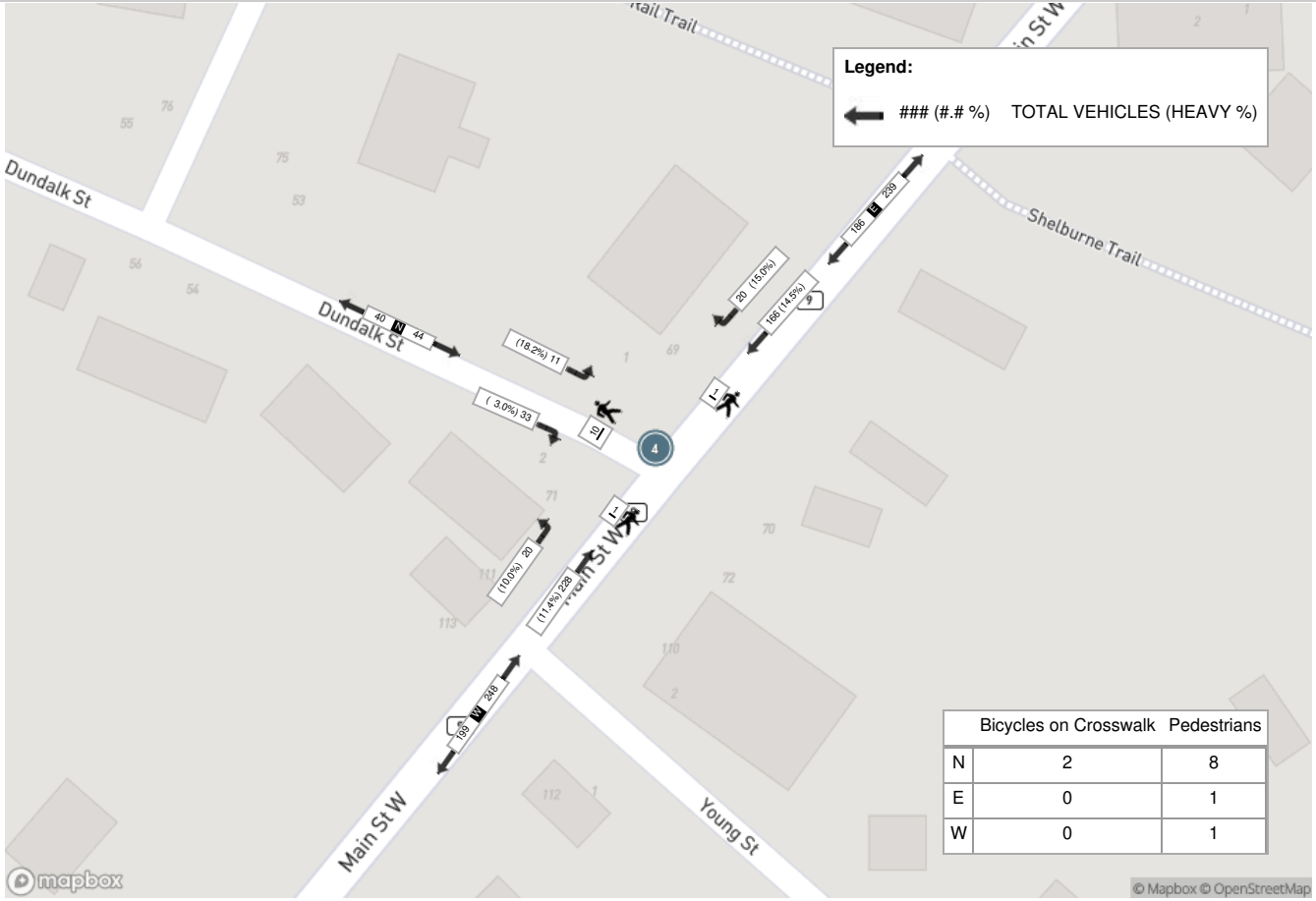
Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach DUNDALK ST					E Approach MAIN ST (GREY RD 9)					W Approach MAIN ST (GREY RD 9)					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
15:45:00	5	6	0	1	11	1	49	0	0	50	40	4	0	0	44	105
16:00:00	11	3	0	1	14	1	41	0	2	42	57	2	0	0	59	115
16:15:00	4	1	0	4	5	2	57	0	0	59	51	3	0	2	54	118
16:30:00	6	6	0	0	12	4	49	0	0	53	44	3	0	0	47	112
Grand Total	26	16	0	6	42	8	196	0	2	204	192	12	0	2	204	**450**
Approach%	61.9%	38.1%	0%		-	3.9%	96.1%	0%		-	94.1%	5.9%	0%		-	**-**
Totals %	5.8%	3.6%	0%		9.3%	1.8%	43.6%	0%		45.3%	42.7%	2.7%	0%		45.3%	**-**
PHF	0.59	0.67	0		0.75	0.5	0.86	0		0.86	0.84	0.75	0		0.86	**-**
Heavy	0	1	0		1	0	17	0		17	11	0	0		11	**-**
Heavy %	0%	6.3%	0%		2.4%	0%	8.7%	0%		8.3%	5.7%	0%	0%		5.4%	**-**
Lights	26	15	0		41	8	179	0		187	181	12	0		193	**-**
Lights %	100%	93.8%	0%		97.6%	100%	91.3%	0%		91.7%	94.3%	100%	0%		94.6%	**-**
Single-Unit Trucks	0	0	0		0	0	9	0		9	4	0	0		4	**-**
Single-Unit Trucks %	0%	0%	0%		0%	0%	4.6%	0%		4.4%	2.1%	0%	0%		2%	**-**
Buses	0	0	0		0	0	1	0		1	3	0	0		3	**-**
Buses %	0%	0%	0%		0%	0%	0.5%	0%		0.5%	1.6%	0%	0%		1.5%	**-**
Articulated Trucks	0	1	0		1	0	7	0		7	4	0	0		4	**-**
Articulated Trucks %	0%	6.3%	0%		2.4%	0%	3.6%	0%		3.4%	2.1%	0%	0%		2%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	2	-	-	-	-	2	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	20%		-	-	-	20%		-	-	-	20%		**-**
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	40%		-	-	-	0%		-	-	-	0%		**-**

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

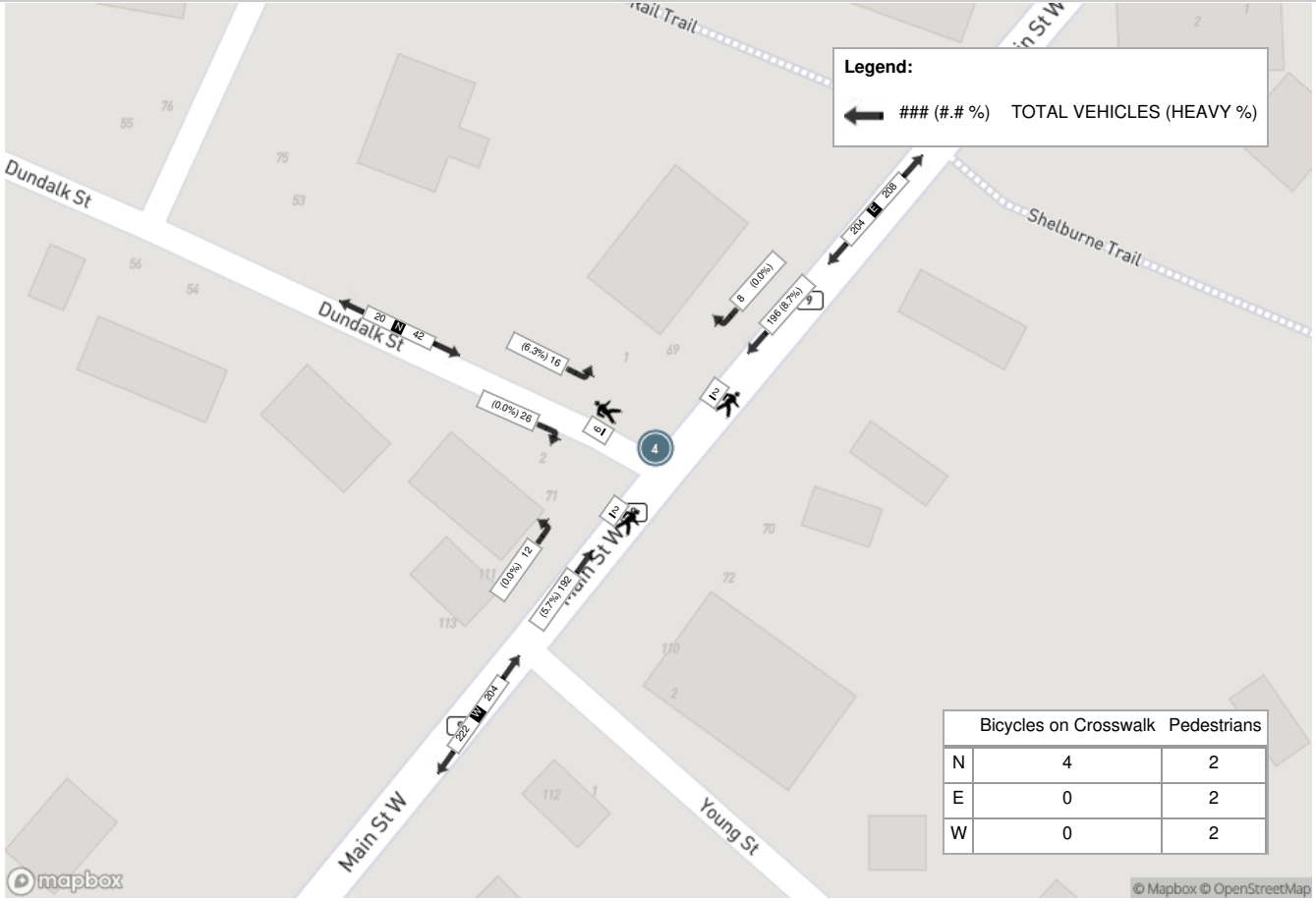
Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (16.73 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	8
E	0	1
W	0	1

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (12.76 °C)



Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (1 . GLENELG ST & IDA ST)

Start Time	N Approach IDA ST					E Approach GLENELG ST					S Approach IDA ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
06:00:00	2	0	0	0	2	0	0	0	0	0	0	1	0	0	1	3	
06:15:00	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
06:30:00	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2	
06:45:00	2	1	0	0	3	0	0	0	0	0	1	3	0	0	4	7	14
07:00:00	5	1	0	0	6	1	0	0	0	1	2	4	0	0	6	13	24
07:15:00	3	1	0	0	4	0	2	0	0	2	0	3	0	0	3	9	31
07:30:00	2	0	0	0	2	0	2	0	0	2	0	2	0	0	2	6	35
07:45:00	5	1	0	0	6	2	2	0	0	4	2	2	0	0	4	14	42
08:00:00	3	0	0	0	3	1	0	0	0	1	1	1	0	0	2	6	35
08:15:00	5	5	0	0	10	0	2	0	0	2	2	1	0	0	3	15	41
08:30:00	3	1	0	0	4	3	1	0	0	4	4	5	0	0	9	17	52
08:45:00	4	2	0	0	6	2	1	0	0	3	1	2	0	0	3	12	50
09:00:00	0	0	0	0	0	2	0	0	0	2	2	1	0	0	3	5	49
09:15:00	2	2	0	0	4	0	1	0	0	1	1	2	0	0	3	8	42
09:30:00	3	2	0	0	5	1	0	0	0	1	0	1	0	0	1	7	32
09:45:00	5	2	0	0	7	0	1	0	0	1	2	2	0	0	4	12	32
BREAK																	
15:00:00	4	1	0	0	5	4	1	0	0	5	1	6	0	0	7	17	
15:15:00	3	2	0	0	5	2	4	0	0	6	6	1	0	0	7	18	
15:30:00	1	2	0	0	3	5	4	0	0	9	1	8	0	0	9	21	
15:45:00	3	2	0	0	5	3	5	0	0	8	0	2	0	0	2	15	71
16:00:00	1	0	0	0	1	2	2	0	0	4	1	3	0	0	4	9	63
16:15:00	4	0	0	1	4	3	3	0	0	6	0	5	0	0	5	15	60
16:30:00	3	0	0	0	3	4	4	0	0	8	3	6	0	0	9	20	59
16:45:00	3	0	0	0	3	2	1	0	0	3	0	2	0	0	2	8	52
17:00:00	3	4	0	0	7	3	5	0	0	8	2	6	0	0	8	23	66
17:15:00	6	4	0	0	10	2	1	0	0	3	4	4	0	0	8	21	72
17:30:00	4	1	0	0	5	4	2	0	0	6	1	10	0	0	11	22	74
17:45:00	2	0	0	0	2	0	1	0	0	1	0	2	0	0	2	5	71
18:00:00	3	0	0	0	3	2	0	0	0	2	1	5	0	0	6	11	59
18:15:00	2	2	0	0	4	2	2	0	0	4	0	2	0	0	2	10	48
18:30:00	2	1	0	0	3	2	0	0	0	2	3	1	0	0	4	9	35
18:45:00	1	0	0	0	1	2	0	0	0	2	3	5	0	0	8	11	41

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Grand Total	91	38	0	1	129	54	47	0	0	101	44	99	0	0	143	**373**	-
Approach%	70.5%	29.5%	0%		-	53.5%	46.5%	0%		-	30.8%	69.2%	0%		-	**-**	-
Totals %	24.4%	10.2%	0%		34.6%	14.5%	12.6%	0%		27.1%	11.8%	26.5%	0%		38.3%	**-**	-
Heavy	7	2	0		-	4	3	0		-	5	12	0		-	**-**	-
Heavy %	7.7%	5.3%	0%		-	7.4%	6.4%	0%		-	11.4%	12.1%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (16.73 °C)

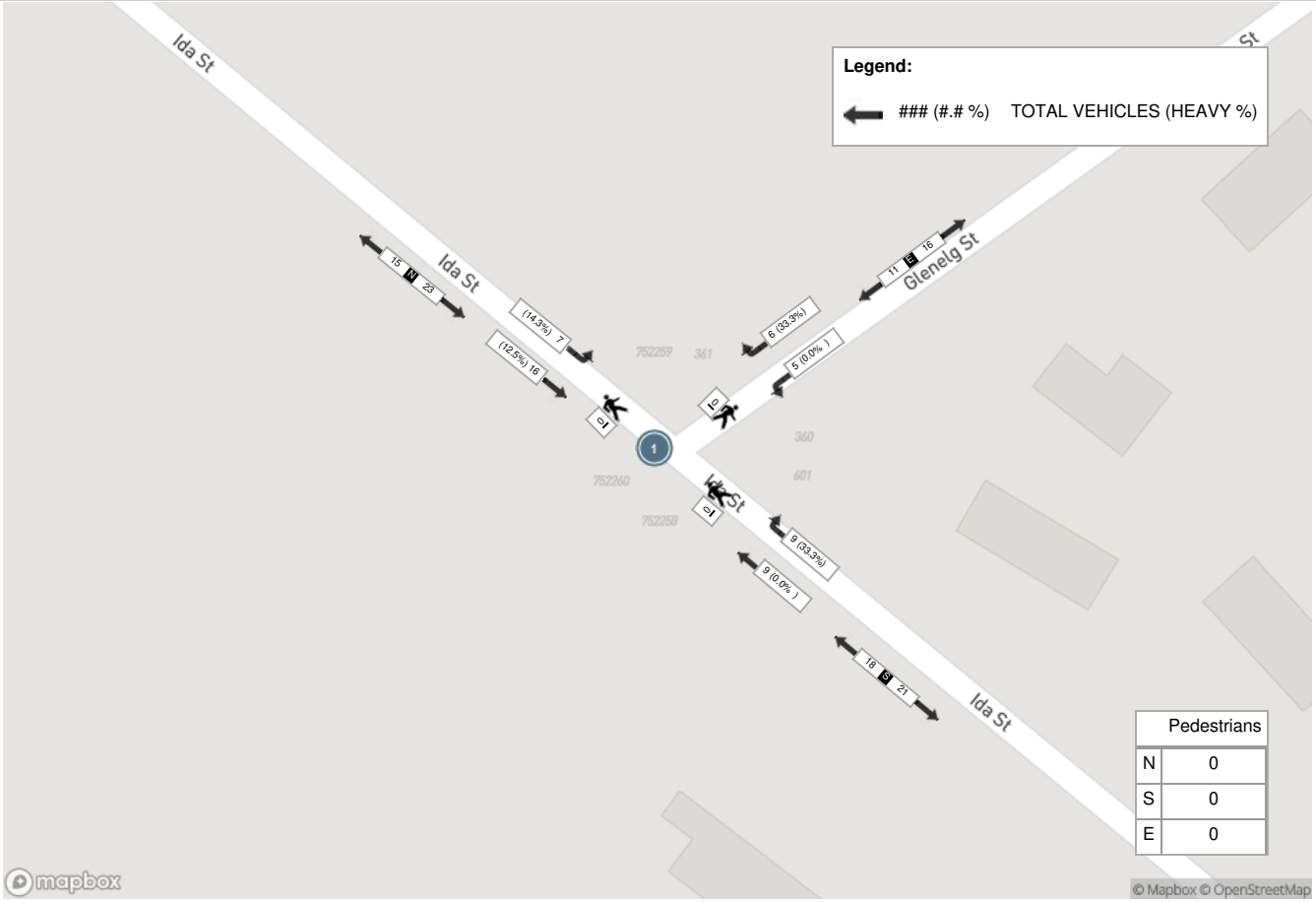
Start Time	N Approach IDA ST					E Approach GLENELG ST					S Approach IDA ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:45:00	5	1	0	0	6	2	2	0	0	4	2	2	0	0	4	14
08:00:00	3	0	0	0	3	1	0	0	0	1	1	1	0	0	2	6
08:15:00	5	5	0	0	10	0	2	0	0	2	2	1	0	0	3	15
08:30:00	3	1	0	0	4	3	1	0	0	4	4	5	0	0	9	17
Grand Total	16	7	0	0	23	6	5	0	0	11	9	9	0	0	18	**52**
Approach%	69.6%	30.4%	0%		-	54.5%	45.5%	0%		-	50%	50%	0%		-	**-**
Totals %	30.8%	13.5%	0%		44.2%	11.5%	9.6%	0%		21.2%	17.3%	17.3%	0%		34.6%	**-**
PHF	0.8	0.35	0		0.58	0.5	0.63	0		0.69	0.56	0.45	0		0.5	**-**
Heavy	2	1	0		3	2	0	0		2	3	0	0		3	**-**
Heavy %	12.5%	14.3%	0%		13%	33.3%	0%	0%		18.2%	33.3%	0%	0%		16.7%	**-**
Lights	14	6	0		20	4	5	0		9	6	9	0		15	**-**
Lights %	87.5%	85.7%	0%		87%	66.7%	100%	0%		81.8%	66.7%	100%	0%		83.3%	**-**
Single-Unit Trucks	1	0	0		1	2	0	0		2	1	0	0		1	**-**
Single-Unit Trucks %	6.3%	0%	0%		4.3%	33.3%	0%	0%		18.2%	11.1%	0%	0%		5.6%	**-**
Buses	1	1	0		2	0	0	0		0	2	0	0		2	**-**
Buses %	6.3%	14.3%	0%		8.7%	0%	0%	0%		0%	22.2%	0%	0%		11.1%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach IDA ST					E Approach GLENELG ST					S Approach IDA ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:45:00	3	0	0	0	3	2	1	0	0	3	0	2	0	0	2	8
17:00:00	3	4	0	0	7	3	5	0	0	8	2	6	0	0	8	23
17:15:00	6	4	0	0	10	2	1	0	0	3	4	4	0	0	8	21
17:30:00	4	1	0	0	5	4	2	0	0	6	1	10	0	0	11	22
Grand Total	16	9	0	0	25	11	9	0	0	20	7	22	0	0	29	**74**
Approach%	64%	36%	0%		-	55%	45%	0%		-	24.1%	75.9%	0%		-	**-**
Totals %	21.6%	12.2%	0%		33.8%	14.9%	12.2%	0%		27%	9.5%	29.7%	0%		39.2%	**-**
PHF	0.67	0.56	0		0.63	0.69	0.45	0		0.63	0.44	0.55	0		0.66	**-**
Heavy	1	0	0		1	0	0	0		0	0	0	0		0	**-**
Heavy %	6.3%	0%	0%		4%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Lights	15	9	0		24	11	9	0		20	7	22	0		29	**-**
Lights %	93.8%	100%	0%		96%	100%	100%	0%		100%	100%	100%	0%		100%	**-**
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	0	0		0	**-**
Single-Unit Trucks %	6.3%	0%	0%		4%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Buses	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

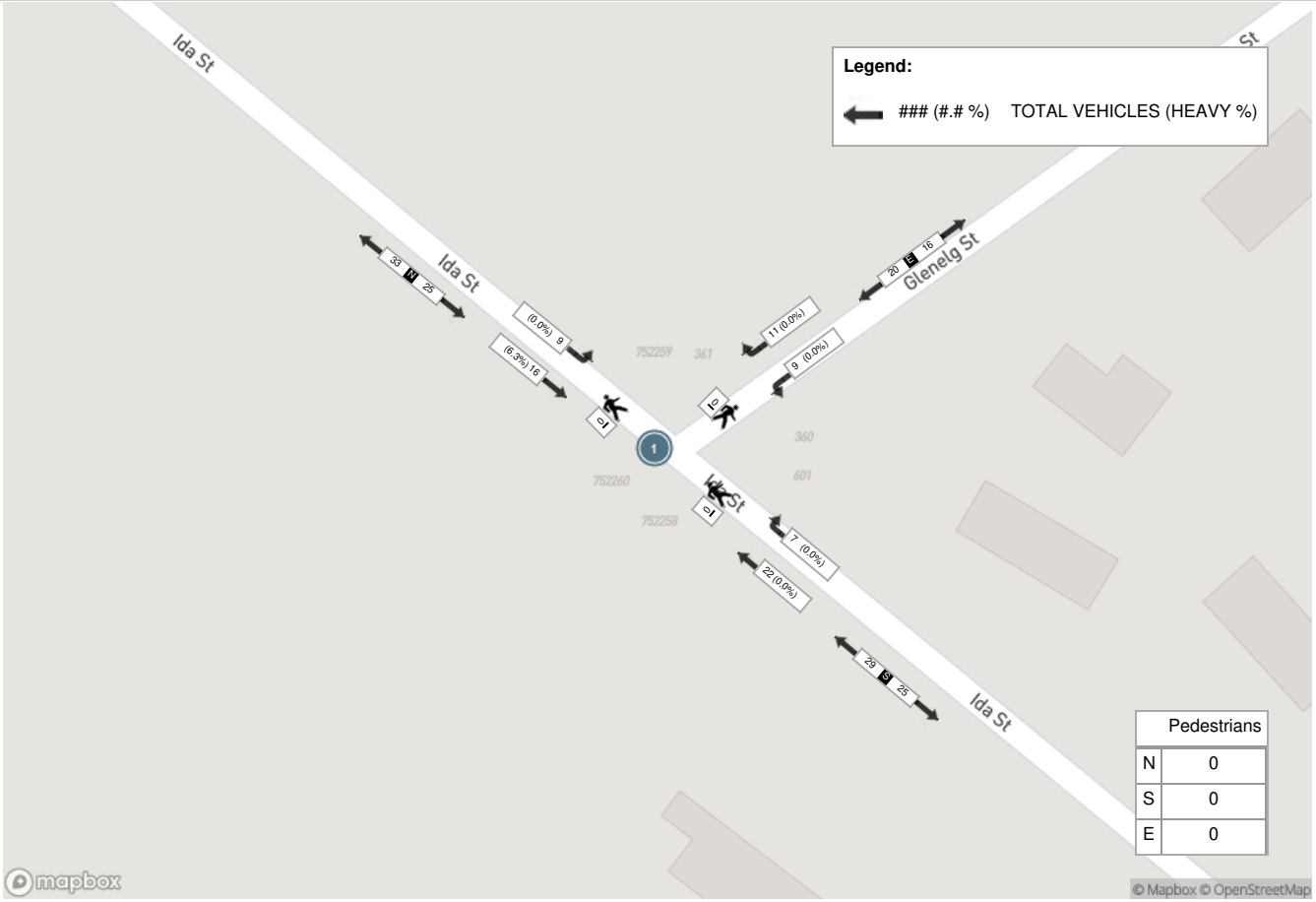
Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (16.73 °C)



Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (12.76 °C)



Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (3 . IDA ST & MAIN ST)

Start Time	N Approach IDA ST						E Approach MAIN ST (GREY RD 9						S Approach IDA ST						W Approach MAIN ST (GREY RD 9						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	2	1	0	0	3	0	13	1	0	0	14	1	0	2	0	0	3	8	16	1	0	0	25	45	
06:15:00	0	2	0	0	0	2	0	20	5	0	0	25	0	0	3	0	0	3	5	9	0	0	0	14	44	
06:30:00	0	0	1	0	0	1	0	22	3	0	0	25	2	0	3	0	0	5	2	16	1	0	0	19	50	
06:45:00	1	1	1	0	0	3	4	12	5	0	6	21	6	3	5	0	0	14	3	15	0	0	0	18	56	195
07:00:00	0	1	3	0	0	4	1	12	4	0	0	17	8	3	5	0	0	16	4	8	2	0	0	14	51	201
07:15:00	1	5	2	0	0	8	3	16	6	0	0	25	4	0	1	0	0	5	8	25	0	0	0	33	71	228
07:30:00	0	6	2	0	0	8	1	22	5	0	0	28	3	1	3	0	0	7	3	20	2	0	0	25	68	246
07:45:00	4	2	5	0	0	11	1	16	3	0	0	20	3	2	3	0	0	8	7	26	2	0	0	35	74	264
08:00:00	0	1	2	0	0	3	0	15	7	0	1	22	7	1	4	0	0	12	2	30	1	0	0	33	70	283
08:15:00	2	5	2	0	0	9	0	12	8	0	0	20	4	0	1	0	0	5	4	31	2	0	0	37	71	283
08:30:00	0	2	4	0	0	6	7	21	13	0	0	41	7	1	3	0	0	11	6	29	1	0	1	36	94	309
08:45:00	1	3	4	0	0	8	3	16	8	0	1	27	6	0	3	0	0	9	5	24	1	0	0	30	74	309
09:00:00	0	0	1	0	0	1	2	18	6	0	0	26	9	2	3	0	0	14	4	23	0	0	0	27	68	307
09:15:00	1	1	1	0	0	3	1	19	4	0	0	24	6	1	0	0	0	7	4	21	0	0	0	25	59	295
09:30:00	1	2	1	0	0	4	2	18	5	0	0	25	7	0	6	0	0	13	2	29	1	0	0	32	74	275
09:45:00	0	2	4	0	0	6	2	17	10	0	0	29	7	2	1	0	0	10	5	27	0	0	0	32	77	278
BREAK																										
15:00:00	1	3	1	0	0	5	3	25	6	0	0	34	10	3	5	0	0	18	0	31	2	0	0	33	90	
15:15:00	3	2	3	0	0	8	4	28	16	0	0	48	7	5	4	0	0	16	5	20	0	0	0	25	97	
15:30:00	3	4	1	0	0	8	3	19	5	0	0	27	8	5	7	0	0	20	7	21	2	0	0	30	85	
15:45:00	5	3	1	0	0	9	1	31	8	0	0	40	11	1	8	0	0	20	3	24	0	0	0	27	96	368
16:00:00	1	1	1	0	2	3	3	31	7	0	0	41	6	3	5	0	0	14	5	32	1	0	0	38	96	374
16:15:00	0	3	4	0	0	7	2	37	10	0	1	49	8	3	5	0	0	16	2	24	2	0	0	28	100	377
16:30:00	2	1	3	0	1	6	3	34	7	0	2	44	13	7	4	0	1	24	4	23	4	0	0	31	105	397
16:45:00	1	2	3	0	1	6	3	22	9	0	1	34	8	2	2	0	0	12	3	24	0	0	0	27	79	380
17:00:00	2	3	3	0	1	8	4	28	9	0	0	41	10	3	8	0	0	21	6	26	1	0	0	33	103	387
17:15:00	3	4	1	0	0	8	3	35	3	0	0	41	11	4	7	0	0	22	0	33	3	0	0	36	107	394
17:30:00	1	2	3	0	0	6	4	25	0	0	0	29	7	8	1	0	0	16	4	29	1	0	0	34	85	374
17:45:00	2	0	3	0	0	5	2	20	5	0	0	27	5	1	4	0	0	10	3	25	0	0	0	28	70	365
18:00:00	0	1	3	0	0	4	1	25	0	0	0	26	4	4	5	0	0	13	3	15	2	0	0	20	63	325
18:15:00	0	1	2	0	0	3	0	13	2	0	0	15	2	3	7	0	0	12	2	30	1	0	0	33	63	281
18:30:00	2	0	0	0	0	2	1	16	4	0	0	21	8	4	1	0	0	13	1	19	1	0	0	21	57	253
18:45:00	0	0	3	0	0	3	3	13	2	0	0	18	1	4	2	0	0	7	0	24	1	0	0	25	53	236
Grand Total	37	65	69	0	5	171	67	671	186	0	12	924	199	76	121	0	1	396	120	749	35	0	1	904	**2395**	-
Approach%	21.6%	38%	40.4%	0%		-	7.3%	72.6%	20.1%	0%		-	50.3%	19.2%	30.6%	0%		-	13.3%	82.9%	3.9%	0%		-	-	-
Totals %	1.5%	2.7%	2.9%	0%		7.1%	2.8%	28%	7.8%	0%		38.6%	8.3%	3.2%	5.1%	0%		16.5%	5%	31.3%	1.5%	0%		37.7%	-	-
Heavy	5	3	2	0		-	4	67	61	0		-	39	4	20	0		-	19	75	9	0		-	-	-
Heavy %	13.5%	4.6%	2.9%	0%		-	6%	10%	32.8%	0%		-	19.6%	5.3%	16.5%	0%		-	15.8%	10%	25.7%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (16.73 °C)

Start Time	N Approach IDA ST						E Approach MAIN ST (GREY RD 9						S Approach IDA ST						W Approach MAIN ST (GREY RD 9						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	0	1	2	0	0	3	0	15	7	0	1	22	7	1	4	0	0	12	2	30	1	0	0	33	70
08:15:00	2	5	2	0	0	9	0	12	8	0	0	20	4	0	1	0	0	5	4	31	2	0	0	37	71
08:30:00	0	2	4	0	0	6	7	21	13	0	0	41	7	1	3	0	0	11	6	29	1	0	1	36	94
08:45:00	1	3	4	0	0	8	3	16	8	0	1	27	6	0	3	0	0	9	5	24	1	0	0	30	74
Grand Total	3	11	12	0	0	26	10	64	36	0	2	110	24	2	11	0	0	37	17	114	5	0	1	136	**309**
Approach%	11.5%	42.3%	46.2%	0%		-	9.1%	58.2%	32.7%	0%		-	64.9%	5.4%	29.7%	0%		-	12.5%	83.8%	3.7%	0%		-	**-**
Totals %	1%	3.6%	3.9%	0%		8.4%	3.2%	20.7%	11.7%	0%		35.6%	7.8%	0.6%	3.6%	0%		12%	5.5%	36.9%	1.6%	0%		44%	**-**
PHF	0.38	0.55	0.75	0		0.72	0.36	0.76	0.69	0		0.67	0.86	0.5	0.69	0		0.77	0.71	0.92	0.63	0		0.92	**-**
Heavy	0	1	1	0		2	1	9	19	0		29	6	0	1	0		7	6	20	1	0		27	**-**
Heavy %	0%	9.1%	8.3%	0%		7.7%	10%	14.1%	52.8%	0%		26.4%	25%	0%	9.1%	0%		18.9%	35.3%	17.5%	20%	0%		19.9%	**-**
Lights	3	10	11	0		24	9	55	17	0		81	18	2	10	0		30	11	94	4	0		109	**-**
Lights %	100%	90.9%	91.7%	0%		92.3%	90%	85.9%	47.2%	0%		73.6%	75%	100%	90.9%	0%		81.1%	64.7%	82.5%	80%	0%		80.1%	**-**
Single-Unit Trucks	0	0	1	0		1	0	3	5	0		8	4	0	0	0		4	0	15	0	0		15	**-**
Single-Unit Trucks %	0%	0%	8.3%	0%		3.8%	0%	4.7%	13.9%	0%		7.3%	16.7%	0%	0%	0%		10.8%	0%	13.2%	0%	0%		11%	**-**
Buses	0	1	0	0		1	1	1	11	0		13	1	0	0	0		1	2	2	1	0		5	**-**
Buses %	0%	9.1%	0%	0%		3.8%	10%	1.6%	30.6%	0%		11.8%	4.2%	0%	0%	0%		2.7%	11.8%	1.8%	20%	0%		3.7%	**-**
Articulated Trucks	0	0	0	0		0	0	5	3	0		8	1	0	1	0		2	4	3	0	0		7	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	7.8%	8.3%	0%		7.3%	4.2%	0%	9.1%	0%		5.4%	23.5%	2.6%	0%	0%		5.1%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	66.7%		-	-	-	-	0%		-	-	-	-	33.3%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

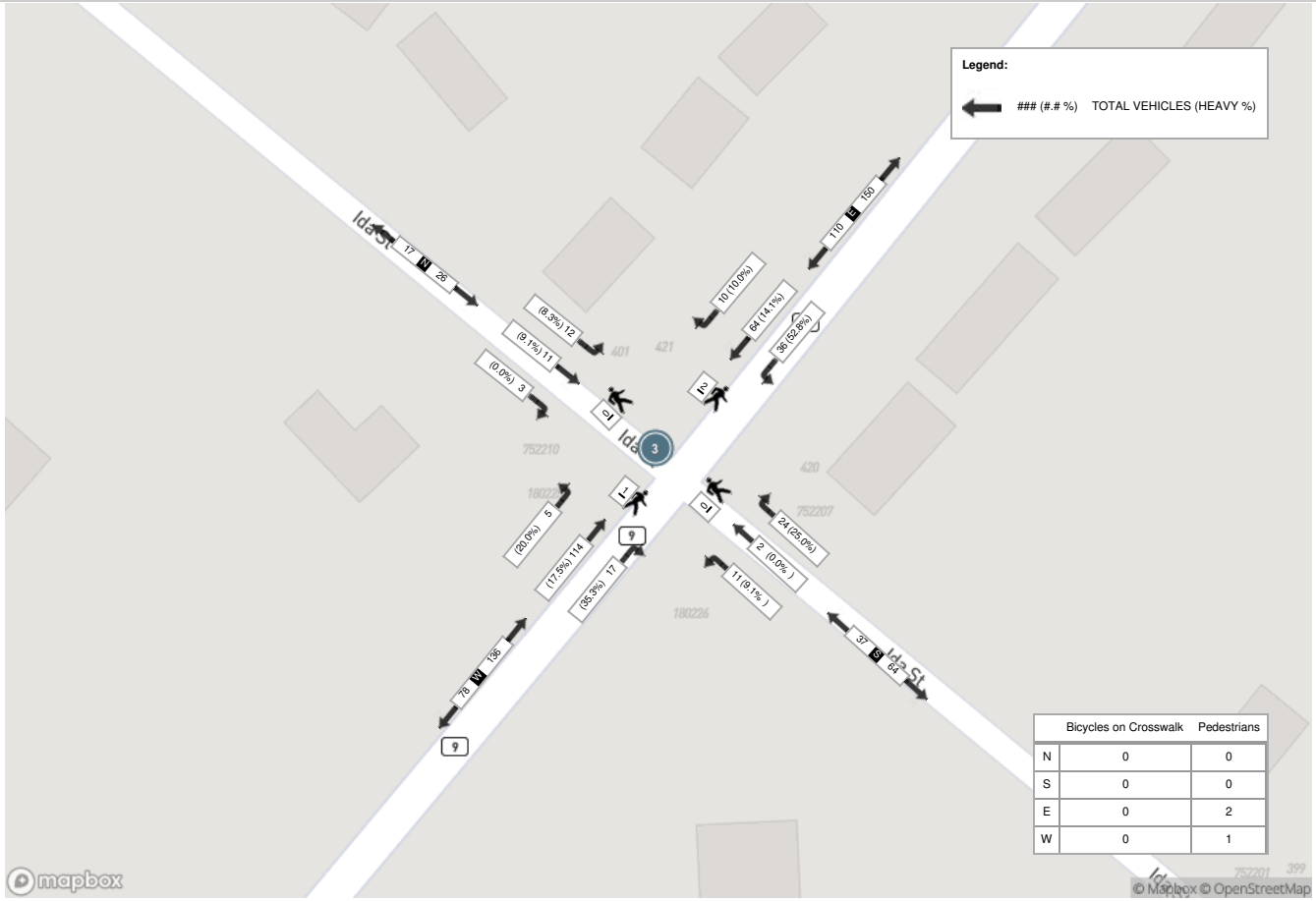
Turning Movement Count
Location Name: IDA ST & MAIN ST
Date: Tue, Jun 07, 2022 Deployment Lead: Tasos Issaaakidis

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (12.76 °C)

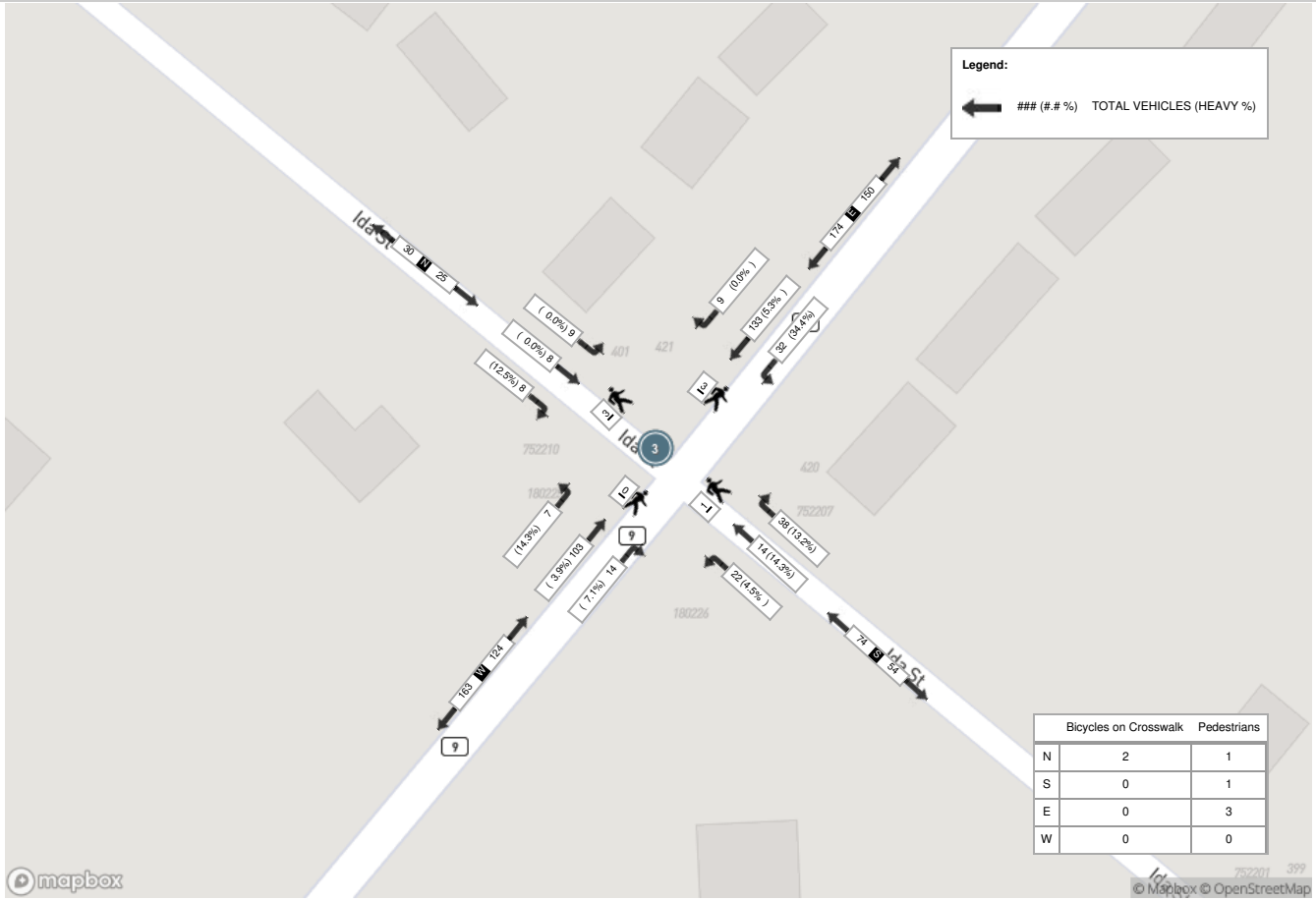
Start Time	N Approach IDA ST						E Approach MAIN ST (GREY RD 9						S Approach IDA ST						W Approach MAIN ST (GREY RD 9						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:45:00	5	3	1	0	0	9	1	31	8	0	0	40	11	1	8	0	0	20	3	24	0	0	0	27	96
16:00:00	1	1	1	0	2	3	3	31	7	0	0	41	6	3	5	0	0	14	5	32	1	0	0	38	96
16:15:00	0	3	4	0	0	7	2	37	10	0	1	49	8	3	5	0	0	16	2	24	2	0	0	28	100
16:30:00	2	1	3	0	1	6	3	34	7	0	2	44	13	7	4	0	1	24	4	23	4	0	0	31	105
Grand Total	8	8	9	0	3	25	9	133	32	0	3	174	38	14	22	0	1	74	14	103	7	0	0	124	**397**
Approach%	32%	32%	36%	0%		-	5.2%	76.4%	18.4%	0%		-	51.4%	18.9%	29.7%	0%		-	11.3%	83.1%	5.6%	0%		-	**-**
Totals %	2%	2%	2.3%	0%		6.3%	2.3%	33.5%	8.1%	0%		43.8%	9.6%	3.5%	5.5%	0%		18.6%	3.5%	25.9%	1.8%	0%		31.2%	**-**
PHF	0.4	0.67	0.56	0		0.69	0.75	0.9	0.8	0		0.89	0.73	0.5	0.69	0		0.77	0.7	0.8	0.44	0		0.82	**-**
Heavy	1	0	0	0		1	0	7	11	0		18	5	2	1	0		8	1	4	1	0		6	**-**
Heavy %	12.5%	0%	0%	0%		4%	0%	5.3%	34.4%	0%		10.3%	13.2%	14.3%	4.5%	0%		10.8%	7.1%	3.9%	14.3%	0%		4.8%	**-**
Lights	7	8	9	0		24	9	126	21	0		156	33	12	21	0		66	13	99	6	0		118	**-**
Lights %	87.5%	100%	100%	0%		96%	100%	94.7%	65.6%	0%		89.7%	86.8%	85.7%	95.5%	0%		89.2%	92.9%	96.1%	85.7%	0%		95.2%	**-**
Single-Unit Trucks	0	0	0	0		0	0	3	6	0		9	2	1	0	0		3	0	1	1	0		2	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	2.3%	18.8%	0%		5.2%	5.3%	7.1%	0%	0%		4.1%	0%	1%	14.3%	0%		1.6%	**-**
Buses	1	0	0	0		1	0	2	0	0		2	0	1	0	0		1	0	3	0	0		3	**-**
Buses %	12.5%	0%	0%	0%		4%	0%	1.5%	0%	0%		1.1%	0%	7.1%	0%	0%		1.4%	0%	2.9%	0%	0%		2.4%	**-**
Articulated Trucks	0	0	0	0		0	0	2	5	0		7	3	0	1	0		4	1	0	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1.5%	15.6%	0%		4%	7.9%	0%	4.5%	0%		5.4%	7.1%	0%	0%	0%		0.8%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	14.3%		-	-	-	-	42.9%		-	-	-	-	14.3%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	28.6%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Overcast Clouds (16.73 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	2
W	0	1

Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (12.76 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	1
S	0	1
E	0	3
W	0	0

Spectrum

Turning Movement Count
Location Name: MAIN ST & OSPREY ST
Date: Tue, Jun 07, 2022 Deployment Lead: Tasos Issaaakidis

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (5 . MAIN ST & OSPREY ST)

Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	0	6	0	0	6	0	17	0	0	0	17	2	0	0	0	0	2	0	30	0	0	0	30	55	
06:15:00	0	0	1	0	0	1	0	23	1	0	0	24	1	0	2	0	0	3	0	24	0	0	0	24	52	
06:30:00	0	0	7	0	0	7	0	22	3	0	0	25	0	0	1	0	0	1	0	32	0	0	0	32	65	
06:45:00	0	0	3	0	1	3	0	23	1	0	0	24	0	0	0	0	0	0	1	37	0	0	3	38	65	237
07:00:00	0	1	7	0	0	8	0	26	2	0	0	28	3	1	1	0	0	5	0	40	0	0	1	40	81	263
07:15:00	1	0	9	0	0	10	0	31	2	0	1	33	1	0	2	0	3	3	0	38	0	0	0	38	84	295
07:30:00	0	0	1	0	0	1	0	30	1	0	0	31	0	1	1	0	0	2	1	41	1	0	0	43	77	307
07:45:00	1	0	4	0	1	5	0	33	1	0	0	34	1	0	1	0	0	2	0	34	2	0	0	36	77	319
08:00:00	0	0	7	0	0	7	1	34	0	0	0	35	2	0	0	0	0	2	0	35	1	0	0	36	80	318
08:15:00	1	1	3	0	0	5	2	41	2	0	0	45	1	0	2	0	4	3	0	33	1	0	2	34	87	321
08:30:00	6	2	4	0	2	12	0	51	2	0	0	53	1	0	3	0	0	4	3	50	1	0	1	54	123	367
08:45:00	2	0	2	0	3	4	0	44	1	0	0	45	6	1	5	0	0	12	6	80	7	0	0	93	154	444
09:00:00	1	1	4	0	2	6	0	44	2	0	0	46	3	0	2	0	0	5	3	48	1	0	0	52	109	473
09:15:00	0	0	5	0	0	5	1	28	1	0	0	30	3	0	1	0	0	4	1	35	1	0	0	37	76	462
09:30:00	0	1	1	0	1	2	1	36	1	0	0	38	1	1	0	0	0	2	1	44	1	1	0	47	89	428
09:45:00	2	1	5	0	0	8	1	34	3	0	0	38	0	0	0	0	0	0	0	35	3	0	0	38	84	358
BREAK																										
15:00:00	2	1	0	0	1	3	0	53	3	0	1	56	5	2	1	0	1	8	0	50	4	0	0	54	121	
15:15:00	2	0	5	0	6	7	1	46	3	0	2	50	2	2	1	0	0	5	7	59	5	0	4	71	133	
15:30:00	3	1	3	0	9	7	0	39	0	0	1	39	5	2	0	0	3	7	1	56	4	0	0	61	114	
15:45:00	1	0	3	0	2	4	1	59	2	0	3	62	3	0	0	0	6	3	1	42	1	0	0	44	113	481
16:00:00	1	2	2	0	1	5	0	45	3	0	3	48	7	1	3	0	0	11	2	46	4	1	0	53	117	477
16:15:00	1	1	2	0	8	4	0	64	2	0	2	66	2	1	4	0	0	7	1	46	2	0	0	49	126	470
16:30:00	1	0	3	0	5	4	0	56	1	0	0	57	1	0	0	0	0	1	2	44	2	0	1	48	110	466
16:45:00	0	0	3	0	3	3	0	48	2	0	0	50	1	1	1	0	0	3	2	44	4	0	0	50	106	459
17:00:00	0	0	2	0	7	2	0	53	4	0	0	57	2	0	0	0	2	2	2	55	0	0	2	57	118	460
17:15:00	1	2	3	0	2	6	1	52	2	0	0	55	4	0	1	0	1	5	0	46	1	0	0	47	113	447
17:30:00	0	0	1	0	1	1	0	42	1	0	0	43	6	1	0	0	0	7	0	48	3	0	0	51	102	439
17:45:00	2	0	0	0	5	2	1	48	4	0	0	53	3	0	1	0	0	4	3	33	5	0	0	41	100	433
18:00:00	0	0	1	0	1	1	0	31	4	0	0	35	3	2	0	0	0	5	1	32	0	0	0	33	74	389
18:15:00	2	0	6	0	0	8	1	25	0	0	0	26	2	1	1	0	0	4	2	35	2	0	0	39	77	353
18:30:00	0	2	4	0	1	6	0	42	2	0	3	44	2	1	0	0	0	3	1	25	0	0	0	26	79	330
18:45:00	1	1	4	0	0	6	0	29	5	0	0	34	2	1	0	0	1	3	1	40	2	0	0	43	86	316
Grand Total	31	17	111	0	62	159	11	1249	61	0	16	1321	75	19	34	0	21	128	42	1337	58	2	14	1439	**3047**	-
Approach%	19.5%	10.7%	69.8%	0%		-	0.8%	94.5%	4.6%	0%		-	58.6%	14.8%	26.6%	0%		-	2.9%	92.9%	4%	0.1%		-	**-**	-
Totals %	1%	0.6%	3.6%	0%		5.2%	0.4%	41%	2%	0%		43.4%	2.5%	0.6%	1.1%	0%		4.2%	1.4%	43.9%	1.9%	0.1%		47.2%	**-**	-
Heavy	0	0	2	0		-	0	124	2	0		-	4	1	2	0		-	0	131	1	0		-	**-**	-
Heavy %	0%	0%	1.8%	0%		-	0%	9.9%	3.3%	0%		-	5.3%	5.3%	5.9%	0%		-	0%	9.8%	1.7%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (16.73 °C)

Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	1	1	3	0	0	5	2	41	2	0	0	45	1	0	2	0	4	3	0	33	1	0	2	34	87
08:30:00	6	2	4	0	2	12	0	51	2	0	0	53	1	0	3	0	0	4	3	50	1	0	1	54	123
08:45:00	2	0	2	0	3	4	0	44	1	0	0	45	6	1	5	0	0	12	6	80	7	0	0	93	154
09:00:00	1	1	4	0	2	6	0	44	2	0	0	46	3	0	2	0	0	5	3	48	1	0	0	52	109
Grand Total	10	4	13	0	7	27	2	180	7	0	0	189	11	1	12	0	4	24	12	211	10	0	3	233	**473**
Approach%	37%	14.8%	48.1%	0%		-	1.1%	95.2%	3.7%	0%		-	45.8%	4.2%	50%	0%		-	5.2%	90.6%	4.3%	0%		-	**-**
Totals %	2.1%	0.8%	2.7%	0%		5.7%	0.4%	38.1%	1.5%	0%		40%	2.3%	0.2%	2.5%	0%		5.1%	2.5%	44.6%	2.1%	0%		49.3%	**-**
PHF	0.42	0.5	0.81	0		0.56	0.25	0.88	0.88	0		0.89	0.46	0.25	0.6	0		0.5	0.5	0.66	0.36	0		0.63	**-**
Heavy	0	0	1	0		1	0	26	0	0		26	2	0	1	0		3	0	29	0	0		29	**-**
Heavy %	0%	0%	7.7%	0%		3.7%	0%	14.4%	0%	0%		13.8%	18.2%	0%	8.3%	0%		12.5%	0%	13.7%	0%	0%		12.4%	**-**
Lights	10	4	12	0		26	2	154	7	0		163	9	1	11	0		21	12	182	10	0		204	**-**
Lights %	100%	100%	92.3%	0%		96.3%	100%	85.6%	100%	0%		86.2%	81.8%	100%	91.7%	0%		87.5%	100%	86.3%	100%	0%		87.6%	**-**
Single-Unit Trucks	0	0	0	0		0	0	11	0	0		11	0	0	0	0		0	0	21	0	0		21	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	6.1%	0%	0%		5.8%	0%	0%	0%	0%		0%	0%	10%	0%	0%		9%	**-**
Buses	0	0	1	0		1	0	6	0	0		6	2	0	1	0		3	0	4	0	0		4	**-**
Buses %	0%	0%	7.7%	0%		3.7%	0%	3.3%	0%	0%		3.2%	18.2%	0%	8.3%	0%		12.5%	0%	1.9%	0%	0%		1.7%	**-**
Articulated Trucks	0	0	0	0		0	0	9	0	0		9	0	0	0	0		0	0	4	0	0		4	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	5%	0%	0%		4.8%	0%	0%	0%	0%		0%	0%	1.9%	0%	0%		1.7%	**-**
Pedestrians	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	42.9%		-	-	-	-	0%		-	-	-	-	28.6%		-	-	-	-	21.4%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	7.1%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 03:00 PM - 04:00 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:00:00	2	1	0	0	1	3	0	53	3	0	1	56	5	2	1	0	1	8	0	50	4	0	0	54	121
15:15:00	2	0	5	0	6	7	1	46	3	0	2	50	2	2	1	0	0	5	7	59	5	0	4	71	133
15:30:00	3	1	3	0	9	7	0	39	0	0	1	39	5	2	0	0	3	7	1	56	4	0	0	61	114
15:45:00	1	0	3	0	2	4	1	59	2	0	3	62	3	0	0	0	6	3	1	42	1	0	0	44	113
Grand Total	8	2	11	0	18	21	2	197	8	0	7	207	15	6	2	0	10	23	9	207	14	0	4	230	**481**
Approach%	38.1%	9.5%	52.4%	0%		-	1%	95.2%	3.9%	0%		-	65.2%	26.1%	8.7%	0%		-	3.9%	90%	6.1%	0%		-	**-**
Totals %	1.7%	0.4%	2.3%	0%		4.4%	0.4%	41%	1.7%	0%		43%	3.1%	1.2%	0.4%	0%		4.8%	1.9%	43%	2.9%	0%		47.8%	**-**
PHF	0.67	0.5	0.55	0		0.75	0.5	0.83	0.67	0		0.83	0.75	0.75	0.5	0		0.72	0.32	0.88	0.7	0		0.81	**-**
Heavy	0	0	0	0		0	0	24	1	0		25	1	0	1	0		2	0	24	1	0		25	**-**
Heavy %	0%	0%	0%	0%		0%	0%	12.2%	12.5%	0%		12.1%	6.7%	0%	50%	0%		8.7%	0%	11.6%	7.1%	0%		10.9%	**-**
Lights	8	2	11	0		21	2	173	7	0		182	14	6	1	0		21	9	183	13	0		205	**-**
Lights %	100%	100%	100%	0%		100%	100%	87.8%	87.5%	0%		87.9%	93.3%	100%	50%	0%		91.3%	100%	88.4%	92.9%	0%		89.1%	**-**
Single-Unit Trucks	0	0	0	0		0	0	11	0	0		11	1	0	0	0		1	0	12	0	0		12	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	5.6%	0%	0%		5.3%	6.7%	0%	0%	0%		4.3%	0%	5.8%	0%	0%		5.2%	**-**
Buses	0	0	0	0		0	0	5	1	0		6	0	0	1	0		1	0	3	1	0		4	**-**
Buses %	0%	0%	0%	0%		0%	0%	2.5%	12.5%	0%		2.9%	0%	0%	50%	0%		4.3%	0%	1.4%	7.1%	0%		1.7%	**-**
Articulated Trucks	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	0	9	0	0		9	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	4.1%	0%	0%		3.9%	0%	0%	0%	0%		0%	0%	4.3%	0%	0%		3.9%	**-**
Pedestrians	-	-	-	-	17	-	-	-	-	-	7	-	-	-	-	-	10	-	-	-	-	-	4	-	**-**
Pedestrians%	-	-	-	-	43.6%		-	-	-	-	17.9%		-	-	-	-	25.6%		-	-	-	-	10.3%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	2.6%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:15 AM - 09:15 AM **Weather: Overcast Clouds (16.73 °C)**

	Bicycles on Crosswalk	Pedestrians
N	1	6
S	0	4
E	0	0
W	0	3

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:00 PM - 04:00 PM **Weather: Overcast Clouds (12.76 °C)**

	Bicycles on Crosswalk	Pedestrians
N	1	17
S	0	10
E	0	7
W	0	4

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (7 . MAIN ST & OWEN SOUND ST)

Start Time	N Approach OWEN SOUND ST					E Approach MAIN ST					W Approach MAIN ST					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	5	0	0	5	3	17	0	0	20	39	0	0	0	39	64	
06:15:00	0	5	0	0	5	1	19	0	0	20	25	0	0	0	25	50	
06:30:00	0	1	0	0	1	3	29	0	0	32	41	0	0	0	41	74	
06:45:00	0	9	0	0	9	1	22	0	0	23	42	1	0	0	43	75	263
07:00:00	0	2	0	0	2	5	28	0	0	33	47	0	0	0	47	82	281
07:15:00	0	4	0	2	4	5	35	0	0	40	48	0	0	0	48	92	323
07:30:00	0	8	0	0	8	5	30	0	0	35	41	0	0	0	41	84	333
07:45:00	0	4	0	1	4	7	34	0	0	41	40	0	0	0	40	85	343
08:00:00	1	3	0	0	4	8	37	2	0	47	45	0	0	0	45	96	357
08:15:00	0	5	0	0	5	3	44	0	0	47	40	0	0	0	40	92	357
08:30:00	0	5	0	2	5	11	54	0	0	65	57	0	0	0	57	127	400
08:45:00	0	11	0	1	11	15	45	0	0	60	78	1	0	0	79	150	465
09:00:00	0	5	0	1	5	10	46	0	0	56	53	1	0	0	54	115	484
09:15:00	0	14	0	0	14	8	30	0	0	38	45	1	0	0	46	98	490
09:30:00	0	3	0	0	3	9	37	0	0	46	43	1	0	0	44	93	456
09:45:00	0	8	0	0	8	7	39	0	0	46	49	0	0	0	49	103	409
BREAK																	
15:00:00	1	3	0	3	4	8	54	0	0	62	61	0	0	3	61	127	
15:15:00	0	16	0	5	16	24	54	0	0	78	64	0	0	0	64	158	
15:30:00	1	11	0	9	12	16	42	0	0	58	58	2	0	0	60	130	
15:45:00	1	7	0	8	8	14	55	0	0	69	52	0	0	0	52	129	544
16:00:00	1	8	0	0	9	22	50	0	0	72	55	1	0	0	56	137	554
16:15:00	1	9	0	4	10	16	64	0	0	80	45	3	0	0	48	138	534
16:30:00	0	9	0	1	9	13	55	0	0	68	45	0	0	0	45	122	526
16:45:00	0	10	0	5	10	10	54	0	0	64	52	0	0	0	52	126	523
17:00:00	0	9	0	9	9	24	56	0	0	80	56	3	0	0	59	148	534
17:15:00	0	10	0	2	10	20	56	0	0	76	50	3	0	0	53	139	535
17:30:00	0	14	0	1	14	12	39	0	0	51	51	1	0	0	52	117	530
17:45:00	2	6	0	2	8	17	51	0	0	68	33	3	0	0	36	112	516
18:00:00	4	11	0	1	15	19	29	0	0	48	32	3	0	0	35	98	466
18:15:00	2	7	0	0	9	23	26	0	0	49	40	3	0	0	43	101	428
18:30:00	0	7	0	4	7	19	42	0	0	61	31	0	0	0	31	99	410
18:45:00	0	11	0	2	11	20	33	0	0	53	40	7	0	2	47	111	409

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Grand Total	14	240	0	63	254	378	1306	2	0	1686	1498	34	0	5	1532	**3472**	-
Approach%	5.5%	94.5%	0%		-	22.4%	77.5%	0.1%		-	97.8%	2.2%	0%		-	**-**	-
Totals %	0.4%	6.9%	0%		7.3%	10.9%	37.6%	0.1%		48.6%	43.1%	1%	0%		44.1%	**-**	-
Heavy	0	2	0		-	10	125	0		-	135	0	0		-	**-**	-
Heavy %	0%	0.8%	0%		-	2.6%	9.6%	0%		-	9%	0%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:30 AM - 09:30 AM Weather: Overcast Clouds (16.73 °C)

Start Time	N Approach OWEN SOUND ST					E Approach MAIN ST					W Approach MAIN ST					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	0	5	0	2	5	11	54	0	0	65	57	0	0	0	57	127
08:45:00	0	11	0	1	11	15	45	0	0	60	78	1	0	0	79	150
09:00:00	0	5	0	1	5	10	46	0	0	56	53	1	0	0	54	115
09:15:00	0	14	0	0	14	8	30	0	0	38	45	1	0	0	46	98
Grand Total	0	35	0	4	35	44	175	0	0	219	233	3	0	0	236	**490**
Approach%	0%	100%	0%		-	20.1%	79.9%	0%		-	98.7%	1.3%	0%		-	**-**
Totals %	0%	7.1%	0%		7.1%	9%	35.7%	0%		44.7%	47.6%	0.6%	0%		48.2%	**-**
PHF	0	0.63	0		0.63	0.73	0.81	0		0.84	0.75	0.75	0		0.75	**-**
Heavy	0	0	0		0	3	26	0		29	30	0	0		30	**-**
Heavy %	0%	0%	0%		0%	6.8%	14.9%	0%		13.2%	12.9%	0%	0%		12.7%	**-**
Lights	0	35	0		35	41	149	0		190	203	3	0		206	**-**
Lights %	0%	100%	0%		100%	93.2%	85.1%	0%		86.8%	87.1%	100%	0%		87.3%	**-**
Single-Unit Trucks	0	0	0		0	1	10	0		11	16	0	0		16	**-**
Single-Unit Trucks %	0%	0%	0%		0%	2.3%	5.7%	0%		5%	6.9%	0%	0%		6.8%	**-**
Buses	0	0	0		0	2	4	0		6	8	0	0		8	**-**
Buses %	0%	0%	0%		0%	4.5%	2.3%	0%		2.7%	3.4%	0%	0%		3.4%	**-**
Articulated Trucks	0	0	0		0	0	12	0		12	6	0	0		6	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	6.9%	0%		5.5%	2.6%	0%	0%		2.5%	**-**
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	75%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	25%		-	-	-	0%		-	-	-	0%		**-**

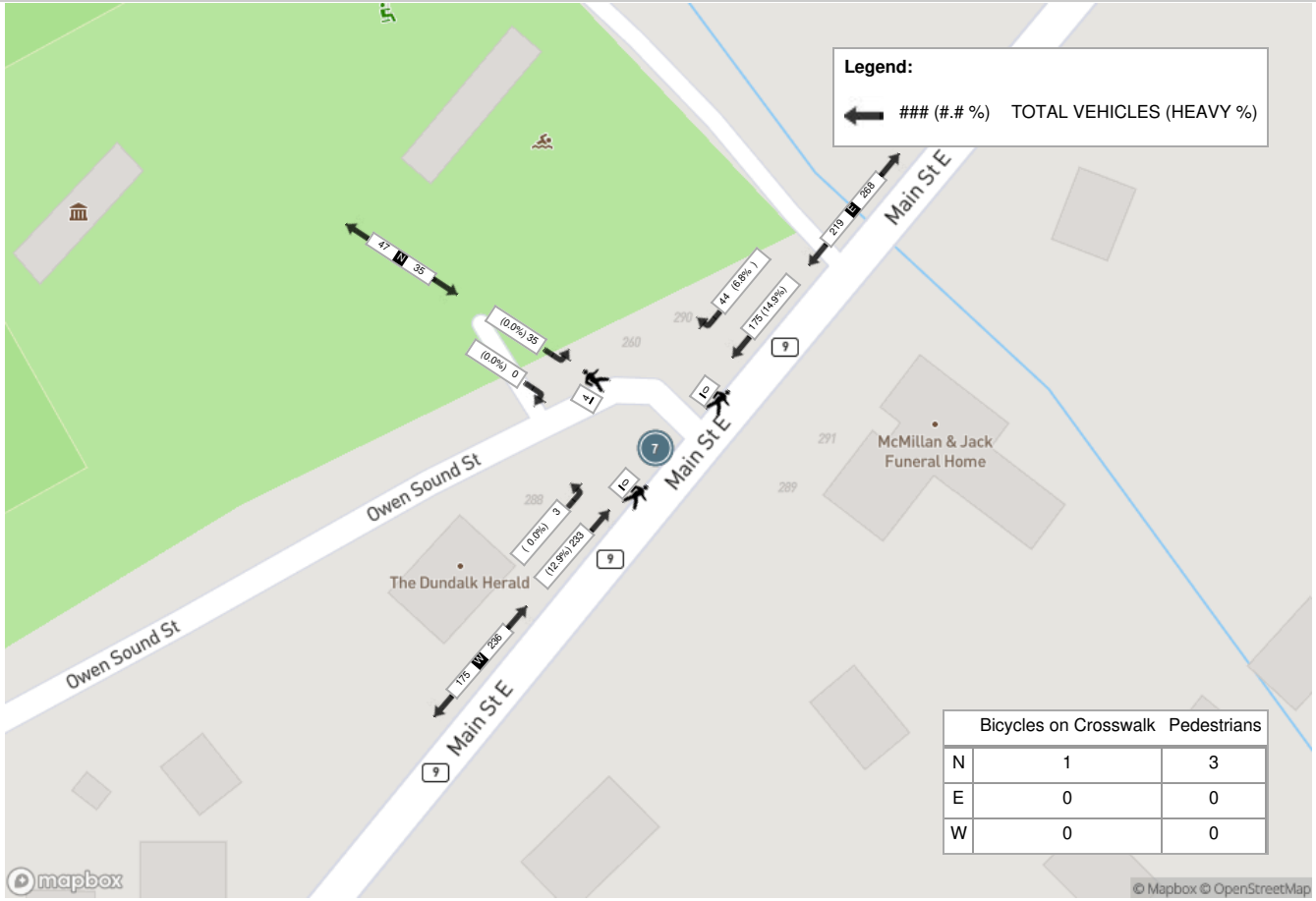
Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach OWEN SOUND ST					E Approach MAIN ST					W Approach MAIN ST					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
15:15:00	0	16	0	5	16	24	54	0	0	78	64	0	0	0	64	158
15:30:00	1	11	0	9	12	16	42	0	0	58	58	2	0	0	60	130
15:45:00	1	7	0	8	8	14	55	0	0	69	52	0	0	0	52	129
16:00:00	1	8	0	0	9	22	50	0	0	72	55	1	0	0	56	137
Grand Total	3	42	0	22	45	76	201	0	0	277	229	3	0	0	232	**554**
Approach%	6.7%	93.3%	0%		-	27.4%	72.6%	0%		-	98.7%	1.3%	0%		-	**-**
Totals %	0.5%	7.6%	0%		8.1%	13.7%	36.3%	0%		50%	41.3%	0.5%	0%		41.9%	**-**
PHF	0.75	0.66	0		0.7	0.79	0.91	0		0.89	0.89	0.38	0		0.91	**-**
Heavy	0	0	0		0	3	20	0		23	21	0	0		21	**-**
Heavy %	0%	0%	0%		0%	3.9%	10%	0%		8.3%	9.2%	0%	0%		9.1%	**-**
Lights	3	42	0		45	73	181	0		254	208	3	0		211	**-**
Lights %	100%	100%	0%		100%	96.1%	90%	0%		91.7%	90.8%	100%	0%		90.9%	**-**
Single-Unit Trucks	0	0	0		0	0	9	0		9	8	0	0		8	**-**
Single-Unit Trucks %	0%	0%	0%		0%	0%	4.5%	0%		3.2%	3.5%	0%	0%		3.4%	**-**
Buses	0	0	0		0	3	4	0		7	4	0	0		4	**-**
Buses %	0%	0%	0%		0%	3.9%	2%	0%		2.5%	1.7%	0%	0%		1.7%	**-**
Articulated Trucks	0	0	0		0	0	7	0		7	9	0	0		9	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	3.5%	0%		2.5%	3.9%	0%	0%		3.9%	**-**
Pedestrians	-	-	-	22	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

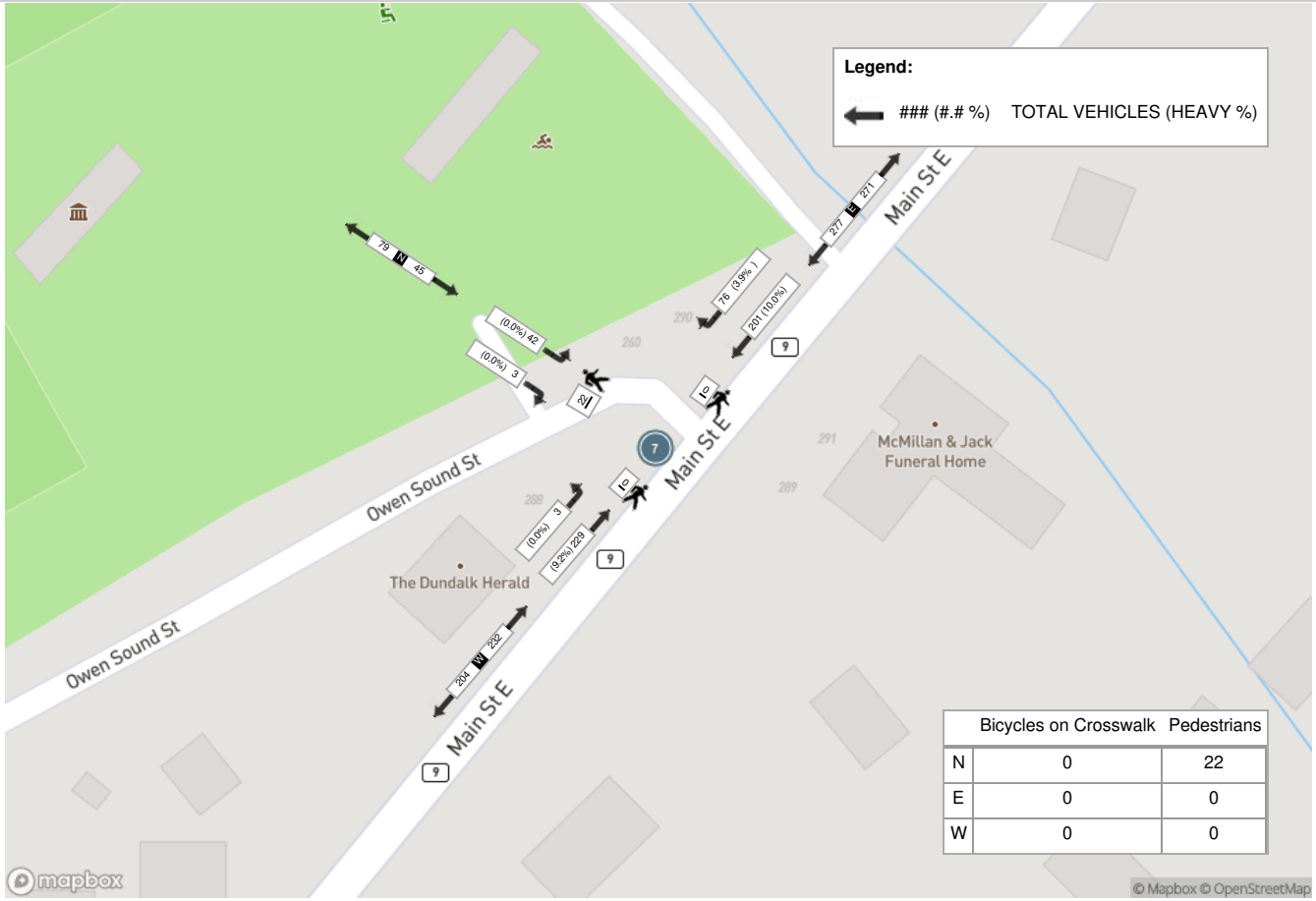
Peak Hour: 08:30 AM - 09:30 AM Weather: Overcast Clouds (16.73 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	3
E	0	0
W	0	0

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (12.76 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	22
E	0	0
W	0	0

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Turning Movement Count (6 . TORONTO ST & OSPREY ST)

Start Time	N Approach OSPREY ST						E Approach TORONTO ST						S Approach OSPREY ST						W Approach TORONTO ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	3	0	0	0	3	0	0	4	0	0	4	1	1	1	0	0	3	1	0	0	0	0	1	11	
06:15:00	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	2	
06:30:00	0	2	0	0	0	2	0	0	3	0	0	3	1	1	0	0	0	2	2	0	0	0	0	2	9	
06:45:00	0	4	0	0	0	4	0	0	4	0	1	4	0	0	0	0	0	0	1	0	0	0	0	1	9	31
07:00:00	0	2	0	0	0	2	0	0	5	0	0	5	1	2	0	0	0	3	0	0	0	0	0	0	10	30
07:15:00	0	3	0	0	0	3	0	1	7	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	11	39
07:30:00	0	2	0	0	0	2	0	0	3	0	0	3	1	1	0	0	0	2	0	0	0	0	0	0	7	37
07:45:00	0	0	0	0	0	0	0	0	5	0	0	5	3	3	0	0	0	6	1	0	0	0	0	1	12	40
08:00:00	0	2	0	0	0	2	1	2	6	0	0	9	2	2	0	0	0	4	1	1	0	0	1	2	17	47
08:15:00	1	2	0	0	4	3	0	1	4	0	1	5	2	0	0	0	0	2	0	1	0	0	1	1	11	47
08:30:00	1	3	0	0	0	4	1	1	5	0	3	7	1	1	0	0	3	2	0	0	0	0	3	0	13	53
08:45:00	0	2	0	0	0	2	0	2	5	0	0	7	7	6	2	0	0	15	0	1	1	0	0	2	26	67
09:00:00	0	1	0	0	0	1	0	1	6	0	0	7	1	1	0	0	0	2	0	0	0	0	0	0	10	60
09:15:00	0	3	0	0	0	3	0	0	6	0	0	6	7	2	0	0	0	9	1	0	0	0	0	1	19	68
09:30:00	0	1	0	0	0	1	0	0	3	0	0	3	3	2	1	0	0	6	0	1	0	0	0	1	11	66
09:45:00	0	2	0	0	0	2	0	1	3	0	0	4	4	2	1	0	0	7	0	0	0	0	0	0	13	53
BREAK																										
15:00:00	0	0	0	0	0	0	0	0	1	0	0	1	5	0	0	0	0	5	1	1	0	0	0	2	8	
15:15:00	0	3	0	0	3	3	0	2	7	0	5	9	12	4	4	0	0	20	0	1	0	0	0	1	33	
15:30:00	0	0	0	0	3	0	0	0	5	0	4	5	10	4	0	0	0	14	1	1	0	0	0	2	21	
15:45:00	0	3	0	0	0	3	1	0	4	0	2	5	7	3	0	0	0	10	0	2	0	0	0	2	20	82
16:00:00	0	0	0	0	0	0	0	2	2	0	0	4	10	3	1	0	0	14	0	1	0	0	0	1	19	93
16:15:00	0	0	0	0	0	0	0	0	5	0	0	5	9	4	1	0	0	14	1	0	0	0	0	1	20	80
16:30:00	0	2	0	0	1	2	0	0	3	0	4	3	4	1	0	0	0	5	0	1	0	0	0	1	11	70
16:45:00	1	2	0	0	0	3	0	1	5	0	0	6	6	5	1	0	1	12	0	0	0	0	1	0	21	71
17:00:00	0	0	0	0	0	0	0	0	3	0	0	3	4	4	3	0	1	11	0	0	0	0	1	0	14	66
17:15:00	0	3	0	0	0	3	0	1	6	0	1	7	4	5	1	0	0	10	1	4	0	0	0	5	25	71
17:30:00	0	2	0	0	0	2	0	2	1	0	0	3	4	0	2	0	1	6	0	1	0	0	1	1	12	72
17:45:00	0	1	0	0	0	1	0	1	3	0	0	4	11	2	0	1	0	14	0	0	0	0	0	0	19	70
18:00:00	0	2	0	0	1	2	0	1	2	0	0	3	6	2	1	0	0	9	1	0	0	0	0	1	15	71
18:15:00	0	3	0	0	0	3	0	0	4	0	1	4	5	5	0	0	0	10	0	0	0	0	0	0	17	63
18:30:00	0	0	0	0	3	0	0	0	9	0	1	9	4	2	0	0	0	6	0	0	0	0	2	0	15	66
18:45:00	0	1	0	0	0	1	0	0	3	0	0	3	7	2	1	1	0	11	0	0	0	0	0	0	15	62
Grand Total	3	54	0	0	15	57	3	20	132	0	23	155	142	71	20	2	6	235	12	16	1	0	10	29	**476**	-
Approach%	5.3%	94.7%	0%	0%		-	1.9%	12.9%	85.2%	0%		-	60.4%	30.2%	8.5%	0.9%		-	41.4%	55.2%	3.4%	0%		-	-	-
Totals %	0.6%	11.3%	0%	0%		12%	0.6%	4.2%	27.7%	0%		32.6%	29.8%	14.9%	4.2%	0.4%		49.4%	2.5%	3.4%	0.2%	0%		6.1%	-	-
Heavy	1	1	0	0		-	0	0	0	0		-	1	2	1	0		-	0	0	0	0		-	-	-
Heavy %	33.3%	1.9%	0%	0%		-	0%	0%	0%	0%		-	0.7%	2.8%	5%	0%		-	0%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:30 AM - 09:30 AM Weather: Overcast Clouds (16.73 °C)

Start Time	N Approach OSPREY ST						E Approach TORONTO ST						S Approach OSPREY ST						W Approach TORONTO ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	1	3	0	0	0	4	1	1	5	0	3	7	1	1	0	0	3	2	0	0	0	0	3	0	13
08:45:00	0	2	0	0	0	2	0	2	5	0	0	7	7	6	2	0	0	15	0	1	1	0	0	2	26
09:00:00	0	1	0	0	0	1	0	1	6	0	0	7	1	1	0	0	0	2	0	0	0	0	0	0	10
09:15:00	0	3	0	0	0	3	0	0	6	0	0	6	7	2	0	0	0	9	1	0	0	0	0	1	19
Grand Total	1	9	0	0	0	10	1	4	22	0	3	27	16	10	2	0	3	28	1	1	1	0	3	3	**68**
Approach%	10%	90%	0%	0%		-	3.7%	14.8%	81.5%	0%		-	57.1%	35.7%	7.1%	0%		-	33.3%	33.3%	33.3%	0%		-	**-**
Totals %	1.5%	13.2%	0%	0%		14.7%	1.5%	5.9%	32.4%	0%		39.7%	23.5%	14.7%	2.9%	0%		41.2%	1.5%	1.5%	1.5%	0%		4.4%	**-**
PHF	0.25	0.75	0	0		0.63	0.25	0.5	0.92	0		0.96	0.57	0.42	0.25	0		0.47	0.25	0.25	0.25	0		0.38	**-**
Heavy	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Heavy %	0%	11.1%	0%	0%		10%	0%	0%	0%	0%		0%	0%	10%	0%	0%		3.6%	0%	0%	0%	0%		0%	**-**
Lights	1	8	0	0		9	1	4	22	0		27	16	9	2	0		27	1	1	1	0		3	**-**
Lights %	100%	88.9%	0%	0%		90%	100%	100%	100%	0%		100%	100%	90%	100%	0%		96.4%	100%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Buses %	0%	11.1%	0%	0%		10%	0%	0%	0%	0%		0%	0%	10%	0%	0%		3.6%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	33.3%		-	-	-	-	33.3%		-	-	-	-	33.3%		**-**

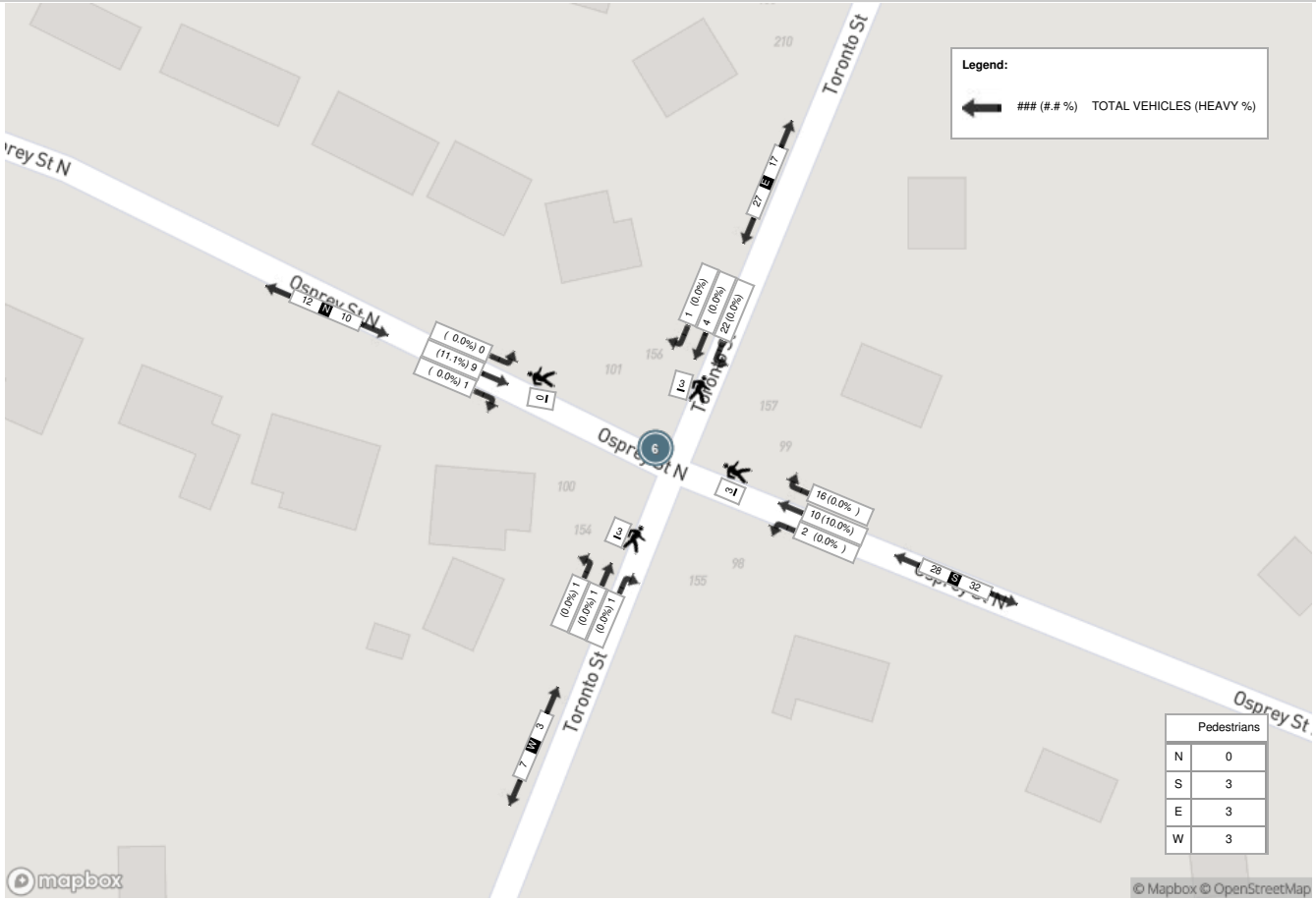
Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (12.76 °C)

Start Time	N Approach OSPREY ST						E Approach TORONTO ST						S Approach OSPREY ST						W Approach TORONTO ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:15:00	0	3	0	0	3	3	0	2	7	0	5	9	12	4	4	0	0	20	0	1	0	0	0	1	33
15:30:00	0	0	0	0	3	0	0	0	5	0	4	5	10	4	0	0	0	14	1	1	0	0	0	2	21
15:45:00	0	3	0	0	0	3	1	0	4	0	2	5	7	3	0	0	0	10	0	2	0	0	0	2	20
16:00:00	0	0	0	0	0	0	0	2	2	0	0	4	10	3	1	0	0	14	0	1	0	0	0	1	19
Grand Total	0	6	0	0	6	6	1	4	18	0	11	23	39	14	5	0	0	58	1	5	0	0	0	6	**93**
Approach%	0%	100%	0%	0%		-	4.3%	17.4%	78.3%	0%		-	67.2%	24.1%	8.6%	0%		-	16.7%	83.3%	0%	0%		-	**-**
Totals %	0%	6.5%	0%	0%		6.5%	1.1%	4.3%	19.4%	0%		24.7%	41.9%	15.1%	5.4%	0%		62.4%	1.1%	5.4%	0%	0%		6.5%	**-**
PHF	0	0.5	0	0		0.5	0.25	0.5	0.64	0		0.64	0.81	0.88	0.31	0		0.73	0.25	0.63	0	0		0.75	**-**
Heavy	0	0	0	0		0	0	0	0	0		0	0	1	1	0		2	0	0	0	0		0	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	7.1%	20%	0%		3.4%	0%	0%	0%	0%		0%	**-**
Lights	0	6	0	0		6	1	4	18	0		23	39	13	4	0		56	1	5	0	0		6	**-**
Lights %	0%	100%	0%	0%		100%	100%	100%	100%	0%		100%	100%	92.9%	80%	0%		96.6%	100%	100%	0%	0%		100%	**-**
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	0	0	0		0	0	0	0	0		0	0	1	1	0		2	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	7.1%	20%	0%		3.4%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	6	-	-	-	-	-	11	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	35.3%		-	-	-	-	64.7%		-	-	-	-	0%		-	-	-	-	0%		**-**

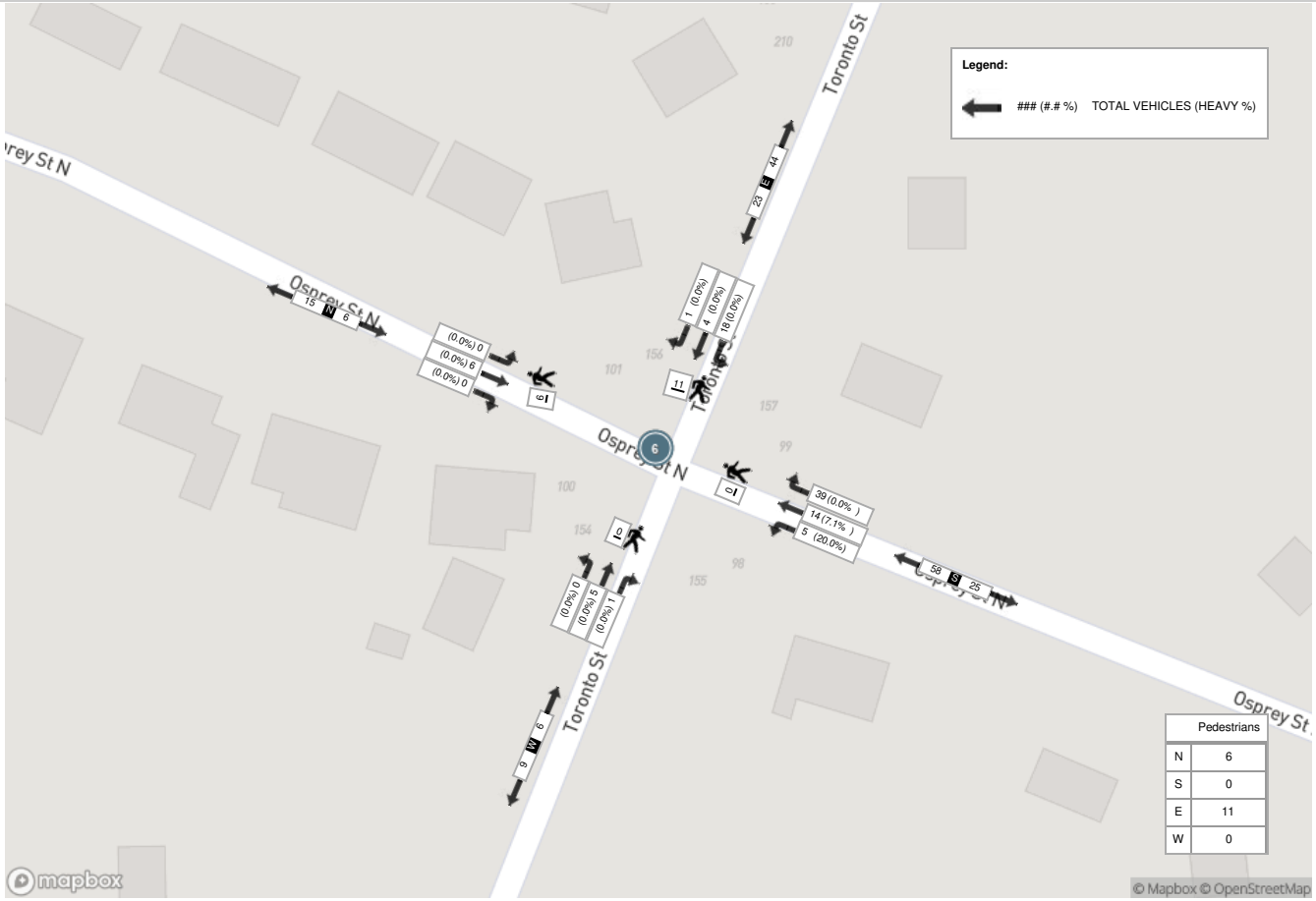
Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 08:30 AM - 09:30 AM **Weather: Overcast Clouds (16.73 °C)**



Crozier & Associates
SUITE 301 40 HURON STREET
COLLINGWOOD ONTARIO, L9Y 4R3
CANADA

Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (12.76 °C)



APPENDIX C

Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX D

Detailed Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	6	9	9	7	16
Future Volume (Veh/h)	5	6	9	9	7	16
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)	7	8	12	12	9	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	57	18			24	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57	18			24	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	99	99			99	
cM capacity (veh/h)	950	977			1516	

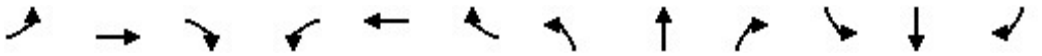
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	15	24	30
Volume Left	7	0	9
Volume Right	8	12	0
cSH	964	1700	1516
Volume to Capacity	0.02	0.01	0.01
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	8.8	0.0	2.2
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	2.2
Approach LOS	A		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	4	17	9	2	10
Future Volume (Veh/h)	0	4	17	9	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	5	23	12	3	13
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			5		60	2
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			5		60	2
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1630		827	1087

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	5	35	16
Volume Left	0	23	3
Volume Right	5	0	13
cSH	1700	1630	1027
Volume to Capacity	0.00	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.4
Control Delay (s)	0.0	4.8	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	4.8	8.6
Approach LOS			A

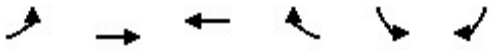
Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	114	17	36	64	10	11	2	24	12	11	3
Future Volume (Veh/h)	5	114	17	36	64	10	11	2	24	12	11	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	139	21	44	78	12	13	2	29	15	13	4
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	90			160			345	340	152	366	344	85
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	90			160			345	340	152	366	344	85
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	100			96			98	100	97	97	98	100
cM capacity (veh/h)	1399			1161			564	561	836	539	544	978

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	166	134	44	32
Volume Left	6	44	13	15
Volume Right	21	12	29	4
cSH	1399	1161	717	573
Volume to Capacity	0.00	0.04	0.06	0.06
Queue Length 95th (m)	0.1	0.9	1.5	1.3
Control Delay (s)	0.3	2.9	10.3	11.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	2.9	10.3	11.7
Approach LOS			B	B

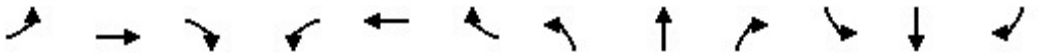
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	27.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	228	166	20	11	33
Future Volume (Veh/h)	20	228	166	20	11	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	28	317	231	28	15	46
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	269				629	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	269				629	256
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	98				96	94
cM capacity (veh/h)	1235				407	770

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	345	259	61
Volume Left	28	0	15
Volume Right	0	28	46
cSH	1235	1700	631
Volume to Capacity	0.02	0.15	0.10
Queue Length 95th (m)	0.5	0.0	2.4
Control Delay (s)	0.9	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	0.9	0.0	11.3
Approach LOS			B

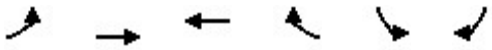
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	211	12	7	180	2	12	1	11	13	4	10
Future Volume (Veh/h)	10	211	12	7	180	2	12	1	11	13	4	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	274	16	9	234	3	16	1	14	17	5	13
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	244			296			586	576	288	583	582	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244			296			586	576	288	583	582	246
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	99			99			96	100	98	96	99	98
cM capacity (veh/h)	1326			1270			391	419	711	395	415	791

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	303	246	31	35
Volume Left	13	9	16	17
Volume Right	16	3	14	13
cSH	1326	1270	492	489
Volume to Capacity	0.01	0.01	0.06	0.07
Queue Length 95th (m)	0.2	0.2	1.5	1.7
Control Delay (s)	0.4	0.3	12.8	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	0.3	12.8	12.9
Approach LOS			B	B

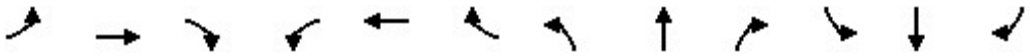
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	26.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
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)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
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				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

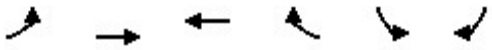
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	1	1	22	4	1	2	10	16	0	9	1
Future Volume (vph)	1	1	1	22	4	1	2	10	16	0	9	1
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	2	2	2	34	6	2	3	15	25	0	14	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	6	42	43	16
Volume Left (vph)	2	34	3	0
Volume Right (vph)	2	2	25	2
Hadj (s)	-0.13	0.13	-0.28	0.09
Departure Headway (s)	3.9	4.2	3.7	4.1
Degree Utilization, x	0.01	0.05	0.04	0.02
Capacity (veh/h)	895	849	936	855
Control Delay (s)	7.0	7.4	6.9	7.2
Approach Delay (s)	7.0	7.4	6.9	7.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay		7.1		
Level of Service		A		
Intersection Capacity Utilization		15.4%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	233	175	44	35	0
Future Volume (Veh/h)	3	233	175	44	35	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	4	284	213	54	43	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	271				536	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	271				536	244
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)	1298				505	796

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	288	267	43
Volume Left	4	0	43
Volume Right	0	54	0
cSH	1298	1700	505
Volume to Capacity	0.00	0.16	0.09
Queue Length 95th (m)	0.1	0.0	2.1
Control Delay (s)	0.1	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	11	22	7	9	16
Future Volume (Veh/h)	9	11	22	7	9	16
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	11	14	28	9	11	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	74	32			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	74	32			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	928	1047			1587	

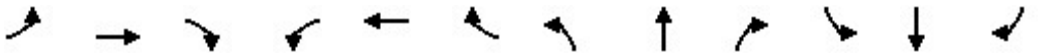
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	25	37	31
Volume Left	11	0	11
Volume Right	14	9	0
cSH	991	1700	1587
Volume to Capacity	0.03	0.02	0.01
Queue Length 95th (m)	0.6	0.0	0.2
Control Delay (s)	8.7	0.0	2.6
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	2.6
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	19	11	10	20	7	11
Future Volume (Veh/h)	19	11	10	20	7	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	21	12	11	22	8	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			33		71	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			33		71	27
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1592		898	1054

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	33	33	20
Volume Left	0	11	8
Volume Right	12	0	12
cSH	1700	1592	986
Volume to Capacity	0.02	0.01	0.02
Queue Length 95th (m)	0.0	0.2	0.5
Control Delay (s)	0.0	2.5	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	2.5	8.7
Approach LOS			A

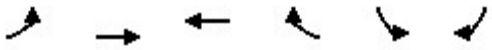
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	103	14	32	133	9	22	14	38	9	8	8
Future Volume (Veh/h)	7	103	14	32	133	9	22	14	38	9	8	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	108	15	34	140	9	23	15	40	9	8	8
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	152			124			355	350	120	396	354	148
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152			124			355	350	120	396	354	148
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	99			97			96	97	96	98	99	99
cM capacity (veh/h)	1354			1285			566	535	899	513	554	868

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	130	183	78	25
Volume Left	7	34	23	9
Volume Right	15	9	40	8
cSH	1354	1285	689	607
Volume to Capacity	0.01	0.03	0.11	0.04
Queue Length 95th (m)	0.1	0.6	2.9	1.0
Control Delay (s)	0.5	1.6	10.9	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	1.6	10.9	11.2
Approach LOS			B	B

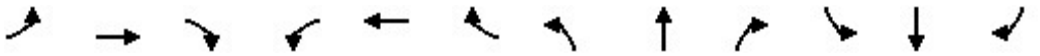
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	28.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	192	196	8	16	26
Future Volume (Veh/h)	12	192	196	8	16	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	202	206	8	17	27
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	220				446	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220				446	218
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	99				97	97
cM capacity (veh/h)	1351				552	819

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	215	214	44
Volume Left	13	0	17
Volume Right	0	8	27
cSH	1351	1700	690
Volume to Capacity	0.01	0.13	0.06
Queue Length 95th (m)	0.2	0.0	1.5
Control Delay (s)	0.5	0.0	10.6
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	10.6
Approach LOS			B

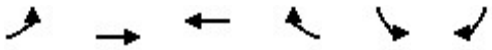
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	207	9	8	197	2	2	6	15	11	2	8
Future Volume (Veh/h)	14	207	9	8	197	2	2	6	15	11	2	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	230	10	9	219	2	2	7	17	12	2	9
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	239			257			536	541	259	550	545	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	239			257			536	541	259	550	545	242
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			99	98	98	97	100	99
cM capacity (veh/h)	1278			1228			361	428	751	407	426	786

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	256	230	26	23
Volume Left	16	9	2	12
Volume Right	10	2	17	9
cSH	1278	1228	584	504
Volume to Capacity	0.01	0.01	0.04	0.05
Queue Length 95th (m)	0.3	0.2	1.1	1.1
Control Delay (s)	0.6	0.4	11.4	12.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.4	11.4	12.5
Approach LOS			B	B

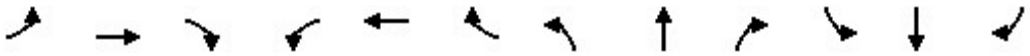
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
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)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
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				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

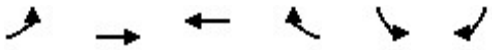
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	5	1	18	4	1	5	14	39	0	6	0
Future Volume (vph)	0	5	1	18	4	1	5	14	39	0	6	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	0	7	1	26	6	1	7	20	56	0	9	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	8	33	83	9
Volume Left (vph)	0	26	7	0
Volume Right (vph)	1	1	56	0
Hadj (s)	-0.07	0.14	-0.33	0.00
Departure Headway (s)	4.0	4.2	3.7	4.1
Degree Utilization, x	0.01	0.04	0.08	0.01
Capacity (veh/h)	864	829	958	869
Control Delay (s)	7.1	7.4	7.0	7.1
Approach Delay (s)	7.1	7.4	7.0	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
Level of Service	A		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	229	201	76	42	3
Future Volume (Veh/h)	3	229	201	76	42	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	260	228	86	48	3
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	336				559	293
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				559	293
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)	1202				479	731

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	263	314	51
Volume Left	3	0	48
Volume Right	0	86	3
cSH	1202	1700	489
Volume to Capacity	0.00	0.18	0.10
Queue Length 95th (m)	0.1	0.0	2.6
Control Delay (s)	0.1	0.0	13.2
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	13.2
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	27	10	16	14	18
Future Volume (Veh/h)	23	27	10	16	14	18
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)	30	36	13	21	18	24
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	24			34	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84	24			34	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	97	96			99	
cM capacity (veh/h)	912	970			1503	

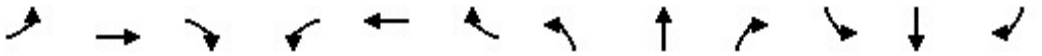
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	66	34	42
Volume Left	30	0	18
Volume Right	36	21	0
cSH	943	1700	1503
Volume to Capacity	0.07	0.02	0.01
Queue Length 95th (m)	1.7	0.0	0.3
Control Delay (s)	9.1	0.0	3.2
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	3.2
Approach LOS	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	45	126	29	24	43	13
Future Volume (Veh/h)	45	126	29	24	43	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	60	168	39	32	57	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			228		254	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			228		254	144
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			97		91	98
cM capacity (veh/h)			1352		623	909

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	228	71	74
Volume Left	0	39	57
Volume Right	168	0	17
cSH	1700	1352	672
Volume to Capacity	0.13	0.03	0.11
Queue Length 95th (m)	0.0	0.7	2.8
Control Delay (s)	0.0	4.4	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	4.4	11.0
Approach LOS			B

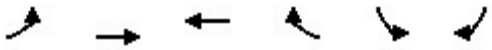
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	157	19	39	140	11	12	3	26	13	12	21
Future Volume (Veh/h)	12	157	19	39	140	11	12	3	26	13	12	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	15	191	23	48	171	13	15	4	32	16	15	26
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	184			214			540	512	204	542	518	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184			214			540	512	204	542	518	178
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	99			96			96	99	96	96	96	97
cM capacity (veh/h)	1290			1105			399	442	779	402	427	869

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	229	232	51	57
Volume Left	15	48	15	16
Volume Right	23	13	32	26
cSH	1290	1105	582	544
Volume to Capacity	0.01	0.04	0.09	0.10
Queue Length 95th (m)	0.3	1.0	2.2	2.7
Control Delay (s)	0.6	2.1	11.8	12.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	2.1	11.8	12.4
Approach LOS			B	B

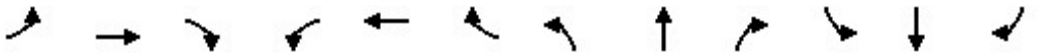
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	31.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	279	246	53	114	50
Future Volume (Veh/h)	26	279	246	53	114	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	36	388	342	74	158	69
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426				850	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426				850	390
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	97				47	89
cM capacity (veh/h)	1079				296	648

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	424	416	227
Volume Left	36	0	158
Volume Right	0	74	69
cSH	1079	1700	355
Volume to Capacity	0.03	0.24	0.64
Queue Length 95th (m)	0.8	0.0	32.0
Control Delay (s)	1.1	0.0	31.5
Lane LOS	A		D
Approach Delay (s)	1.1	0.0	31.5
Approach LOS			D

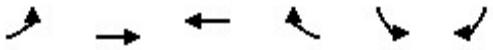
Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	351	24	8	263	3	42	2	12	16	5	12
Future Volume (Veh/h)	12	351	24	8	263	3	42	2	12	16	5	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	16	456	31	10	342	4	55	3	16	21	6	16
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	353			493			896	882	478	892	896	354
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	353			493			896	882	478	892	896	354
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	99			99			77	99	97	91	98	98
cM capacity (veh/h)	1209			1075			237	277	553	239	272	688

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	503	356	74	43
Volume Left	16	10	55	21
Volume Right	31	4	16	16
cSH	1209	1075	272	323
Volume to Capacity	0.01	0.01	0.27	0.13
Queue Length 95th (m)	0.3	0.2	8.2	3.5
Control Delay (s)	0.4	0.3	23.1	17.8
Lane LOS	A	A	C	C
Approach Delay (s)	0.4	0.3	23.1	17.8
Approach LOS			C	C

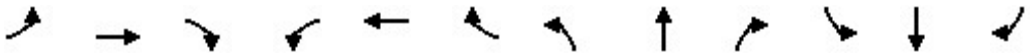
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	36.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	35	25	38	135	33
Future Volume (Veh/h)	11	35	25	38	135	33
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)	12	38	27	41	147	36
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	68				110	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	68				110	48
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	96
cM capacity (veh/h)	1533				881	1022

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	50	68	183
Volume Left	12	0	147
Volume Right	0	41	36
cSH	1533	1700	905
Volume to Capacity	0.01	0.04	0.20
Queue Length 95th (m)	0.2	0.0	5.7
Control Delay (s)	1.8	0.0	10.0
Lane LOS	A		A
Approach Delay (s)	1.8	0.0	10.0
Approach LOS			A

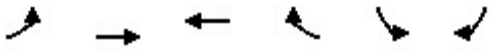
Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	4	2	50	9	2	3	11	27	0	10	2
Future Volume (vph)	2	4	2	50	9	2	3	11	27	0	10	2
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	3	6	3	77	14	3	5	17	42	0	15	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	12	94	64	18
Volume Left (vph)	3	77	5	0
Volume Right (vph)	3	3	42	3
Hadj (s)	-0.10	0.14	-0.33	0.06
Departure Headway (s)	4.1	4.2	3.8	4.3
Degree Utilization, x	0.01	0.11	0.07	0.02
Capacity (veh/h)	858	833	907	820
Control Delay (s)	7.1	7.7	7.1	7.3
Approach Delay (s)	7.1	7.7	7.1	7.3
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.4			
Level of Service	A			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	375	258	56	62	0
Future Volume (Veh/h)	4	375	258	56	62	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	457	315	68	76	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387				820	353
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				820	353
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				78	100
cM capacity (veh/h)	1177				344	692

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	462	383	76
Volume Left	5	0	76
Volume Right	0	68	0
cSH	1177	1700	344
Volume to Capacity	0.00	0.23	0.22
Queue Length 95th (m)	0.1	0.0	6.3
Control Delay (s)	0.1	0.0	18.4
Lane LOS	A		C
Approach Delay (s)	0.1	0.0	18.4
Approach LOS			C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	25	24	27	32	18
Future Volume (Veh/h)	21	25	24	27	32	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	26	31	30	34	40	22
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	149	47			64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	149	47			64	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			97	
cM capacity (veh/h)	826	1028			1551	

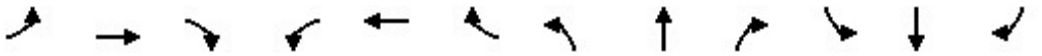
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	57	64	62
Volume Left	26	0	40
Volume Right	31	34	0
cSH	925	1700	1551
Volume to Capacity	0.06	0.04	0.03
Queue Length 95th (m)	1.5	0.0	0.6
Control Delay (s)	9.1	0.0	4.8
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	4.8
Approach LOS	A		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	41	82	14	51	127	18
Future Volume (Veh/h)	41	82	14	51	127	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	46	92	16	57	143	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			138		181	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			138		181	92
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		82	98
cM capacity (veh/h)			1458		773	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	138	73	163
Volume Left	0	16	143
Volume Right	92	0	20
cSH	1700	1458	793
Volume to Capacity	0.08	0.01	0.21
Queue Length 95th (m)	0.0	0.3	5.8
Control Delay (s)	0.0	1.7	10.7
Lane LOS		A	B
Approach Delay (s)	0.0	1.7	10.7
Approach LOS			B

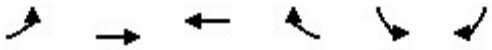
Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	191	16	35	198	10	24	16	41	10	9	19
Future Volume (Veh/h)	27	191	16	35	198	10	24	16	41	10	9	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	201	17	37	208	11	25	17	43	11	9	20
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			219			578	562	214	610	566	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			219			578	562	214	610	566	216
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	98			97			94	96	95	97	98	97
cM capacity (veh/h)	1274			1181			387	395	796	355	412	794

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	246	256	85	40
Volume Left	28	37	25	11
Volume Right	17	11	43	20
cSH	1274	1181	526	513
Volume to Capacity	0.02	0.03	0.16	0.08
Queue Length 95th (m)	0.5	0.7	4.4	1.9
Control Delay (s)	1.1	1.4	13.2	12.6
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	1.4	13.2	12.6
Approach LOS			B	B

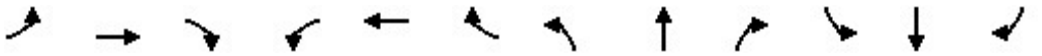
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	32.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	283	264	120	83	37
Future Volume (Veh/h)	27	283	264	120	83	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	298	278	126	87	39
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410				703	349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				703	349
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				77	94
cM capacity (veh/h)	1151				385	693

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	326	404	126
Volume Left	28	0	87
Volume Right	0	126	39
cSH	1151	1700	446
Volume to Capacity	0.02	0.24	0.28
Queue Length 95th (m)	0.6	0.0	8.7
Control Delay (s)	0.9	0.0	16.2
Lane LOS	A		C
Approach Delay (s)	0.9	0.0	16.2
Approach LOS			C

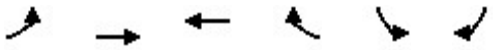
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	332	42	9	355	4	23	7	17	12	3	10
Future Volume (Veh/h)	17	332	42	9	355	4	23	7	17	12	3	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	19	369	47	10	394	4	26	8	19	13	3	11
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	416			433			880	884	416	894	905	418
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	416			433			880	884	416	894	905	418
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			87	97	97	94	99	98
cM capacity (veh/h)	1099			1054			203	270	612	234	263	627

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	435	408	53	27
Volume Left	19	10	26	13
Volume Right	47	4	19	11
cSH	1099	1054	281	319
Volume to Capacity	0.02	0.01	0.19	0.08
Queue Length 95th (m)	0.4	0.2	5.2	2.1
Control Delay (s)	0.5	0.3	20.8	17.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.3	20.8	17.3
Approach LOS			C	C

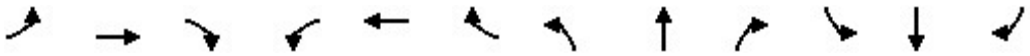
Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	40.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	37	32	132	86	22
Future Volume (Veh/h)	37	37	32	132	86	22
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)	40	40	35	143	93	24
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				226	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	178				226	106
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				87	97
cM capacity (veh/h)	1398				740	948

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	80	178	117
Volume Left	40	0	93
Volume Right	0	143	24
cSH	1398	1700	775
Volume to Capacity	0.03	0.10	0.15
Queue Length 95th (m)	0.7	0.0	4.0
Control Delay (s)	3.9	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	3.9	0.0	10.5
Approach LOS			B

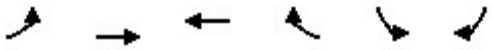
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	2	33	7	2	6	16	70	0	7	0
Future Volume (vph)	0	10	2	33	7	2	6	16	70	0	7	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	0	14	3	47	10	3	9	23	100	0	10	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	17	60	132	10
Volume Left (vph)	0	47	9	0
Volume Right (vph)	3	3	100	0
Hadj (s)	-0.11	0.13	-0.40	0.00
Departure Headway (s)	4.1	4.3	3.7	4.2
Degree Utilization, x	0.02	0.07	0.14	0.01
Capacity (veh/h)	833	803	947	834
Control Delay (s)	7.2	7.7	7.3	7.2
Approach Delay (s)	7.2	7.7	7.3	7.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.4			
Level of Service	A			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	356	359	107	58	5
Future Volume (Veh/h)	5	356	359	107	58	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	405	408	122	66	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	552				908	491
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552				908	491
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				78	99
cM capacity (veh/h)	1001				298	566

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	411	530	72
Volume Left	6	0	66
Volume Right	0	122	6
cSH	1001	1700	310
Volume to Capacity	0.01	0.31	0.23
Queue Length 95th (m)	0.1	0.0	6.7
Control Delay (s)	0.2	0.0	20.1
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	20.1
Approach LOS			C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	48	10	24	21	18
Future Volume (Veh/h)	44	48	10	24	21	18
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)	58	63	13	32	28	24
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	109	29			45	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109	29			45	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	93	93			98	
cM capacity (veh/h)	876	963			1489	

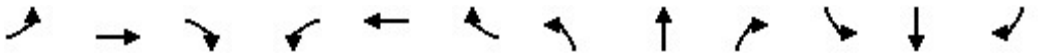
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	121	45	52
Volume Left	58	0	28
Volume Right	63	32	0
cSH	920	1700	1489
Volume to Capacity	0.13	0.03	0.02
Queue Length 95th (m)	3.4	0.0	0.4
Control Delay (s)	9.5	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	56	126	39	55	43	17
Future Volume (Veh/h)	56	126	39	55	43	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	75	168	52	73	57	23
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			243		336	159
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			243		336	159
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			96		90	97
cM capacity (veh/h)			1335		550	892

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	243	125	80
Volume Left	0	52	57
Volume Right	168	0	23
cSH	1700	1335	618
Volume to Capacity	0.14	0.04	0.13
Queue Length 95th (m)	0.0	0.9	3.4
Control Delay (s)	0.0	3.4	11.7
Lane LOS		A	B
Approach Delay (s)	0.0	3.4	11.7
Approach LOS			B

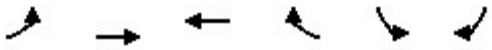
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	157	19	39	140	11	12	3	26	13	12	42
Future Volume (Veh/h)	20	157	19	39	140	11	12	3	26	13	12	42
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	191	23	48	171	13	15	4	32	16	15	51
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	184			214			584	530	204	560	536	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184			214			584	530	204	560	536	178
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	98			96			96	99	96	96	96	94
cM capacity (veh/h)	1290			1105			360	429	779	389	415	869

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	238	232	51	82
Volume Left	24	48	15	16
Volume Right	23	13	32	51
cSH	1290	1105	554	603
Volume to Capacity	0.02	0.04	0.09	0.14
Queue Length 95th (m)	0.4	1.0	2.3	3.6
Control Delay (s)	0.9	2.1	12.2	11.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.9	2.1	12.2	11.9
Approach LOS			B	B

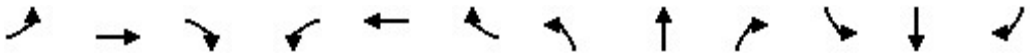
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	279	246	53	114	60
Future Volume (Veh/h)	30	279	246	53	114	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	42	388	342	74	158	83
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426				862	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426				862	390
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	96				45	87
cM capacity (veh/h)	1079				290	648

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	430	416	241
Volume Left	42	0	158
Volume Right	0	74	83
cSH	1079	1700	358
Volume to Capacity	0.04	0.24	0.67
Queue Length 95th (m)	0.9	0.0	35.6
Control Delay (s)	1.2	0.0	33.5
Lane LOS	A		D
Approach Delay (s)	1.2	0.0	33.5
Approach LOS			D

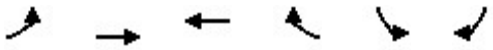
Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	351	24	8	263	3	42	2	12	79	5	12
Future Volume (Veh/h)	12	351	24	8	263	3	42	2	12	79	5	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	16	456	31	10	342	4	55	3	16	103	6	16
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	353			493			896	882	478	892	896	354
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	353			493			896	882	478	892	896	354
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	99			99			77	99	97	57	98	98
cM capacity (veh/h)	1209			1075			237	277	553	239	272	688

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	503	356	74	125
Volume Left	16	10	55	103
Volume Right	31	4	16	16
cSH	1209	1075	272	263
Volume to Capacity	0.01	0.01	0.27	0.48
Queue Length 95th (m)	0.3	0.2	8.2	18.2
Control Delay (s)	0.4	0.3	23.1	30.6
Lane LOS	A	A	C	D
Approach Delay (s)	0.4	0.3	23.1	30.6
Approach LOS			C	D

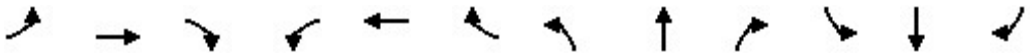
Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	46	56	38	135	44
Future Volume (Veh/h)	15	46	56	38	135	44
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)	16	50	61	41	147	48
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	102				164	82
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	102				164	82
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				82	95
cM capacity (veh/h)	1490				818	978

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	66	102	195
Volume Left	16	0	147
Volume Right	0	41	48
cSH	1490	1700	853
Volume to Capacity	0.01	0.06	0.23
Queue Length 95th (m)	0.2	0.0	6.7
Control Delay (s)	1.9	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	1.9	0.0	10.5
Approach LOS			B

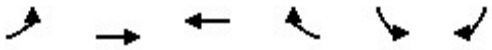
Intersection Summary			
Average Delay		6.0	
Intersection Capacity Utilization		26.7%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	15	2	176	40	2	3	11	73	0	10	2
Future Volume (vph)	2	15	2	176	40	2	3	11	73	0	10	2
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	3	23	3	271	62	3	5	17	112	0	15	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	29	336	134	18
Volume Left (vph)	3	271	5	0
Volume Right (vph)	3	3	112	3
Hadj (s)	-0.04	0.16	-0.47	0.06
Departure Headway (s)	4.6	4.4	4.3	5.0
Degree Utilization, x	0.04	0.41	0.16	0.02
Capacity (veh/h)	741	783	773	655
Control Delay (s)	7.8	10.6	8.1	8.1
Approach Delay (s)	7.8	10.6	8.1	8.1
Approach LOS	A	B	A	A

Intersection Summary				
Delay	9.7			
Level of Service	A			
Intersection Capacity Utilization	33.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	438	258	102	125	0
Future Volume (Veh/h)	4	438	258	102	125	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	534	315	124	152	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	443				925	381
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	443				925	381
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				49	100
cM capacity (veh/h)	1122				298	667

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	539	439	152
Volume Left	5	0	152
Volume Right	0	124	0
cSH	1122	1700	298
Volume to Capacity	0.00	0.26	0.51
Queue Length 95th (m)	0.1	0.0	20.6
Control Delay (s)	0.1	0.0	29.0
Lane LOS	A		D
Approach Delay (s)	0.1	0.0	29.0
Approach LOS			D

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	36	40	24	51	57	18
Future Volume (Veh/h)	36	40	24	51	57	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	45	50	30	64	71	22
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	226	62			94	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	226	62			94	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	95			95	
cM capacity (veh/h)	731	1009			1513	

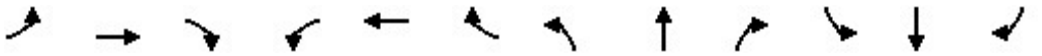
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	95	94	93
Volume Left	45	0	71
Volume Right	50	64	0
cSH	855	1700	1513
Volume to Capacity	0.11	0.06	0.05
Queue Length 95th (m)	2.8	0.0	1.1
Control Delay (s)	9.7	0.0	5.8
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	5.8
Approach LOS	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	77	82	21	73	127	30
Future Volume (Veh/h)	77	82	21	73	127	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	87	92	24	82	143	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			179		263	133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			179		263	133
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		79	96
cM capacity (veh/h)			1409		689	922

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	179	106	177
Volume Left	0	24	143
Volume Right	92	0	34
cSH	1700	1409	724
Volume to Capacity	0.11	0.02	0.24
Queue Length 95th (m)	0.0	0.4	7.3
Control Delay (s)	0.0	1.8	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.8	11.6
Approach LOS			B

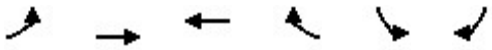
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	191	16	35	198	10	24	16	41	10	9	34
Future Volume (Veh/h)	51	191	16	35	198	10	24	16	41	10	9	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	54	201	17	37	208	11	25	17	43	11	9	36
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			219			646	614	214	662	618	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			219			646	614	214	662	618	216
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	96			97			93	95	95	97	98	95
cM capacity (veh/h)	1274			1181			335	361	796	322	377	794

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	272	256	85	56
Volume Left	54	37	25	11
Volume Right	17	11	43	36
cSH	1274	1181	484	541
Volume to Capacity	0.04	0.03	0.18	0.10
Queue Length 95th (m)	1.0	0.7	4.8	2.6
Control Delay (s)	1.9	1.4	14.0	12.4
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	1.4	14.0	12.4
Approach LOS			B	B

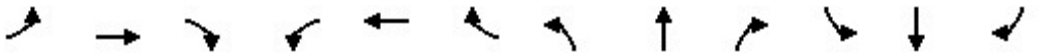
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	283	264	120	83	44
Future Volume (Veh/h)	39	283	264	120	83	44
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	298	278	126	87	46
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410				729	349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				729	349
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	96				76	93
cM capacity (veh/h)	1151				367	693

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	339	404	133
Volume Left	41	0	87
Volume Right	0	126	46
cSH	1151	1700	438
Volume to Capacity	0.04	0.24	0.30
Queue Length 95th (m)	0.8	0.0	9.6
Control Delay (s)	1.3	0.0	16.8
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	16.8
Approach LOS			C

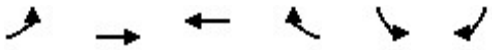
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	332	42	9	355	4	23	7	17	56	3	10
Future Volume (Veh/h)	17	332	42	9	355	4	23	7	17	56	3	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	19	369	47	10	394	4	26	8	19	62	3	11
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	416			433			880	884	416	894	905	418
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	416			433			880	884	416	894	905	418
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			87	97	97	73	99	98
cM capacity (veh/h)	1099			1054			203	270	612	234	263	627

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	435	408	53	76
Volume Left	19	10	26	62
Volume Right	47	4	19	11
cSH	1099	1054	281	258
Volume to Capacity	0.02	0.01	0.19	0.29
Queue Length 95th (m)	0.4	0.2	5.2	9.0
Control Delay (s)	0.5	0.3	20.8	24.6
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.3	20.8	24.6
Approach LOS			C	C

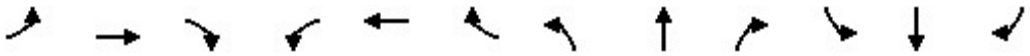
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	73	54	132	86	30
Future Volume (Veh/h)	50	73	54	132	86	30
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)	54	79	59	143	93	33
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	202				318	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	202				318	130
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	96
cM capacity (veh/h)	1370				649	919

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	133	202	126
Volume Left	54	0	93
Volume Right	0	143	33
cSH	1370	1700	703
Volume to Capacity	0.04	0.12	0.18
Queue Length 95th (m)	0.9	0.0	4.9
Control Delay (s)	3.3	0.0	11.2
Lane LOS	A		B
Approach Delay (s)	3.3	0.0	11.2
Approach LOS			B

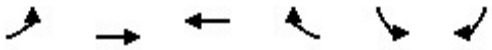
Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	46	2	121	29	2	6	16	215	0	7	0
Future Volume (vph)	0	46	2	121	29	2	6	16	215	0	7	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	0	66	3	173	41	3	9	23	307	0	10	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	69	217	339	10
Volume Left (vph)	0	173	9	0
Volume Right (vph)	3	3	307	0
Hadj (s)	-0.03	0.15	-0.52	0.00
Departure Headway (s)	4.9	4.9	4.1	5.0
Degree Utilization, x	0.09	0.30	0.39	0.01
Capacity (veh/h)	662	686	832	647
Control Delay (s)	8.5	10.0	9.7	8.1
Approach Delay (s)	8.5	10.0	9.7	8.1
Approach LOS	A	A	A	A

Intersection Summary				
Delay	9.6			
Level of Service	A			
Intersection Capacity Utilization	42.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	400	359	252	102	5
Future Volume (Veh/h)	5	400	359	252	102	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	455	408	286	116	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	716				1040	573
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	716				1040	573
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				53	99
cM capacity (veh/h)	870				249	509

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	461	694	122
Volume Left	6	0	116
Volume Right	0	286	6
cSH	870	1700	255
Volume to Capacity	0.01	0.41	0.48
Queue Length 95th (m)	0.2	0.0	18.3
Control Delay (s)	0.2	0.0	31.4
Lane LOS	A		D
Approach Delay (s)	0.2	0.0	31.4
Approach LOS			D

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	27	11	17	15	19
Future Volume (Veh/h)	23	27	11	17	15	19
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)	30	36	14	22	20	25
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	25			36	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	25			36	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	97	96			99	
cM capacity (veh/h)	903	968			1501	

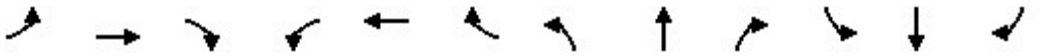
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	66	36	45
Volume Left	30	0	20
Volume Right	36	22	0
cSH	938	1700	1501
Volume to Capacity	0.07	0.02	0.01
Queue Length 95th (m)	1.7	0.0	0.3
Control Delay (s)	9.1	0.0	3.4
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	3.4
Approach LOS	A		

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	18.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	46	127	31	25	44	14
Future Volume (Veh/h)	46	127	31	25	44	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	61	169	41	33	59	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			230		260	146
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			230		260	146
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			97		90	98
cM capacity (veh/h)			1350		617	907

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	230	74	78
Volume Left	0	41	59
Volume Right	169	0	19
cSH	1700	1350	669
Volume to Capacity	0.14	0.03	0.12
Queue Length 95th (m)	0.0	0.7	3.0
Control Delay (s)	0.0	4.4	11.1
Lane LOS		A	B
Approach Delay (s)	0.0	4.4	11.1
Approach LOS			B

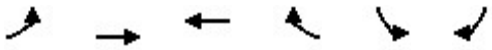
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	167	20	42	146	12	13	3	28	14	13	21
Future Volume (Veh/h)	12	167	20	42	146	12	13	3	28	14	13	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	15	204	24	51	178	15	16	4	34	17	16	26
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	193			228			568	541	218	572	546	186
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	193			228			568	541	218	572	546	186
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	99			95			96	99	96	96	96	97
cM capacity (veh/h)	1279			1090			380	425	766	382	411	860

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	243	244	54	59
Volume Left	15	51	16	17
Volume Right	24	15	34	26
cSH	1279	1090	563	519
Volume to Capacity	0.01	0.05	0.10	0.11
Queue Length 95th (m)	0.3	1.1	2.4	2.9
Control Delay (s)	0.6	2.1	12.1	12.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	2.1	12.1	12.8
Approach LOS			B	B

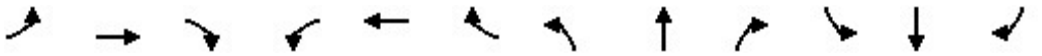
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	298	260	55	115	53
Future Volume (Veh/h)	28	298	260	55	115	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	39	414	361	76	160	74
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	447				902	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	447				902	410
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	96				42	88
cM capacity (veh/h)	1059				275	631

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	453	437	234
Volume Left	39	0	160
Volume Right	0	76	74
cSH	1059	1700	334
Volume to Capacity	0.04	0.26	0.70
Queue Length 95th (m)	0.9	0.0	38.0
Control Delay (s)	1.1	0.0	37.4
Lane LOS	A		E
Approach Delay (s)	1.1	0.0	37.4
Approach LOS			E

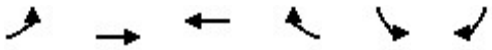
Intersection Summary			
Average Delay	8.2		
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	368	25	9	278	3	43	2	13	17	5	13
Future Volume (Veh/h)	13	368	25	9	278	3	43	2	13	17	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	17	478	32	12	361	4	56	3	17	22	6	17
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	372			516			944	930	500	940	944	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372			516			944	930	500	940	944	373
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	99			99			74	99	97	90	98	97
cM capacity (veh/h)	1190			1054			218	259	537	220	255	671

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	527	377	76	45
Volume Left	17	12	56	22
Volume Right	32	4	17	17
cSH	1190	1054	253	302
Volume to Capacity	0.01	0.01	0.30	0.15
Queue Length 95th (m)	0.3	0.3	9.3	3.9
Control Delay (s)	0.4	0.4	25.2	19.0
Lane LOS	A	A	D	C
Approach Delay (s)	0.4	0.4	25.2	19.0
Approach LOS			D	C

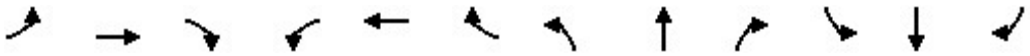
Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	38.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	37	27	38	135	33
Future Volume (Veh/h)	11	37	27	38	135	33
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)	12	40	29	41	147	36
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	70				114	50
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				114	50
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	96
cM capacity (veh/h)	1531				876	1019

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	52	70	183
Volume Left	12	0	147
Volume Right	0	41	36
cSH	1531	1700	901
Volume to Capacity	0.01	0.04	0.20
Queue Length 95th (m)	0.2	0.0	5.8
Control Delay (s)	1.7	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	1.7	0.0	10.0
Approach LOS			B

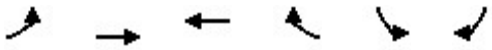
Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	4	2	52	9	2	3	12	28	0	11	2
Future Volume (vph)	2	4	2	52	9	2	3	12	28	0	11	2
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	3	6	3	80	14	3	5	18	43	0	17	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	12	97	66	20
Volume Left (vph)	3	80	5	0
Volume Right (vph)	3	3	43	3
Hadj (s)	-0.10	0.15	-0.33	0.07
Departure Headway (s)	4.1	4.2	3.8	4.3
Degree Utilization, x	0.01	0.11	0.07	0.02
Capacity (veh/h)	855	830	903	815
Control Delay (s)	7.1	7.8	7.1	7.4
Approach Delay (s)	7.1	7.8	7.1	7.4
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	22.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	394	273	60	65	0
Future Volume (Veh/h)	4	394	273	60	65	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	480	333	73	79	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410				864	374
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				864	374
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				76	100
cM capacity (veh/h)	1154				324	674

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	485	406	79
Volume Left	5	0	79
Volume Right	0	73	0
cSH	1154	1700	324
Volume to Capacity	0.00	0.24	0.24
Queue Length 95th (m)	0.1	0.0	7.1
Control Delay (s)	0.1	0.0	19.6
Lane LOS	A		C
Approach Delay (s)	0.1	0.0	19.6
Approach LOS			C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	26	26	28	33	19
Future Volume (Veh/h)	22	26	26	28	33	19
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	28	32	32	35	41	24
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	50			67	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156	50			67	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			97	
cM capacity (veh/h)	818	1025			1547	

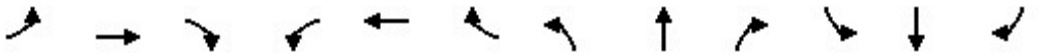
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	67	65
Volume Left	28	0	41
Volume Right	32	35	0
cSH	917	1700	1547
Volume to Capacity	0.07	0.04	0.03
Queue Length 95th (m)	1.6	0.0	0.6
Control Delay (s)	9.2	0.0	4.7
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	4.7
Approach LOS	A		

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		19.5%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	43	83	15	53	128	19
Future Volume (Veh/h)	43	83	15	53	128	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	48	93	17	60	144	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			141		188	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			141		188	94
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		81	98
cM capacity (veh/h)			1455		765	968

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	141	77	165
Volume Left	0	17	144
Volume Right	93	0	21
cSH	1700	1455	786
Volume to Capacity	0.08	0.01	0.21
Queue Length 95th (m)	0.0	0.3	6.0
Control Delay (s)	0.0	1.7	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	1.7	10.8
Approach LOS			B

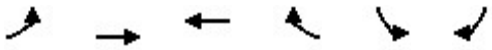
Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	200	17	38	209	11	26	17	45	11	10	20
Future Volume (Veh/h)	28	200	17	38	209	11	26	17	45	11	10	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	211	18	40	220	12	27	18	47	12	11	21
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	235			230			612	594	224	646	597	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	235			230			612	594	224	646	597	229
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	98			97			93	95	94	96	97	97
cM capacity (veh/h)	1260			1169			364	378	785	332	393	781

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	258	272	92	44
Volume Left	29	40	27	12
Volume Right	18	12	47	21
cSH	1260	1169	506	484
Volume to Capacity	0.02	0.03	0.18	0.09
Queue Length 95th (m)	0.5	0.8	5.0	2.3
Control Delay (s)	1.1	1.5	13.7	13.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	1.5	13.7	13.2
Approach LOS			B	B

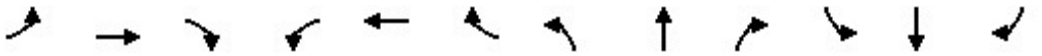
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	34.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	299	280	121	84	39
Future Volume (Veh/h)	28	299	280	121	84	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	315	295	127	88	41
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	428				740	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428				740	366
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	97				76	94
cM capacity (veh/h)	1134				366	677

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	344	422	129
Volume Left	29	0	88
Volume Right	0	127	41
cSH	1134	1700	428
Volume to Capacity	0.03	0.25	0.30
Queue Length 95th (m)	0.6	0.0	9.5
Control Delay (s)	0.9	0.0	17.0
Lane LOS	A		C
Approach Delay (s)	0.9	0.0	17.0
Approach LOS			C

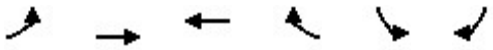
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	350	43	10	371	4	23	7	18	13	3	11
Future Volume (Veh/h)	18	350	43	10	371	4	23	7	18	13	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	389	48	11	412	4	26	8	20	14	3	12
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	434			454			924	926	437	938	948	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434			454			924	926	437	938	948	436
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			86	97	97	94	99	98
cM capacity (veh/h)	1082			1035			188	255	596	217	247	612

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	457	427	54	29
Volume Left	20	11	26	14
Volume Right	48	4	20	12
cSH	1082	1035	266	301
Volume to Capacity	0.02	0.01	0.20	0.10
Queue Length 95th (m)	0.4	0.2	5.7	2.4
Control Delay (s)	0.6	0.3	22.0	18.2
Lane LOS	A	A	C	C
Approach Delay (s)	0.6	0.3	22.0	18.2
Approach LOS			C	C

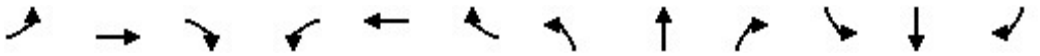
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	39	34	132	86	22
Future Volume (Veh/h)	37	39	34	132	86	22
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)	40	42	37	143	93	24
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	180				230	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	180				230	108
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				87	97
cM capacity (veh/h)	1396				736	945

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	82	180	117
Volume Left	40	0	93
Volume Right	0	143	24
cSH	1396	1700	771
Volume to Capacity	0.03	0.11	0.15
Queue Length 95th (m)	0.7	0.0	4.1
Control Delay (s)	3.8	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	3.8	0.0	10.5
Approach LOS			B

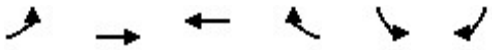
Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		30.1%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	2	34	7	2	6	17	73	0	7	0
Future Volume (vph)	0	10	2	34	7	2	6	17	73	0	7	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	0	14	3	49	10	3	9	24	104	0	10	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	17	62	137	10
Volume Left (vph)	0	49	9	0
Volume Right (vph)	3	3	104	0
Hadj (s)	-0.11	0.13	-0.40	0.00
Departure Headway (s)	4.1	4.3	3.7	4.2
Degree Utilization, x	0.02	0.07	0.14	0.01
Capacity (veh/h)	829	800	946	831
Control Delay (s)	7.2	7.7	7.3	7.2
Approach Delay (s)	7.2	7.7	7.3	7.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	375	376	114	61	5
Future Volume (Veh/h)	5	375	376	114	61	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	426	427	130	69	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	579				952	514
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	579				952	514
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				75	99
cM capacity (veh/h)	978				281	549

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	432	557	75
Volume Left	6	0	69
Volume Right	0	130	6
cSH	978	1700	292
Volume to Capacity	0.01	0.33	0.26
Queue Length 95th (m)	0.1	0.0	7.6
Control Delay (s)	0.2	0.0	21.5
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	21.5
Approach LOS			C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	48	11	25	22	19
Future Volume (Veh/h)	44	48	11	25	22	19
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)	58	63	14	33	29	25
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	114	30			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	30			47	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	93	93			98	
cM capacity (veh/h)	871	961			1487	

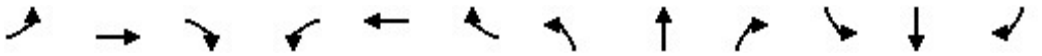
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	121	47	54
Volume Left	58	0	29
Volume Right	63	33	0
cSH	916	1700	1487
Volume to Capacity	0.13	0.03	0.02
Queue Length 95th (m)	3.5	0.0	0.5
Control Delay (s)	9.5	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	57	127	41	56	44	18
Future Volume (Veh/h)	57	127	41	56	44	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	76	169	55	75	59	24
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			245		346	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			245		346	160
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			96		89	97
cM capacity (veh/h)			1333		541	890

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	245	130	83
Volume Left	0	55	59
Volume Right	169	0	24
cSH	1700	1333	611
Volume to Capacity	0.14	0.04	0.14
Queue Length 95th (m)	0.0	1.0	3.6
Control Delay (s)	0.0	3.5	11.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.5	11.8
Approach LOS			B

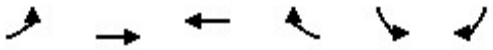
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	167	20	42	146	12	13	3	28	14	13	42
Future Volume (Veh/h)	20	167	20	42	146	12	13	3	28	14	13	42
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	204	24	51	178	15	16	4	34	17	16	51
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	193			228			612	559	218	590	564	186
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	193			228			612	559	218	590	564	186
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	98			95			95	99	96	95	96	94
cM capacity (veh/h)	1279			1090			343	412	766	370	398	860

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	252	244	54	84
Volume Left	24	51	16	17
Volume Right	24	15	34	51
cSH	1279	1090	536	577
Volume to Capacity	0.02	0.05	0.10	0.15
Queue Length 95th (m)	0.4	1.1	2.5	3.9
Control Delay (s)	0.9	2.1	12.5	12.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.9	2.1	12.5	12.3
Approach LOS			B	B

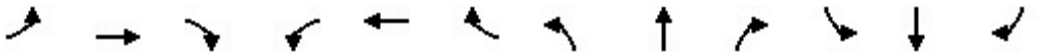
Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	298	260	55	115	63
Future Volume (Veh/h)	32	298	260	55	115	63
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	44	414	361	76	160	88
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	447				912	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	447				912	410
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	96				41	86
cM capacity (veh/h)	1059				269	631

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	458	437	248
Volume Left	44	0	160
Volume Right	0	76	88
cSH	1059	1700	338
Volume to Capacity	0.04	0.26	0.73
Queue Length 95th (m)	1.0	0.0	42.0
Control Delay (s)	1.2	0.0	40.0
Lane LOS	A		E
Approach Delay (s)	1.2	0.0	40.0
Approach LOS			E

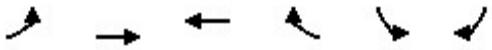
Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	368	25	9	278	3	43	2	13	80	5	13
Future Volume (Veh/h)	13	368	25	9	278	3	43	2	13	80	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	17	478	32	12	361	4	56	3	17	104	6	17
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	372			516			944	930	500	940	944	373
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372			516			944	930	500	940	944	373
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	99			99			74	99	97	53	98	97
cM capacity (veh/h)	1190			1054			218	259	537	220	255	671

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	527	377	76	127
Volume Left	17	12	56	104
Volume Right	32	4	17	17
cSH	1190	1054	253	244
Volume to Capacity	0.01	0.01	0.30	0.52
Queue Length 95th (m)	0.3	0.3	9.3	20.9
Control Delay (s)	0.4	0.4	25.2	34.8
Lane LOS	A	A	D	D
Approach Delay (s)	0.4	0.4	25.2	34.8
Approach LOS			D	D

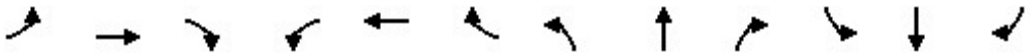
Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	40.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	48	58	38	135	44
Future Volume (Veh/h)	15	48	58	38	135	44
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)	16	52	63	41	147	48
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	104				168	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104				168	84
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				82	95
cM capacity (veh/h)	1488				814	976

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	68	104	195
Volume Left	16	0	147
Volume Right	0	41	48
cSH	1488	1700	849
Volume to Capacity	0.01	0.06	0.23
Queue Length 95th (m)	0.2	0.0	6.7
Control Delay (s)	1.8	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	1.8	0.0	10.5
Approach LOS			B

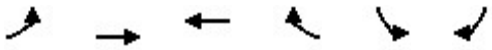
Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	15	2	178	40	2	3	12	74	0	11	2
Future Volume (vph)	2	15	2	178	40	2	3	12	74	0	11	2
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	3	23	3	274	62	3	5	18	114	0	17	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	29	339	137	20
Volume Left (vph)	3	274	5	0
Volume Right (vph)	3	3	114	3
Hadj (s)	-0.04	0.16	-0.47	0.07
Departure Headway (s)	4.6	4.5	4.3	5.0
Degree Utilization, x	0.04	0.42	0.16	0.03
Capacity (veh/h)	737	780	770	651
Control Delay (s)	7.8	10.6	8.2	8.2
Approach Delay (s)	7.8	10.6	8.2	8.2
Approach LOS	A	B	A	A

Intersection Summary				
Delay	9.7			
Level of Service	A			
Intersection Capacity Utilization	34.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	457	273	106	128	0
Future Volume (Veh/h)	4	457	273	106	128	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	557	333	129	156	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	466				968	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466				968	402
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				45	100
cM capacity (veh/h)	1101				281	650

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	562	462	156
Volume Left	5	0	156
Volume Right	0	129	0
cSH	1101	1700	281
Volume to Capacity	0.00	0.27	0.55
Queue Length 95th (m)	0.1	0.0	23.7
Control Delay (s)	0.1	0.0	32.7
Lane LOS	A		D
Approach Delay (s)	0.1	0.0	32.7
Approach LOS			D

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	41	26	52	58	19
Future Volume (Veh/h)	37	41	26	52	58	19
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	46	51	32	65	72	24
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	232	64			97	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232	64			97	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	95			95	
cM capacity (veh/h)	724	1005			1509	

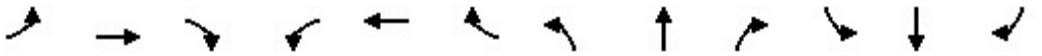
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	97	97	96
Volume Left	46	0	72
Volume Right	51	65	0
cSH	849	1700	1509
Volume to Capacity	0.11	0.06	0.05
Queue Length 95th (m)	2.9	0.0	1.1
Control Delay (s)	9.8	0.0	5.7
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	5.7
Approach LOS	A		

Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization		22.1%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	79	83	22	75	128	31
Future Volume (Veh/h)	79	83	22	75	128	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	89	93	25	84	144	35
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			182		270	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		270	136
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		79	96
cM capacity (veh/h)			1405		682	919

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	182	109	179
Volume Left	0	25	144
Volume Right	93	0	35
cSH	1700	1405	719
Volume to Capacity	0.11	0.02	0.25
Queue Length 95th (m)	0.0	0.4	7.5
Control Delay (s)	0.0	1.9	11.7
Lane LOS		A	B
Approach Delay (s)	0.0	1.9	11.7
Approach LOS			B

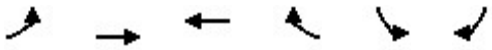
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	200	17	38	209	11	26	17	45	11	10	35
Future Volume (Veh/h)	52	200	17	38	209	11	26	17	45	11	10	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	211	18	40	220	12	27	18	47	12	11	37
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	235			230			680	646	224	698	649	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	235			230			680	646	224	698	649	229
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	96			97			91	95	94	96	97	95
cM capacity (veh/h)	1260			1169			315	345	785	301	360	781

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	284	272	92	60
Volume Left	55	40	27	12
Volume Right	18	12	47	37
cSH	1260	1169	465	509
Volume to Capacity	0.04	0.03	0.20	0.12
Queue Length 95th (m)	1.0	0.8	5.5	3.0
Control Delay (s)	1.9	1.5	14.6	13.0
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	1.5	14.6	13.0
Approach LOS			B	B

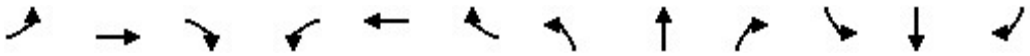
Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	36.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	299	280	121	84	46
Future Volume (Veh/h)	40	299	280	121	84	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	315	295	127	88	48
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	428				766	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428				766	366
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	96				75	93
cM capacity (veh/h)	1134				349	677

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	357	422	136
Volume Left	42	0	88
Volume Right	0	127	48
cSH	1134	1700	421
Volume to Capacity	0.04	0.25	0.32
Queue Length 95th (m)	0.9	0.0	10.5
Control Delay (s)	1.3	0.0	17.6
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	17.6
Approach LOS			C

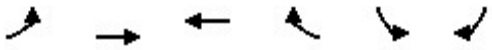
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	350	43	10	371	4	23	7	18	57	3	11
Future Volume (Veh/h)	18	350	43	10	371	4	23	7	18	57	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	389	48	11	412	4	26	8	20	63	3	12
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	434			454			924	926	437	938	948	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434			454			924	926	437	938	948	436
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			86	97	97	71	99	98
cM capacity (veh/h)	1082			1035			188	255	596	217	247	612

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	457	427	54	78
Volume Left	20	11	26	63
Volume Right	48	4	20	12
cSH	1082	1035	266	242
Volume to Capacity	0.02	0.01	0.20	0.32
Queue Length 95th (m)	0.4	0.2	5.7	10.2
Control Delay (s)	0.6	0.3	22.0	26.7
Lane LOS	A	A	C	D
Approach Delay (s)	0.6	0.3	22.0	26.7
Approach LOS			C	D

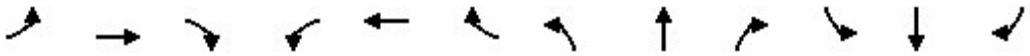
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	43.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	75	56	132	86	30
Future Volume (Veh/h)	50	75	56	132	86	30
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)	54	82	61	143	93	33
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	204				322	132
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204				322	132
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	96
cM capacity (veh/h)	1368				645	917

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	136	204	126
Volume Left	54	0	93
Volume Right	0	143	33
cSH	1368	1700	699
Volume to Capacity	0.04	0.12	0.18
Queue Length 95th (m)	0.9	0.0	5.0
Control Delay (s)	3.3	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	3.3	0.0	11.3
Approach LOS			B

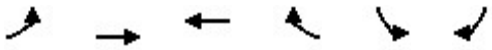
Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	46	2	122	29	2	6	17	218	0	7	0
Future Volume (vph)	0	46	2	122	29	2	6	17	218	0	7	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	0	66	3	174	41	3	9	24	311	0	10	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	69	218	344	10
Volume Left (vph)	0	174	9	0
Volume Right (vph)	3	3	311	0
Hadj (s)	-0.03	0.15	-0.52	0.00
Departure Headway (s)	5.0	4.9	4.1	5.0
Degree Utilization, x	0.09	0.30	0.39	0.01
Capacity (veh/h)	659	684	831	645
Control Delay (s)	8.5	10.0	9.8	8.1
Approach Delay (s)	8.5	10.0	9.8	8.1
Approach LOS	A	B	A	A

Intersection Summary				
Delay	9.7			
Level of Service	A			
Intersection Capacity Utilization	42.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	419	376	259	105	5
Future Volume (Veh/h)	5	419	376	259	105	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	476	427	294	119	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	743				1084	596
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	743				1084	596
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				49	99
cM capacity (veh/h)	850				234	494

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	482	721	125
Volume Left	6	0	119
Volume Right	0	294	6
cSH	850	1700	240
Volume to Capacity	0.01	0.42	0.52
Queue Length 95th (m)	0.2	0.0	20.8
Control Delay (s)	0.2	0.0	35.2
Lane LOS	A		E
Approach Delay (s)	0.2	0.0	35.2
Approach LOS			E

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	11	22	7	9	16
Future Volume (vph)	9	11	22	7	9	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.8	3.5	3.3	3.5	3.5	3.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.924		0.967			
Flt Protected	0.978					0.983
Satd. Flow (prot)	1946	0	1776	0	0	1738
Flt Permitted	0.978					0.983
Satd. Flow (perm)	1946	0	1776	0	0	1738
Link Speed (k/h)	40		40			40
Link Distance (m)	456.0		590.7			1083.8
Travel Time (s)	41.0		53.2			97.5
Lane Group Flow (vph)	25	0	37	0	0	31
Sign Control	Stop		Free			Free

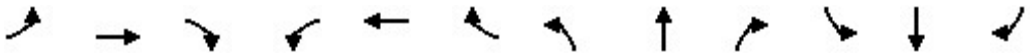
Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	19	11	10	20	7	11
Future Volume (vph)	19	11	10	20	7	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.1	3.5	3.5	3.1	4.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951				0.919	
Flt Protected				0.984	0.980	
Satd. Flow (prot)	1544	0	0	1645	1782	0
Flt Permitted				0.984	0.980	
Satd. Flow (perm)	1544	0	0	1645	1782	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	263.8			381.2	411.0	
Travel Time (s)	23.7			34.3	37.0	
Lane Group Flow (vph)	33	0	0	33	20	0
Sign Control	Free			Free	Stop	

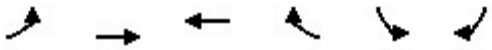
Intersection Summary	
Area Type:	Other

Control Type: Unsignalized



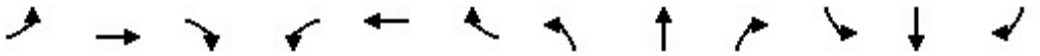
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	103	14	32	133	9	22	14	38	9	8	8
Future Volume (vph)	7	103	14	32	133	9	22	14	38	9	8	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.993			0.931			0.957	
Flt Protected		0.997			0.991			0.985			0.982	
Satd. Flow (prot)	0	2014	0	0	1924	0	0	1782	0	0	1943	0
Flt Permitted		0.997			0.991			0.985			0.982	
Satd. Flow (perm)	0	2014	0	0	1924	0	0	1782	0	0	1943	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		788.4			805.6			914.0			590.7	
Travel Time (s)		71.0			72.5			82.3			53.2	
Lane Group Flow (vph)	0	130	0	0	183	0	0	78	0	0	25	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	



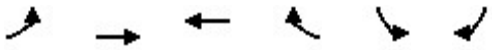
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	192	196	8	16	26
Future Volume (vph)	12	192	196	8	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	4.8	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.917	
Flt Protected		0.997			0.981	
Satd. Flow (prot)	0	1773	1720	0	1893	0
Flt Permitted		0.997			0.981	
Satd. Flow (perm)	0	1773	1720	0	1893	0
Link Speed (k/h)		40	40		40	
Link Distance (m)		805.6	354.8		411.0	
Travel Time (s)		72.5	31.9		37.0	
Lane Group Flow (vph)	0	215	214	0	44	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	



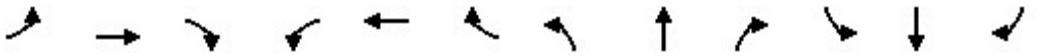
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	207	9	8	197	2	2	6	15	11	2	8
Future Volume (vph)	14	207	9	8	197	2	2	6	15	11	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.8	3.5	3.5	3.8	3.5	3.5	3.5	3.5	4.8	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995			0.999			0.912			0.947	
Flt Protected		0.997			0.998			0.996			0.975	
Satd. Flow (prot)	0	1732	0	0	1730	0	0	1574	0	0	1735	0
Flt Permitted		0.997			0.998			0.996			0.975	
Satd. Flow (perm)	0	1732	0	0	1730	0	0	1574	0	0	1735	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		354.8			155.5			122.8			292.8	
Travel Time (s)		31.9			14.0			11.1			26.4	
Lane Group Flow (vph)	0	256	0	0	230	0	0	26	0	0	23	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	



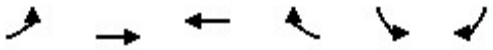
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1842	1842	0	1842	0
Flt Permitted						
Satd. Flow (perm)	0	1842	1842	0	1842	0
Link Speed (k/h)		40	40		40	
Link Distance (m)		456.0	263.8		80.1	
Travel Time (s)		41.0	23.7		7.2	
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	5	1	18	4	1	5	14	39	0	6	0
Future Volume (vph)	0	5	1	18	4	1	5	14	39	0	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	4.4	3.5	3.5	4.4	3.5	3.5	4.3	3.5	3.5	4.3	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.996			0.909				
Flt Protected					0.962			0.996				
Satd. Flow (prot)	0	2034	0	0	1982	0	0	1793	0	0	2048	0
Flt Permitted					0.962			0.996				
Satd. Flow (perm)	0	2034	0	0	1982	0	0	1793	0	0	2048	0
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		109.8			83.2			292.8			179.2	
Travel Time (s)		9.9			7.5			26.4			16.1	
Lane Group Flow (vph)	0	8	0	0	33	0	0	83	0	0	9	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	



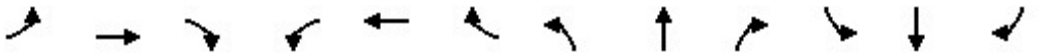
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	229	201	76	42	3
Future Volume (vph)	3	229	201	76	42	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.8	3.8	3.5	4.8	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.963		0.992	
Flt Protected		0.999			0.955	
Satd. Flow (prot)	0	1782	1726	0	2040	0
Flt Permitted		0.999			0.955	
Satd. Flow (perm)	0	1782	1726	0	2040	0
Link Speed (k/h)		40	40		40	
Link Distance (m)		155.5	320.4		154.4	
Travel Time (s)		14.0	28.8		13.9	
Lane Group Flow (vph)	0	263	314	0	51	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	27	27	17	15	118
Future Volume (Veh/h)	23	27	27	17	15	118
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)	30	36	36	22	20	155
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	242	47			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	47			58	
tC, single (s)	6.4	6.5			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.3	
p0 queue free %	96	96			99	
cM capacity (veh/h)	741	941			1473	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	66	58	175
Volume Left	30	0	20
Volume Right	36	22	0
cSH	838	1700	1473
Volume to Capacity	0.08	0.03	0.01
Queue Length 95th (m)	1.9	0.0	0.3
Control Delay (s)	9.7	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	1.0
Approach LOS	A		

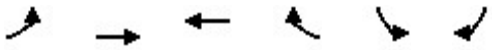
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	127	104	121	124	9	72	22	45	10	117	21
Future Volume (Veh/h)	12	127	104	121	124	9	72	22	45	10	117	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	15	155	127	148	151	11	88	27	55	12	143	26
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	162			282			800	706	220	772	764	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			282			800	706	220	772	764	158
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	99			86			42	91	93	95	48	97
cM capacity (veh/h)	1314			1037			151	307	763	236	276	892

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	297	310	170	181
Volume Left	15	148	88	12
Volume Right	127	11	55	26
cSH	1314	1037	229	302
Volume to Capacity	0.01	0.14	0.74	0.60
Queue Length 95th (m)	0.3	3.8	38.7	27.4
Control Delay (s)	0.5	5.1	55.3	33.2
Lane LOS	A	A	F	D
Approach Delay (s)	0.5	5.1	55.3	33.2
Approach LOS			F	D

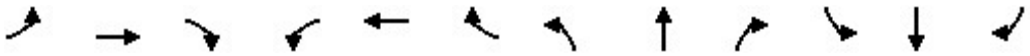
Intersection Summary				
Average Delay	17.9			
Intersection Capacity Utilization	57.3%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	276	314	55	115	53
Future Volume (Veh/h)	28	276	314	55	115	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	39	383	436	76	160	74
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	522				946	485
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	522				946	485
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	96				38	87
cM capacity (veh/h)	993				258	572

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	422	512	234
Volume Left	39	0	160
Volume Right	0	76	74
cSH	993	1700	312
Volume to Capacity	0.04	0.30	0.75
Queue Length 95th (m)	0.9	0.0	43.3
Control Delay (s)	1.2	0.0	44.4
Lane LOS	A		E
Approach Delay (s)	1.2	0.0	44.4
Approach LOS			E

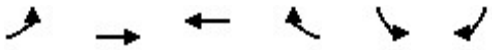
Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	346	25	9	332	3	43	2	13	17	5	13
Future Volume (Veh/h)	13	346	25	9	332	3	43	2	13	17	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	17	449	32	12	431	4	56	3	17	22	6	17
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	442			487			985	971	471	982	985	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	442			487			985	971	471	982	985	443
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	98			99			72	99	97	89	98	97
cM capacity (veh/h)	1122			1081			204	245	558	207	241	613

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	498	447	76	45
Volume Left	17	12	56	22
Volume Right	32	4	17	17
cSH	1122	1081	239	283
Volume to Capacity	0.02	0.01	0.32	0.16
Queue Length 95th (m)	0.4	0.3	10.0	4.2
Control Delay (s)	0.5	0.3	26.9	20.1
Lane LOS	A	A	D	C
Approach Delay (s)	0.5	0.3	26.9	20.1
Approach LOS			D	C

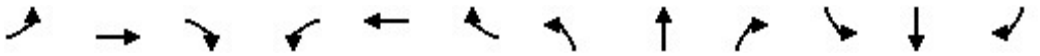
Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	37.5%	ICU Level of Service	A	
Analysis Period (min)	15			



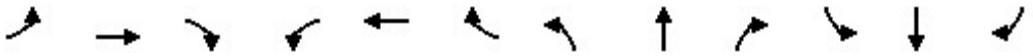
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	371	326	60	65	0
Future Volume (Veh/h)	4	371	326	60	65	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	452	398	73	79	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	475				900	438
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	475				900	438
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				74	100
cM capacity (veh/h)	1092				308	620

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	457	471	79
Volume Left	5	0	79
Volume Right	0	73	0
cSH	1092	1700	308
Volume to Capacity	0.00	0.28	0.26
Queue Length 95th (m)	0.1	0.0	7.6
Control Delay (s)	0.1	0.0	20.6
Lane LOS	A		C
Approach Delay (s)	0.1	0.0	20.6
Approach LOS			C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	164	218	59	162	7	234	107	96	7	28	20
Future Volume (vph)	28	164	218	59	162	7	234	107	96	7	28	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		15.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			0.99			1.00	
Frt		0.928			0.996			0.970			0.950	
Flt Protected		0.997			0.987			0.974			0.994	
Satd. Flow (prot)	0	1854	0	0	1883	0	0	1857	0	0	1940	0
Flt Permitted		0.970			0.835			0.802			0.939	
Satd. Flow (perm)	0	1803	0	0	1593	0	0	1529	0	0	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		141			4			33			21	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		788.4			805.6			914.0			590.7	
Travel Time (s)		71.0			72.5			82.3			53.2	
Confl. Peds. (#/hr)	3		1	1		1			3	3		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	14%	4%	7%	34%	5%	0%	5%	14%	13%	0%	0%	13%
Adj. Flow (vph)	29	173	229	62	171	7	246	113	101	7	29	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	0	0	240	0	0	460	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (%)	52.0%	52.0%		52.0%	52.0%		48.0%	48.0%		48.0%	48.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		20.3			20.3			16.6			16.6	
Actuated g/C Ratio		0.43			0.43			0.35			0.35	
v/c Ratio		0.50			0.35			0.82			0.09	
Control Delay		9.3			11.4			27.2			7.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.3			11.4			27.2			7.5	
LOS		A			B			C			A	
Approach Delay		9.3			11.4			27.2			7.5	
Approach LOS		A			B			C			A	
Queue Length 50th (m)		16.8			13.5			30.4			1.9	
Queue Length 95th (m)		35.8			26.5			#72.9			7.1	
Internal Link Dist (m)		764.4			781.6			890.0			566.7	
Turn Bay Length (m)												
Base Capacity (vph)		887			718			641			757	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.33			0.72			0.08	

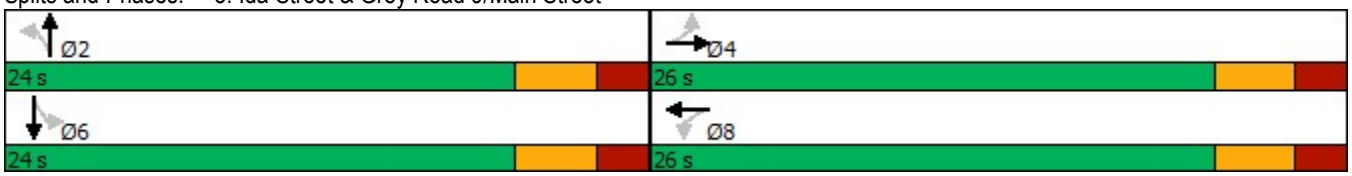
Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 47			
Natural Cycle: 55			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 16.6		Intersection LOS: B	

Intersection Capacity Utilization 68.3% ICU Level of Service C

Analysis Period (min) 15

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

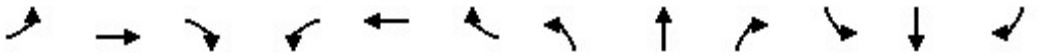
Splits and Phases: 3: Ida Street & Grey Road 9/Main Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	26	113	28	33	34
Future Volume (Veh/h)	22	26	113	28	33	34
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	28	32	141	35	41	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	282	158			176	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	158			176	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	96			97	
cM capacity (veh/h)	691	892			1412	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	176	83
Volume Left	28	0	41
Volume Right	32	35	0
cSH	786	1700	1412
Volume to Capacity	0.08	0.10	0.03
Queue Length 95th (m)	1.9	0.0	0.7
Control Delay (s)	10.0	0.0	3.9
Lane LOS	A		A
Approach Delay (s)	10.0	0.0	3.9
Approach LOS	A		

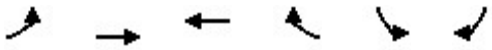
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	164	218	59	162	7	234	107	96	7	28	20
Future Volume (Veh/h)	28	164	218	59	162	7	234	107	96	7	28	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	173	229	62	171	7	246	113	101	7	29	21
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	181			403			680	652	292	808	762	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			403			680	652	292	808	762	178
tC, single (s)	4.2			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	98			94			19	67	86	96	91	97
cM capacity (veh/h)	1320			1001			304	340	719	179	308	835

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	431	240	460	57
Volume Left	29	62	246	7
Volume Right	229	7	101	21
cSH	1320	1001	359	360
Volume to Capacity	0.02	0.06	1.28	0.16
Queue Length 95th (m)	0.5	1.5	158.6	4.2
Control Delay (s)	0.7	2.7	177.0	16.9
Lane LOS	A	A	F	C
Approach Delay (s)	0.7	2.7	177.0	16.9
Approach LOS			F	C

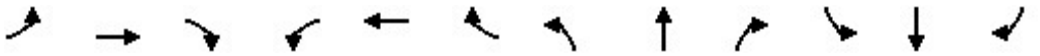
Intersection Summary				
Average Delay	70.2			
Intersection Capacity Utilization	66.6%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	314	251	121	84	39
Future Volume (Veh/h)	28	314	251	121	84	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	331	264	127	88	41
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	397				724	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397				724	336
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				76	94
cM capacity (veh/h)	1164				373	705

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	360	391	129
Volume Left	29	0	88
Volume Right	0	127	41
cSH	1164	1700	439
Volume to Capacity	0.02	0.23	0.29
Queue Length 95th (m)	0.6	0.0	9.2
Control Delay (s)	0.9	0.0	16.6
Lane LOS	A		C
Approach Delay (s)	0.9	0.0	16.6
Approach LOS			C

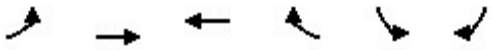
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	365	43	10	342	4	23	7	18	13	3	11
Future Volume (Veh/h)	18	365	43	10	342	4	23	7	18	13	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	406	48	11	380	4	26	8	20	14	3	12
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	402			471			908	911	454	923	933	404
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402			471			908	911	454	923	933	404
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			87	97	97	94	99	98
cM capacity (veh/h)	1112			1020			193	260	583	222	253	638

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	474	395	54	29
Volume Left	20	11	26	14
Volume Right	48	4	20	12
cSH	1112	1020	270	310
Volume to Capacity	0.02	0.01	0.20	0.09
Queue Length 95th (m)	0.4	0.2	5.5	2.3
Control Delay (s)	0.5	0.4	21.6	17.8
Lane LOS	A	A	C	C
Approach Delay (s)	0.5	0.4	21.6	17.8
Approach LOS			C	C

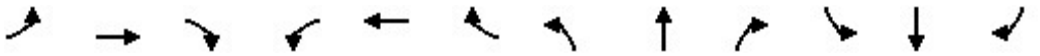
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			



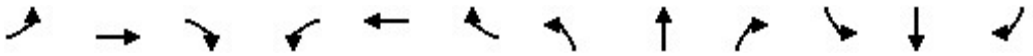
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	390	347	114	61	5
Future Volume (Veh/h)	6	390	347	114	61	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	443	394	130	69	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	546				938	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546				938	481
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				76	99
cM capacity (veh/h)	1006				286	573

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	450	524	75
Volume Left	7	0	69
Volume Right	0	130	6
cSH	1006	1700	298
Volume to Capacity	0.01	0.31	0.25
Queue Length 95th (m)	0.2	0.0	7.4
Control Delay (s)	0.2	0.0	21.1
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	21.1
Approach LOS			C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	127	104	121	124	9	72	22	45	10	117	42
Future Volume (vph)	20	127	104	121	124	9	72	22	45	10	117	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		15.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.99			0.99	
Frt		0.944			0.995			0.956			0.967	
Flt Protected		0.996			0.977			0.975			0.997	
Satd. Flow (prot)	0	1617	0	0	1580	0	0	1762	0	0	1935	0
Flt Permitted		0.960			0.717			0.791			0.971	
Satd. Flow (perm)	0	1559	0	0	1160	0	0	1428	0	0	1884	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		69			4			49			34	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		788.4			805.6			914.0			590.7	
Travel Time (s)		71.0			72.5			82.3			53.2	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	20%	18%	35%	53%	14%	10%	9%	2%	25%	8%	9%	0%
Adj. Flow (vph)	24	155	127	148	151	11	88	27	55	12	143	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	306	0	0	310	0	0	170	0	0	206	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

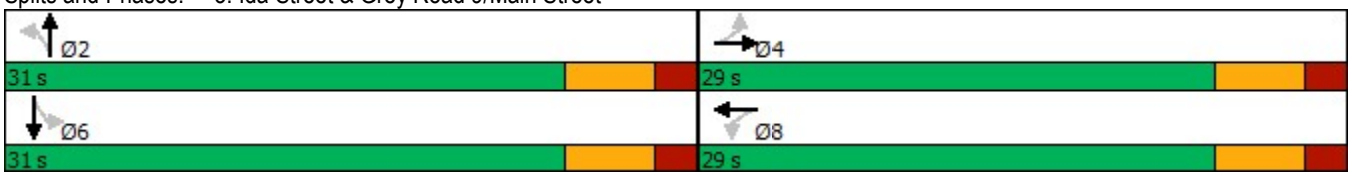


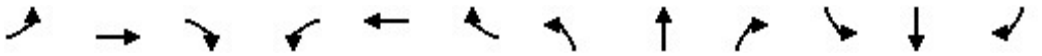
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	29.0	29.0		29.0	29.0		31.0	31.0		31.0	31.0	
Total Split (%)	48.3%	48.3%		48.3%	48.3%		51.7%	51.7%		51.7%	51.7%	
Maximum Green (s)	23.0	23.0		23.0	23.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		24.0			24.0			14.8			14.8	
Actuated g/C Ratio		0.56			0.56			0.34			0.34	
v/c Ratio		0.34			0.48			0.33			0.31	
Control Delay		8.0			12.6			12.0			12.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.0			12.6			12.0			12.6	
LOS		A			B			B			B	
Approach Delay		8.0			12.6			12.0			12.6	
Approach LOS		A			B			B			B	
Queue Length 50th (m)		11.8			17.6			7.2			10.4	
Queue Length 95th (m)		21.9			31.9			17.7			22.0	
Internal Link Dist (m)		764.4			781.6			890.0			566.7	
Turn Bay Length (m)												
Base Capacity (vph)		905			652			890			1162	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.34			0.48			0.19			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 43.1			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 11.1		Intersection LOS: B	

Intersection Capacity Utilization 77.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Ida Street & Grey Road 9/Main Street

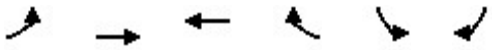




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	127	104	121	124	9	72	22	45	10	117	42
Future Volume (Veh/h)	20	127	104	121	124	9	72	22	45	10	117	42
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	155	127	148	151	11	88	27	55	12	143	51
Pedestrians		1			2							
Lane Width (m)		4.8			4.8							
Walking Speed (m/s)		1.1			1.1							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	162			282			842	724	220	790	782	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			282			842	724	220	790	782	158
tC, single (s)	4.3			4.6			7.2	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.7			3.6	4.0	3.5	3.6	4.1	3.3
p0 queue free %	98			86			34	91	93	95	47	94
cM capacity (veh/h)	1314			1037			134	296	763	228	267	892

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	306	310	170	206
Volume Left	24	148	88	12
Volume Right	127	11	55	51
cSH	1314	1037	207	320
Volume to Capacity	0.02	0.14	0.82	0.64
Queue Length 95th (m)	0.4	3.8	45.6	31.9
Control Delay (s)	0.8	5.1	71.9	34.6
Lane LOS	A	A	F	D
Approach Delay (s)	0.8	5.1	71.9	34.6
Approach LOS			F	D

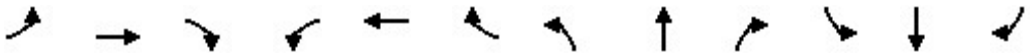
Intersection Summary				
Average Delay	21.3			
Intersection Capacity Utilization	59.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	276	314	55	115	63
Future Volume (Veh/h)	32	276	314	55	115	63
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	44	383	436	76	160	88
Pedestrians		1	1		10	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	522				956	485
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	522				956	485
tC, single (s)	4.2				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.7	3.3
p0 queue free %	96				37	85
cM capacity (veh/h)	993				253	572

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	427	512	248
Volume Left	44	0	160
Volume Right	0	76	88
cSH	993	1700	315
Volume to Capacity	0.04	0.30	0.79
Queue Length 95th (m)	1.1	0.0	48.0
Control Delay (s)	1.4	0.0	48.1
Lane LOS	A		E
Approach Delay (s)	1.4	0.0	48.1
Approach LOS			E

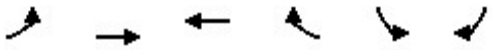
Intersection Summary			
Average Delay	10.5		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	346	25	9	332	3	43	2	13	80	5	13
Future Volume (Veh/h)	13	346	25	9	332	3	43	2	13	80	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	17	449	32	12	431	4	56	3	17	104	6	17
Pedestrians		3						6			7	
Lane Width (m)		3.8						3.5			3.5	
Walking Speed (m/s)		1.1						1.1			1.1	
Percent Blockage		0						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	442			487			985	971	471	982	985	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	442			487			985	971	471	982	985	443
tC, single (s)	4.1			4.1			7.2	6.5	6.4	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.5	3.6	4.0	3.3
p0 queue free %	98			99			72	99	97	50	98	97
cM capacity (veh/h)	1122			1081			204	245	558	207	241	613

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	498	447	76	127
Volume Left	17	12	56	104
Volume Right	32	4	17	17
cSH	1122	1081	239	228
Volume to Capacity	0.02	0.01	0.32	0.56
Queue Length 95th (m)	0.4	0.3	10.0	23.1
Control Delay (s)	0.5	0.3	26.9	38.9
Lane LOS	A	A	D	E
Approach Delay (s)	0.5	0.3	26.9	38.9
Approach LOS			D	E

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	39.5%	ICU Level of Service	A	
Analysis Period (min)	15			



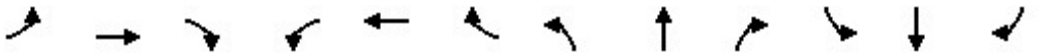
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	434	326	106	128	0
Future Volume (Veh/h)	4	434	326	106	128	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	529	398	129	156	0
Pedestrians					4	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	531				1006	466
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	531				1006	466
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				42	100
cM capacity (veh/h)	1042				267	597

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	534	527	156
Volume Left	5	0	156
Volume Right	0	129	0
cSH	1042	1700	267
Volume to Capacity	0.00	0.31	0.58
Queue Length 95th (m)	0.1	0.0	25.7
Control Delay (s)	0.1	0.0	35.8
Lane LOS	A		E
Approach Delay (s)	0.1	0.0	35.8
Approach LOS			E

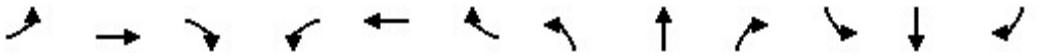
Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	37	41	113	52	58	34
Future Volume (vph)	37	41	113	52	58	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.8	3.5	3.3	3.5	3.5	3.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.929		0.957			
Flt Protected	0.977					0.969
Satd. Flow (prot)	1954	0	1758	0	0	1741
Flt Permitted	0.977					0.969
Satd. Flow (perm)	1954	0	1758	0	0	1741
Link Speed (k/h)	40		40			40
Link Distance (m)	359.8		590.7			1083.8
Travel Time (s)	32.4		53.2			97.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%
Adj. Flow (vph)	46	51	141	65	73	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	97	0	206	0	0	116
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.8		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	0.85	1.01	1.04	1.01	1.01	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	164	218	59	162	7	234	107	96	7	28	35
Future Volume (vph)	52	164	218	59	162	7	234	107	96	7	28	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5	3.5	4.8	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		15.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			0.99			1.00	
Frt		0.932			0.996			0.970			0.932	
Flt Protected		0.994			0.987			0.974			0.995	
Satd. Flow (prot)	0	1686	0	0	1883	0	0	1857	0	0	1860	0
Flt Permitted		0.931			0.820			0.793			0.949	
Satd. Flow (perm)	0	1578	0	0	1564	0	0	1512	0	0	1773	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		98			3			29			37	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		788.4			805.6			914.0			590.7	
Travel Time (s)		71.0			72.5			82.3			53.2	
Confl. Peds. (#/hr)	3		1	1		1			3	3		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	4%	7%	34%	5%	0%	5%	14%	13%	0%	2%	13%
Adj. Flow (vph)	55	173	229	62	171	7	246	113	101	7	29	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	240	0	0	460	0	0	73	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01	1.01	0.85	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	29.0	29.0		29.0	29.0		31.0	31.0		31.0	31.0	
Total Split (%)	48.3%	48.3%		48.3%	48.3%		51.7%	51.7%		51.7%	51.7%	
Maximum Green (s)	23.0	23.0		23.0	23.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		21.3			21.3			20.0			20.0	
Actuated g/C Ratio		0.40			0.40			0.37			0.37	
v/c Ratio		0.66			0.38			0.79			0.11	
Control Delay		16.8			14.6			25.2			6.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.8			14.6			25.2			6.8	
LOS		B			B			C			A	
Approach Delay		16.8			14.6			25.2			6.8	
Approach LOS		B			B			C			A	
Queue Length 50th (m)		27.1			16.0			33.5			2.0	
Queue Length 95th (m)		60.4			34.1			#70.9			8.4	
Internal Link Dist (m)		764.4			781.6			890.0			566.7	
Turn Bay Length (m)												
Base Capacity (vph)		742			682			730			858	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.62			0.35			0.63			0.09	

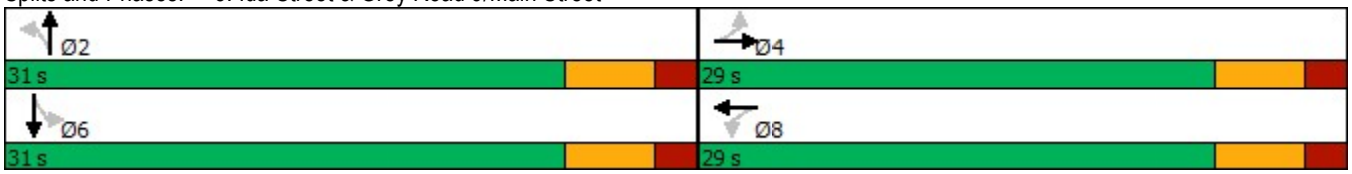
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 53.4			
Natural Cycle: 55			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 18.9		Intersection LOS: B	

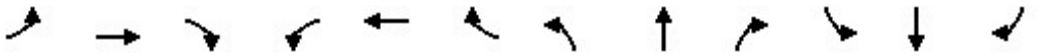
Intersection Capacity Utilization 69.1% ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 3: Ida Street & Grey Road 9/Main Street

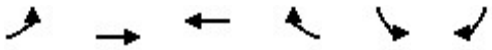




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	164	218	59	162	7	234	107	96	7	28	35
Future Volume (Veh/h)	52	164	218	59	162	7	234	107	96	7	28	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	173	229	62	171	7	246	113	101	7	29	37
Pedestrians					3			1			3	
Lane Width (m)					4.8			4.8			4.8	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	181			403			748	704	292	860	814	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			403			748	704	292	860	814	178
tC, single (s)	5.1			4.4			7.1	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	3.1			2.5			3.5	4.1	3.4	3.5	4.0	3.4
p0 queue free %	94			94			5	63	86	95	89	96
cM capacity (veh/h)	967			1001			259	306	719	155	275	835

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	457	240	460	73
Volume Left	55	62	246	7
Volume Right	229	7	101	37
cSH	967	1001	315	374
Volume to Capacity	0.06	0.06	1.46	0.20
Queue Length 95th (m)	1.4	1.5	190.0	5.4
Control Delay (s)	1.7	2.7	254.7	16.9
Lane LOS	A	A	F	C
Approach Delay (s)	1.7	2.7	254.7	16.9
Approach LOS			F	C

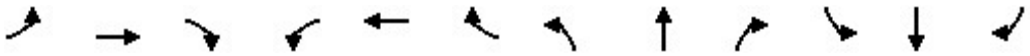
Intersection Summary				
Average Delay	97.4			
Intersection Capacity Utilization	65.7%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	314	251	121	84	46
Future Volume (Veh/h)	40	314	251	121	84	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	331	264	127	88	48
Pedestrians		2	2		6	
Lane Width (m)		3.5	3.5		4.8	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	397				750	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397				750	336
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	96				75	93
cM capacity (veh/h)	1164				356	705

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	373	391	136
Volume Left	42	0	88
Volume Right	0	127	48
cSH	1164	1700	432
Volume to Capacity	0.04	0.23	0.32
Queue Length 95th (m)	0.9	0.0	10.1
Control Delay (s)	1.3	0.0	17.1
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	17.1
Approach LOS			C

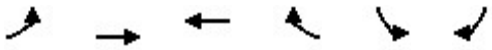
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	365	43	10	342	4	23	7	18	57	3	11
Future Volume (Veh/h)	18	365	43	10	342	4	23	7	18	57	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	406	48	11	380	4	26	8	20	63	3	12
Pedestrians		4			7			17			18	
Lane Width (m)		3.8			3.8			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	402			471			908	911	454	923	933	404
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402			471			908	911	454	923	933	404
tC, single (s)	4.2			4.2			7.6	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			4.0	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			99			87	97	97	72	99	98
cM capacity (veh/h)	1112			1020			193	260	583	222	253	638

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	474	395	54	78
Volume Left	20	11	26	63
Volume Right	48	4	20	12
cSH	1112	1020	270	248
Volume to Capacity	0.02	0.01	0.20	0.31
Queue Length 95th (m)	0.4	0.2	5.5	9.8
Control Delay (s)	0.5	0.4	21.6	26.0
Lane LOS	A	A	C	D
Approach Delay (s)	0.5	0.4	21.6	26.0
Approach LOS			C	D

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	44.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	434	347	259	105	5
Future Volume (Veh/h)	6	434	347	259	105	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	493	394	294	119	6
Pedestrians					22	
Lane Width (m)					4.8	
Walking Speed (m/s)					1.1	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	710				1070	563
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710				1070	563
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				50	99
cM capacity (veh/h)	875				238	515

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	500	688	125
Volume Left	7	0	119
Volume Right	0	294	6
cSH	875	1700	245
Volume to Capacity	0.01	0.40	0.51
Queue Length 95th (m)	0.2	0.0	20.2
Control Delay (s)	0.2	0.0	34.1
Lane LOS	A		D
Approach Delay (s)	0.2	0.0	34.1
Approach LOS			D

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
© Copyright TRL Limited, 2022

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Future Total 2032 Eco-Park Traffic Volumes.arc8
Path: J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Design\Traffic\Working\Roundabout\Eco-Park FT 2023
Report generation date: 2022-08-25 9:34:23 PM

Summary of intersection performance

	PM						
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Future Total 2032 [Entry Lane Simulation] - 2022						
Leg 1	0.22	1.33	2.56	N/A	A	3.02	A
Leg 2	0.04	~1	1.35	N/A	A		
Leg 3	0.43	2.36	2.80	N/A	A		
Leg 4	0.60	2.89	3.75	N/A	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2022, AM" model duration: 8:00 AM - 9:30 AM
"D2 - 2022, PM " model duration: 5:00 PM - 6:30 PM

Run using Junctions 8.0.6.541 at 2022-08-25 9:34:23 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2022-08-12
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	khagan
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Entry Lane Analysis Options

Stop Criteria (%)	Random Seed	Results Refresh Speed (s)	Individual Vehicle Animation Number Of Trials	Time Step Size (s)	Last Run Random Seed	Last Run Number Of Trials
1.00	-1	3	1	10	142901952	1583

Future Total 2032 - 2022, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Entry Lane Analysis	A1 - Future Total 2032 [Entry Lane Simulation]	This analysis set uses entry lane simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Future Total 2032	Entry Lane Simulation		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2022, PM	2022	PM		ONE HOUR	17:00	18:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Intersection Delay (s)	Intersection LOS
1	untitled	Roundabout	1,2,3,4			3.02	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
1	1	Main Street W	
2	2	Ida Street	
3	3	Grey Road 9	
4	4	Ida Street	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.80	4.25	5.00	20.00	35.00	32.50	
2	3.80	4.25	5.00	20.00	35.00	32.50	
3	3.80	4.25	5.00	20.00	35.00	32.50	

4	3.80	4.25	5.00	20.00	35.00	32.50	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1		(calculated)	(calculated)	0.557	1246.355
2		(calculated)	(calculated)	0.557	1246.355
3		(calculated)	(calculated)	0.557	1246.355
4		(calculated)	(calculated)	0.557	1246.355

The slope and intercept shown above include any corrections and adjustments.

Entry Lane Analysis: Leg options

Leg	Lane Capacity Source	Traffic Considering Secondary Lanes (%)
1	Evenly split	10.00
2	Evenly split	10.00
3	Evenly split	10.00
4	Evenly split	10.00

Lanes

Leg	Lane Level	Lane	Has Limited Storage	Storage (PCE)	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	1	1		Infinity	0.00	99999.00
2	1	1		Infinity	0.00	99999.00
3	1	1		Infinity	0.00	99999.00
4	1	1		Infinity	0.00	99999.00

Entry Lane slope and intercept

Leg	Slope	Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1	(calculated)	(calculated)	0.557	1246.355
2	(calculated)	(calculated)	0.557	1246.355
3	(calculated)	(calculated)	0.557	1246.355
4	(calculated)	(calculated)	0.557	1246.355

Lane Movements

Intersection	Leg	Lane Level	Lane	Leg			
				1	2	3	4
1	1	1	1	✓	✓	✓	✓
1	2	1	1	✓	✓	✓	✓
1	3	1	1	✓	✓	✓	✓
1	4	1	1	✓	✓	✓	✓

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)

1	ONE HOUR	✓	228.00	100.000
2	ONE HOUR	✓	70.00	100.000
3	ONE HOUR	✓	434.00	100.000
4	ONE HOUR	✓	437.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	7.000	162.000	59.000
	2	7.000	0.000	35.000	28.000
	3	164.000	52.000	0.000	218.000
	4	96.000	107.000	234.000	0.000

Turning Proportions (Veh) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.03	0.71	0.26
	2	0.10	0.00	0.50	0.40
	3	0.38	0.12	0.00	0.50
	4	0.22	0.24	0.54	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.000	1.053	1.344
	2	1.000	1.000	1.125	1.000
	3	1.039	1.143	1.000	1.071
	4	1.132	1.143	1.045	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	0.0	5.3	34.4
	2	0.0	0.0	12.5	0.0
	3	3.9	14.3	0.0	7.1
	4	13.2	14.3	4.5	0.0

Results

Results Summary for whole modelled period

Leg	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)
1	2.56	0.22	1.33	A	231.27	346.90	13.41	2.32	0.15
2	1.35	0.04	~1	A	69.33	104.00	2.16	1.24	0.02
3	2.80	0.43	2.36	A	424.35	636.52	24.73	2.33	0.27
4	3.75	0.60	2.89	A	435.77	653.65	32.90	3.02	0.37

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
© Copyright TRL Limited, 2022

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Future Total 2032 Eco-Park Traffic Volumes.arc8
Path: J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Design\Traffic\Working\Roundabout\Eco-Park FT 2023
Report generation date: 2022-08-25 9:28:00 PM

Summary of intersection performance

	AM						
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Future Total 2032 [Entry Lane Simulation] - 2022						
Leg 1	0.31	1.85	2.53	N/A	A	2.36	A
Leg 2	0.12	0.62	1.75	N/A	A		
Leg 3	0.33	1.83	3.09	N/A	A		
Leg 4	0.07	~1	1.22	N/A	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2022, AM " model duration: 8:00 AM - 9:30 AM
"D2 - 2022, PM" model duration: 5:00 PM - 6:30 PM

Run using Junctions 8.0.6.541 at 2022-08-25 9:28:00 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2022-08-12
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	khagan
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Entry Lane Analysis Options

Stop Criteria (%)	Random Seed	Results Refresh Speed (s)	Individual Vehicle Animation Number Of Trials	Time Step Size (s)	Last Run Random Seed	Last Run Number Of Trials
1.00	-1	3	1	10	97924373	2865

Future Total 2032 - 2022, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Entry Lane Analysis	A1 - Future Total 2032 [Entry Lane Simulation]	This analysis set uses entry lane simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Future Total 2032	Entry Lane Simulation		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2022, AM	2022	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Intersection Delay (s)	Intersection LOS
1	untitled	Roundabout	1,2,3,4			2.36	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
1	1	Main Street W	
2	2	Ida Street	
3	3	Grey Road 9	
4	4	Ida Street	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.80	4.25	5.00	20.00	35.00	32.50	
2	3.80	4.25	5.00	20.00	35.00	32.50	
3	3.80	4.25	5.00	20.00	35.00	32.50	

4	3.80	4.25	5.00	20.00	35.00	32.50	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1		(calculated)	(calculated)	0.557	1246.355
2		(calculated)	(calculated)	0.557	1246.355
3		(calculated)	(calculated)	0.557	1246.355
4		(calculated)	(calculated)	0.557	1246.355

The slope and intercept shown above include any corrections and adjustments.

Entry Lane Analysis: Leg options

Leg	Lane Capacity Source	Traffic Considering Secondary Lanes (%)
1	Evenly split	10.00
2	Evenly split	10.00
3	Evenly split	10.00
4	Evenly split	10.00

Lanes

Leg	Lane Level	Lane	Has Limited Storage	Storage (PCE)	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	1	1		Infinity	0.00	99999.00
2	1	1		Infinity	0.00	99999.00
3	1	1		Infinity	0.00	99999.00
4	1	1		Infinity	0.00	99999.00

Entry Lane slope and intercept

Leg	Slope	Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1	(calculated)	(calculated)	0.557	1246.355
2	(calculated)	(calculated)	0.557	1246.355
3	(calculated)	(calculated)	0.557	1246.355
4	(calculated)	(calculated)	0.557	1246.355

Lane Movements

Intersection	Leg	Lane Level	Lane	Leg			
				1	2	3	4
1	1	1	1	✓	✓	✓	✓
1	2	1	1	✓	✓	✓	✓
1	3	1	1	✓	✓	✓	✓
1	4	1	1	✓	✓	✓	✓

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)

1	ONE HOUR	✓	254.00	100.000
2	ONE HOUR	✓	169.00	100.000
3	ONE HOUR	✓	251.00	100.000
4	ONE HOUR	✓	139.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	9.000	124.000	121.000
	2	10.000	0.000	42.000	117.000
	3	127.000	20.000	0.000	104.000
	4	45.000	22.000	72.000	0.000

Turning Proportions (Veh) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.04	0.49	0.48
	2	0.06	0.00	0.25	0.69
	3	0.51	0.08	0.00	0.41
	4	0.32	0.16	0.52	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.100	1.141	1.528
	2	1.083	1.000	1.000	1.091
	3	1.175	1.200	1.000	1.353
	4	1.250	1.000	1.091	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	10.0	14.1	52.8
	2	8.3	0.0	0.0	9.1
	3	17.5	20.0	0.0	35.3
	4	25.0	0.0	9.1	0.0

Results

Results Summary for whole modelled period

Leg	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)
1	2.53	0.31	1.85	A	310.26	465.39	18.87	2.43	0.21
2	1.75	0.12	0.62	A	167.47	251.20	6.50	1.55	0.07
3	3.09	0.33	1.83	A	288.72	433.08	20.39	2.83	0.23
4	1.22	0.07	~1	A	142.55	213.83	4.45	1.25	0.05

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
© Copyright TRL Limited, 2022

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Future Total 2032 Traffic Volumes.arc8
Path: J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Design\Traffic\Working\Roundabout
Report generation date: 2022-08-12 10:15:07 AM

Summary of intersection performance

	PM						
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Future Total 2032 [Entry Lane Simulation] - 2022						
Leg 1	0.15	0.81	1.57	N/A	A	1.40	A
Leg 2	0.02	~1	0.91	N/A	A		
Leg 3	0.14	0.77	1.44	N/A	A		
Leg 4	0.04	~1	1.12	N/A	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2022, AM" model duration: 8:00 AM - 9:30 AM
"D2 - 2022, PM " model duration: 5:00 PM - 6:30 PM

Run using Junctions 8.0.6.541 at 2022-08-12 10:15:07 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2022-08-12
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	khagan
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Entry Lane Analysis Options

Stop Criteria (%)	Random Seed	Results Refresh Speed (s)	Individual Vehicle Animation Number Of Trials	Time Step Size (s)	Last Run Random Seed	Last Run Number Of Trials
1.00	-1	3	1	10	123421417	6619

Future Total 2032 - 2022, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Entry Lane Analysis	A1 - Future Total 2032 [Entry Lane Simulation]	This analysis set uses entry lane simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Future Total 2032	Entry Lane Simulation		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2022, PM	2022	PM		ONE HOUR	17:00	18:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Intersection Delay (s)	Intersection LOS
1	untitled	Roundabout	1,2,3,4			1.40	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
1	1	Main Street W	
2	2	Ida Street	
3	3	Grey Road 9	
4	4	Ida Street	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.80	4.25	5.00	20.00	35.00	32.50	
2	3.80	4.25	5.00	20.00	35.00	32.50	
3	3.80	4.25	5.00	20.00	35.00	32.50	

4	3.80	4.25	5.00	20.00	35.00	32.50	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1		(calculated)	(calculated)	0.557	1246.355
2		(calculated)	(calculated)	0.557	1246.355
3		(calculated)	(calculated)	0.557	1246.355
4		(calculated)	(calculated)	0.557	1246.355

The slope and intercept shown above include any corrections and adjustments.

Entry Lane Analysis: Leg options

Leg	Lane Capacity Source	Traffic Considering Secondary Lanes (%)
1	Evenly split	10.00
2	Evenly split	10.00
3	Evenly split	10.00
4	Evenly split	10.00

Lanes

Leg	Lane Level	Lane	Has Limited Storage	Storage (PCE)	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	1	1		Infinity	0.00	99999.00
2	1	1		Infinity	0.00	99999.00
3	1	1		Infinity	0.00	99999.00
4	1	1		Infinity	0.00	99999.00

Entry Lane slope and intercept

Leg	Slope	Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1	(calculated)	(calculated)	0.557	1246.355
2	(calculated)	(calculated)	0.557	1246.355
3	(calculated)	(calculated)	0.557	1246.355
4	(calculated)	(calculated)	0.557	1246.355

Lane Movements

Intersection	Leg	Lane Level	Lane	Leg			
				1	2	3	4
1	1	1	1	✓	✓	✓	✓
1	2	1	1	✓	✓	✓	✓
1	3	1	1	✓	✓	✓	✓
1	4	1	1	✓	✓	✓	✓

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)

1	ONE HOUR	✓	258.00	100.000
2	ONE HOUR	✓	56.00	100.000
3	ONE HOUR	✓	269.00	100.000
4	ONE HOUR	✓	88.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	11.000	209.000	38.000
	2	11.000	0.000	35.000	10.000
	3	200.000	52.000	0.000	17.000
	4	45.000	17.000	26.000	0.000

Turning Proportions (Veh) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.04	0.81	0.15
	2	0.20	0.00	0.63	0.18
	3	0.74	0.19	0.00	0.06
	4	0.51	0.19	0.30	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.000	1.053	1.344
	2	1.000	1.000	1.125	1.000
	3	1.039	1.143	1.000	1.071
	4	1.132	1.143	1.045	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	0.0	5.3	34.4
	2	0.0	0.0	12.5	0.0
	3	3.9	14.3	0.0	7.1
	4	13.2	14.3	4.5	0.0

Results

Results Summary for whole modelled period

Leg	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)
1	1.57	0.15	0.81	A	259.29	388.93	9.57	1.48	0.11
2	0.91	0.02	~1	A	55.64	83.46	1.29	0.92	0.01
3	1.44	0.14	0.77	A	263.93	395.89	8.62	1.31	0.10
4	1.12	0.04	~1	A	89.61	134.41	2.53	1.13	0.03

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
© Copyright TRL Limited, 2022

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Future Total 2032 Traffic Volumes.arc8
Path: J:\1000\1060-Flato Dev\6220- Glenelg Expansion Lands\Design\Traffic\Working\Roundabout
Report generation date: 2022-08-12 10:05:43 AM

Summary of intersection performance

	AM						
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Future Total 2032 [Entry Lane Simulation] - 2022						
Leg 1	0.14	0.84	1.51	N/A	A	1.42	A
Leg 2	0.02	~1	0.79	N/A	A		
Leg 3	0.14	0.79	1.59	N/A	A		
Leg 4	0.02	~1	0.99	N/A	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2022, AM " model duration: 8:00 AM - 9:30 AM
"D2 - 2022, PM" model duration: 5:00 PM - 6:30 PM

Run using Junctions 8.0.6.541 at 2022-08-12 10:05:43 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2022-08-12
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	khagan
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Entry Lane Analysis Options

Stop Criteria (%)	Random Seed	Results Refresh Speed (s)	Individual Vehicle Animation Number Of Trials	Time Step Size (s)	Last Run Random Seed	Last Run Number Of Trials
1.00	-1	3	1	10	166832361	7187

Future Total 2032 - 2022, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Entry Lane Analysis	A1 - Future Total 2032 [Entry Lane Simulation]	This analysis set uses entry lane simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Future Total 2032	Entry Lane Simulation		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2022, AM	2022	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Intersection Delay (s)	Intersection LOS
1	untitled	Roundabout	1,2,3,4			1.42	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
1	1	Main Street W	
2	2	Ida Street	
3	3	Grey Road 9	
4	4	Ida Street	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00
4	0.00	99999.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.80	4.25	5.00	20.00	35.00	32.50	
2	3.80	4.25	5.00	20.00	35.00	32.50	
3	3.80	4.25	5.00	20.00	35.00	32.50	

4	3.80	4.25	5.00	20.00	35.00	32.50	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1		(calculated)	(calculated)	0.557	1246.355
2		(calculated)	(calculated)	0.557	1246.355
3		(calculated)	(calculated)	0.557	1246.355
4		(calculated)	(calculated)	0.557	1246.355

The slope and intercept shown above include any corrections and adjustments.

Entry Lane Analysis: Leg options

Leg	Lane Capacity Source	Traffic Considering Secondary Lanes (%)
1	Evenly split	10.00
2	Evenly split	10.00
3	Evenly split	10.00
4	Evenly split	10.00

Lanes

Leg	Lane Level	Lane	Has Limited Storage	Storage (PCE)	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
1	1	1		Infinity	0.00	99999.00
2	1	1		Infinity	0.00	99999.00
3	1	1		Infinity	0.00	99999.00
4	1	1		Infinity	0.00	99999.00

Entry Lane slope and intercept

Leg	Slope	Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
1	(calculated)	(calculated)	0.557	1246.355
2	(calculated)	(calculated)	0.557	1246.355
3	(calculated)	(calculated)	0.557	1246.355
4	(calculated)	(calculated)	0.557	1246.355

Lane Movements

Intersection	Leg	Lane Level	Lane	Leg			
				1	2	3	4
1	1	1	1	✓	✓	✓	✓
1	2	1	1	✓	✓	✓	✓
1	3	1	1	✓	✓	✓	✓
1	4	1	1	✓	✓	✓	✓

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)

1	ONE HOUR	✓	200.00	100.000
2	ONE HOUR	✓	69.00	100.000
3	ONE HOUR	✓	207.00	100.000
4	ONE HOUR	✓	44.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	12.000	146.000	42.000
	2	14.000	0.000	42.000	13.000
	3	167.000	20.000	0.000	20.000
	4	28.000	3.000	13.000	0.000

Turning Proportions (Veh) - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.06	0.73	0.21
	2	0.20	0.00	0.61	0.19
	3	0.81	0.10	0.00	0.10
	4	0.64	0.07	0.30	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	1.000	1.100	1.141	1.528
	2	1.083	1.000	1.000	1.091
	3	1.175	1.200	1.000	1.353
	4	1.250	1.000	1.091	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	10.0	14.1	52.8
	2	8.3	0.0	0.0	9.1
	3	17.5	20.0	0.0	35.3
	4	25.0	0.0	9.1	0.0

Results

Results Summary for whole modelled period

Leg	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)
1	1.51	0.14	0.84	A	223.79	335.69	8.74	1.56	0.10
2	0.79	0.02	~1	A	65.53	98.30	1.25	0.77	0.01
3	1.59	0.14	0.79	A	225.92	338.88	9.14	1.62	0.10
4	0.99	0.02	~1	A	47.66	71.49	1.34	1.13	0.01

APPENDIX E

Background Development Reports

WHITE ROSE (PHASE 3)

PLAN OF SUBDIVISION

TOWNSHIP OF SOUTHGATE (DUNDALK)

GREY COUNTY

TRAFFIC IMPACT STUDY

SEPTEMBER, 2020

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

18 Robb Boulevard, Unit 8
Orangeville, Ontario
L9W 3L2
Tel: (519) 941-0330
Fax: (519) 941-1830
ORANGEVILLE X FERGUS X GRAVENHURST X HARRISTON

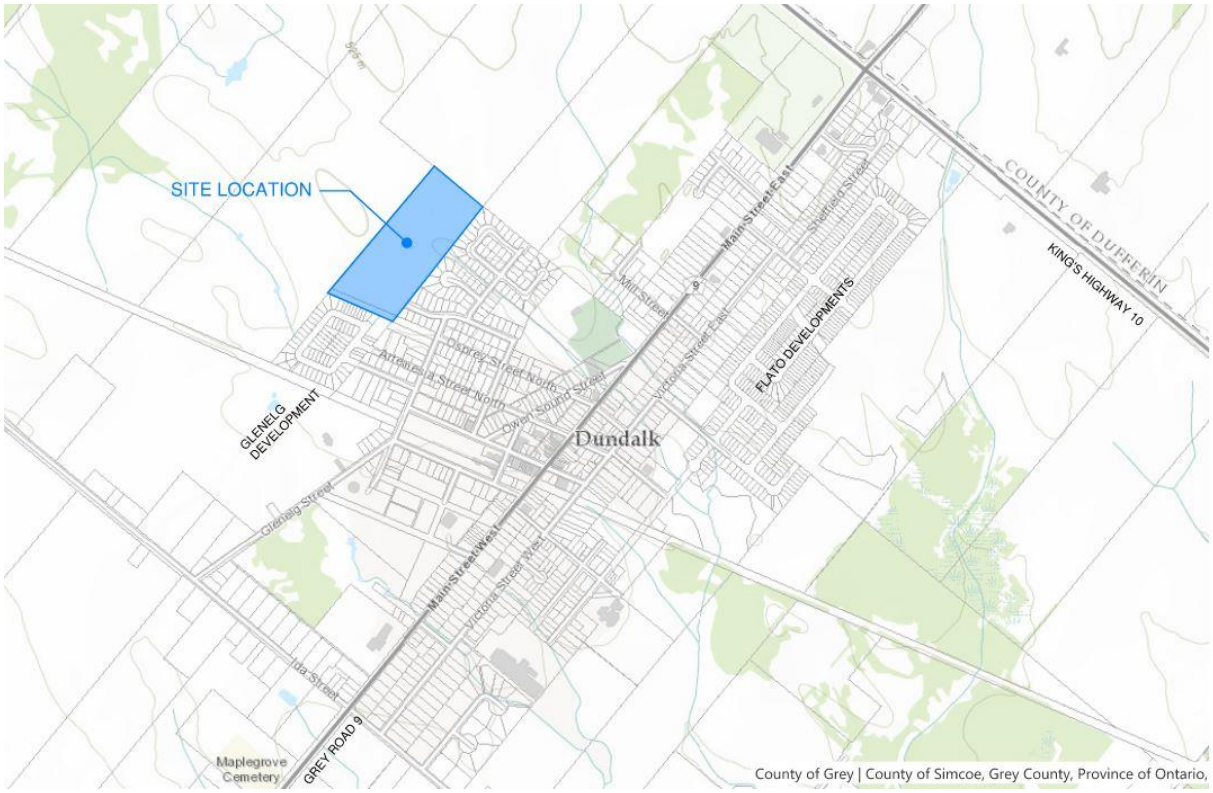
1.0 INTRODUCTION

Triton Engineering Services Limited (TESL) has been retained by White Rose Park to prepare a Traffic Impact Study (TIS) in support of a Draft Plan Application for a proposed residential development located in the Community of Dundalk, Township of Southgate. The purpose of this study is to address the impact of this development on Grey Road 9 (Main Street East) and to determine what road and intersection improvements may be required.

2.0 EXISTING CONDITIONS

2.1 Road Network

The proposed site is located on the northwest side of Dundalk at the end of Bradley Street. The location of the proposed site is shown on the Key Plan below.



Key Plan

The road network in Dundalk has a skewed orientation. To provide clarity throughout this study, King's Highway 10, Osprey Street, Artemesia Street, Proton Street, Dundalk Street, and Ida Street have been designated as north-south roads and Glenelg Street and Grey Road 9 (Main Street) have been designated as east-west roads.

3.0 PROPOSED DEVELOPMENT

MHBC have provided a draft plan of subdivision, enclosed in Appendix A.

The proposed development consists of 33 single-family dwellings, 24 townhouses, and 34 senior dwellings. The development has two proposed accesses, with 'Street A' connecting to Todd Crescent (Phase 1/2 of White Rose Park) and 'Street B' connecting to the north end of Bradley Street.

4.0 EXISTING TRAFFIC

Weekday morning and afternoon peak period traffic counts were undertaken as part of the Glenelg Residential Subdivision TIS in 2018 by C.F. Crozier & Associates Inc. (Crozier) at the intersection of Glenelg Street and Ida Street, the intersection of Grey Road 9 and Ida Street, and the intersection of Grey Road 9 and Dundalk Street. Since these counts were undertaken, there have been no major developments in the surrounding area and are considered acceptable. The traffic volumes were converted into 2020 existing traffic volumes by applying a 1.5% growth rate. This growth rate is consistent with the Glenelg development TIS and the Flato development TIS conducted in 2016 by Crozier.

A traffic count was undertaken at the intersection of Owen Sound Street and Grey Road 9 during the morning and afternoon peak periods on September 8, 2020. Traffic counts were not undertaken at the Proton Street and Artemesia Street intersections with Grey Road 9 as the increase to traffic volumes generated by White Rose Park at these intersections is expected to be very minor, as shown in Figure 5. It is assumed that if increased traffic volumes can be accommodated by the Dundalk Street and Grey Road 9 intersection, then the Proton Street and Artemesia Street intersections will also be able to accommodate the increased traffic volumes.

The existing peak hours for the four intersections and their respective traffic volumes are illustrated on Figure 1 and Table 1 lists the peak hours for each traffic count.

Table 1: Peak Hours

Intersection	Peak Hour
Ida Street and Glenelg Street	8:00-9:00 am
	4:15-5:15 pm
Grey Road 9 and Ida Street	7:45-8:45 am
	5:00-6:00 pm
Grey Road 9 and Dundalk Street	8:00-9:00 am
	5:00-6:00 pm
Grey Road 9 and Owen Sound Street	8:00-9:00 am
	4:15-5:15 pm

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
Grey Road 9 and Owen Sound Street (Unsignalized)	EB left-thru WB thru-right SB left-right	A (0.1) A (0.0) B (14.0)	A (0.1) A (0.0) C (17.4)

The levels of service remain consistent for most movements due to the increase in traffic volumes during the 2025 and 2030 years with slightly increased delays. The northbound movement at the Ida Street and Grey Road 9 intersection operates at a LOS 'B' during the 2025 AM peak hour, the southbound movement at the Grey Road 9 and Dundalk Street operates at a LOS 'B' during the 2025 AM and PM peak hours, and the southbound movement at the Grey Road 9 and Owen Sound Street intersection operates at a LOS 'C' during the 2025 PM peak hour. All movements are still operating with acceptable delays.

6.0 SITE GENERATED TRAFFIC

6.1 General

Trip generation is forecast for future developments from studies of similar developments. The *Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition* was used in this analysis. Trips generated from residential condominium/townhouse land uses are considered primary trips.

6.2 Trip Generation

The ITE Code and the calculated number of trips generated by the development are shown in Table 5.

Table 5: Trip Generation Codes and Distribution

Land Use	ITE Code	Description	Trips Generated per Unit					
			Weekday AM			Weekday PM		
			Total	Entering	Exiting	Total	Entering	Exiting
Residential	210	Single-Family Detached Housing	31	8	23	36	23	13
Residential	230	Residential Condominium/ Townhouse	17	3	14	19	13	6
Residential	252	Senior Adult Housing – Attached	5	2	3	6	5	1
Development Total			**53**	**13**	**40**	**61**	**41**	**20**

The trip distribution used by the Glenelg and Flato Developments was applied to the White Rose Phase 3 development and is described below:

- 60% to/from Highway 10 via the Owen Sound Street/Grey Road 9 intersection;
- 10% to/from the north via the Ida Street/Glenelg Street intersection;
- 10% to/from the west via Dundalk Street and Grey Road 9; and,
- 20% to/from downtown Dundalk via Dundalk Street, Proton Street, Artemesia Street, and Osprey Street.

This distribution is illustrated on Figure 4 and the trips assigned to the road network is illustrated on Figure 5.

7.0 FUTURE TRAFFIC

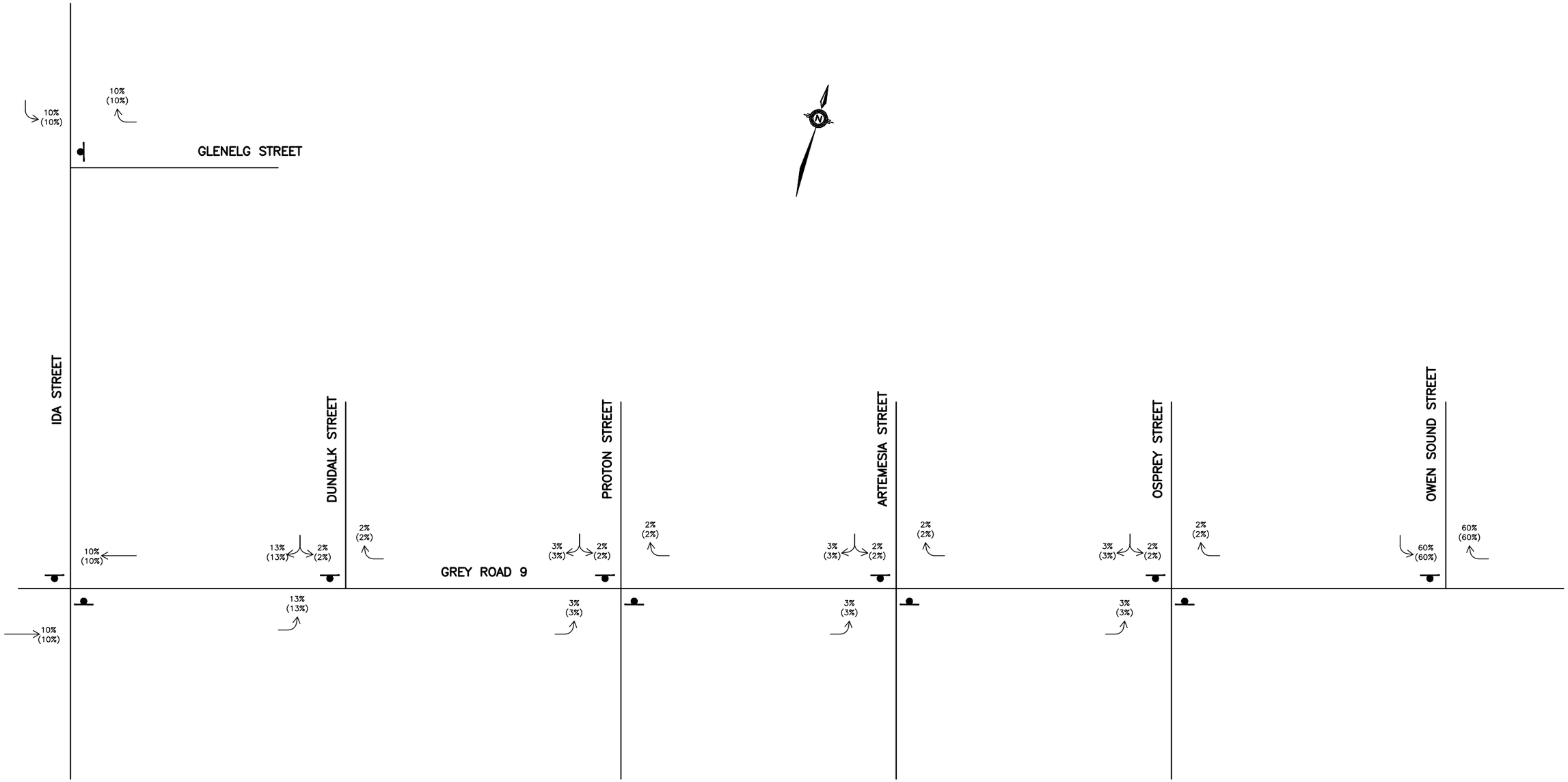
The total development generated traffic was added to the 2025 and 2030 background traffic volumes to determine the total 2025 and 2030 future peak hour traffic, as illustrated in Figures 6 and 7, respectively.

7.1 Level of Service Analysis

A level of service analysis was carried out to determine the impact of the trips generated by the development on the existing intersections during the Weekday AM and PM peak hours. The detailed capacity analyses are included in Appendix C. Table 6 and Table 7 summarize the future levels of service for 2025 and 2030 respectively.

Table 6: 2025 Future Traffic Level of Service

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
Ida Street and Glenelg Street (Unsignalized)	EB left-right NB thru-right SB thru-left	A (8.8) A (0.0) A (2.7)	A (8.9) A (0.0) A (3.2)
Ida Street and Grey Road 9 (Unsignalized)	EB left-thru-right WB left-thru-right NB left-thru-right SB left-thru-right	A (0.5) A (1.7) B (10.2) B (11.4)	A (0.9) A (0.7) B (12.9) B (13.3)
Grey Road 9 and Dundalk Street (Unsignalized)	EB left-thru WB thru-right SB left-right	A (0.7) A (0.0) B (12.6)	A (0.5) A (0.0) B (13.7)
Grey Road 9 and Owen Sound Street (Unsignalized)	EB left-thru WB thru-right SB left-right	A (0.1) A (0.0) B (14.2)	A (0.1) A (0.0) C (17.5)

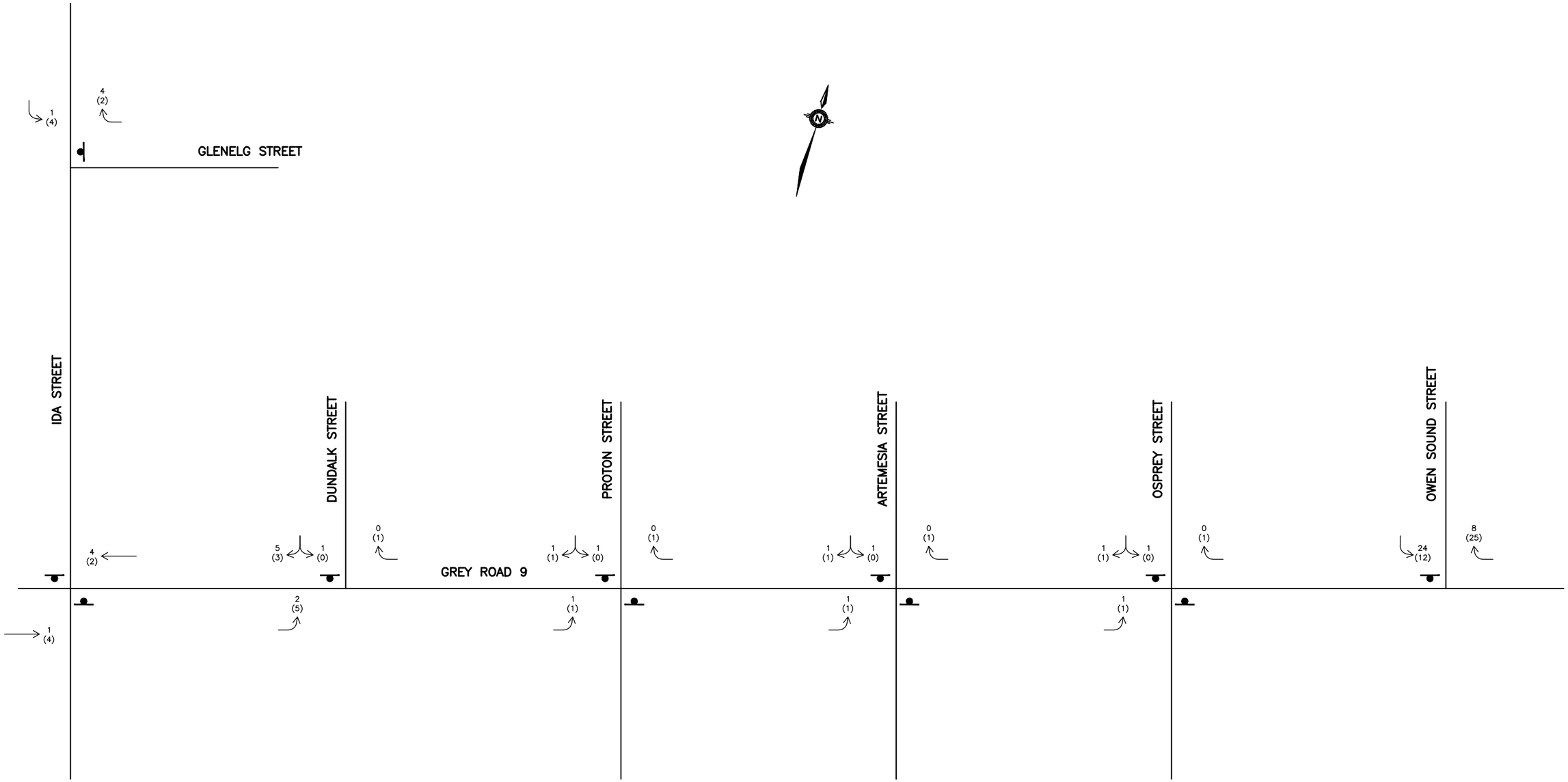


LEGEND:

- STOP CONTROL
- TRAFFIC FLOW
- 25 am Peak / (25) pm Peak TRAFFIC VOLUMES
- TRAFFIC SIGNALS
- EXISTING ROAD
- PROPOSED ENTRANCE

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

FIGURE 4:
DEVELOPMENT PEAK HOUR TRIP ASSIGNMENT
(NOT TO SCALE)



LEGEND:

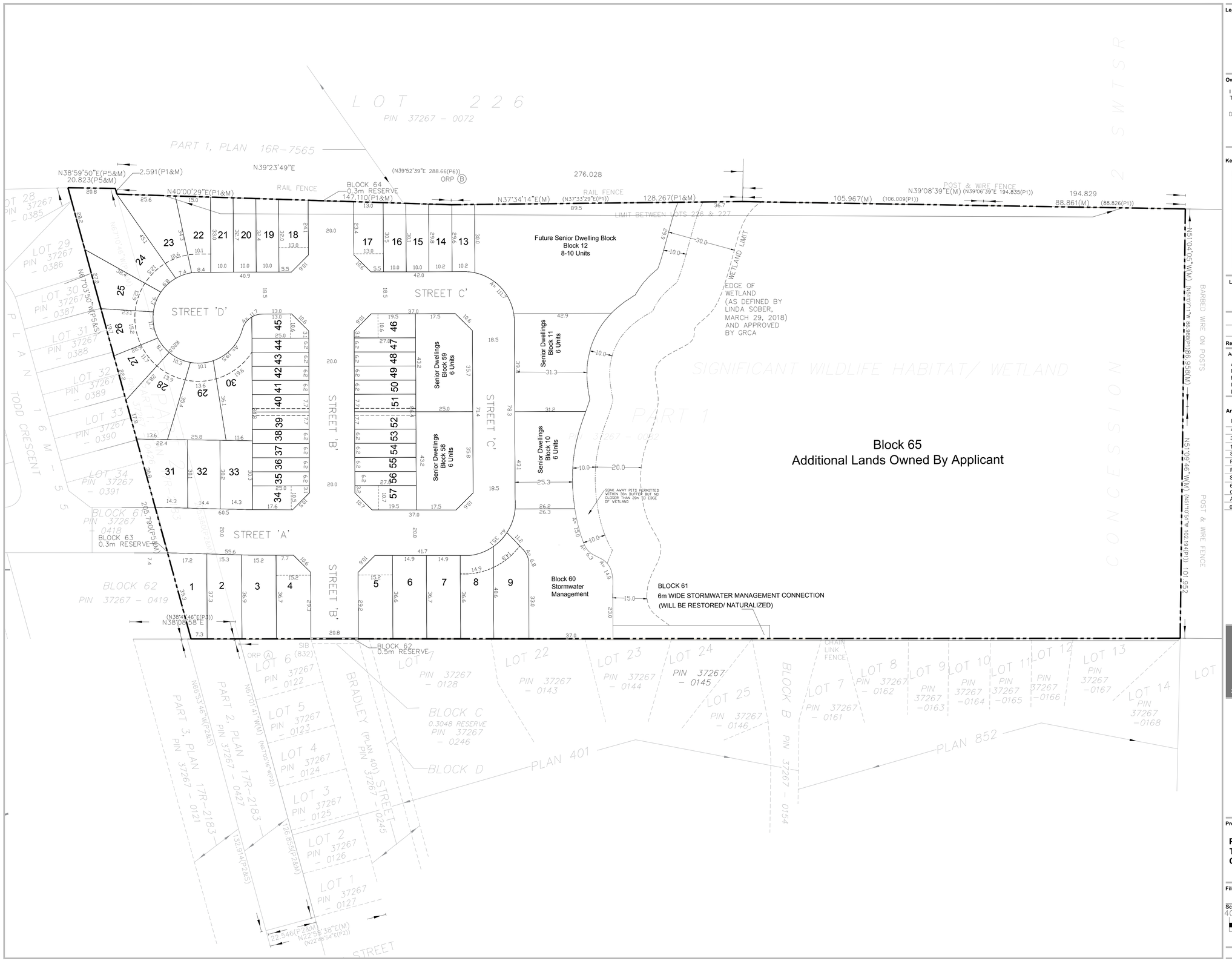
- STOP CONTROL
- TRAFFIC FLOW
- 25 am Peak / (25) pm Peak TRAFFIC VOLUMES
- TRAFFIC SIGNALS
- EXISTING ROAD
- PROPOSED ENTRANCE

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

FIGURE 5:
DEVELOPMENT PEAK HOUR TRIP DISTRIBUTION
(NOT TO SCALE)

APPENDIX A

Draft Plan of Subdivision



Legal Description

PART OF LOT 227, CONCESSION 2 SWTSR
PART 1 17R2183 AND AS IN R480846
(VILLAGE OF DUNDALK)
NOW IN THE TOWNSHIP OF SOUTHGATE
(GEOGRAPHIC TOWNSHIP OF PROTON)
COUNTY OF GREY

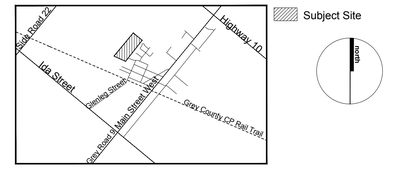
Owner's Certificate

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____

_____
DOMENIC DE PALMA
2570970 ONTARIO INC.

Key Plan NOT TO SCALE



Legend

Revision No.	Date	Issued / Revision	By

Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended

A. As Shown	B. As Shown	C. As Shown
D. Residential, Stormwater Management		E. As Shown
F. As Shown	G. As Shown	H. Municipal Water Supply
I. Listowel Silt Loam	J. As Shown	K. All Services As Required
L. As Shown		

Area Schedule

Description	Lots/Blocks	Units	Area
40' (12.2m) Single Detached	1-9,31-33	12	0.64ha (1.57ac)
30' (10.0m) Single Detached	13-30	18	0.80ha (1.98ac)
19.5' (6.0m) Townhouses	34-57	24	0.44ha (1.08ac)
Senior Dwelling Blocks (20' (6.2m))	Block 10-11,58-,59	24	0.47ha (1.17ac)
Future Senior Dwelling Block	Block 12	8-10	0.36ha (0.89ac)
Roads	Street 'A' - Street 'D'		1.14ha (2.82ac)
Stormwater Management	Block 60		0.19ha (0.48ac)
6m Stormwater Management Connection	Block 61		0.04ha (0.10ac)
Additional Lands Owned by Applicant	Block 65		4.79ha (11.84ac)
0.3m & 0.5m Reserve	Block 62-64		0.01ha (0.02ac)
		86-88	8.88ha (21.94ac)

White Rose Park

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
230-7050 WESTON ROAD WOODBRIDGE, ON. L4L 8G7 | P: 905 761 5588 F: 905 761 5589 | WWW.MHBCPLAN.COM

Date	May 11, 2020
File No.	13126B
Plan Scale	1:750
Drawn By	T.H.
Checked By	D.K & A.P.
Other	

Project

**Part of Lot 227 Concession 2,
Township of Southgate,
County of Grey**

North

File Name DRAFT PLAN OF SUBDIVISION

Dwg No. 1 of 1

Scale Bar

40 0 40 80

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\13126\B – Dundalk\2020\06. June\Draft Plan\CAD\8876 WHITE ROSE June 04 2020–C.dwg

APPENDIX F

ITE 11th Edition Excerpts

Land Use: 210
Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077,1078, 1079

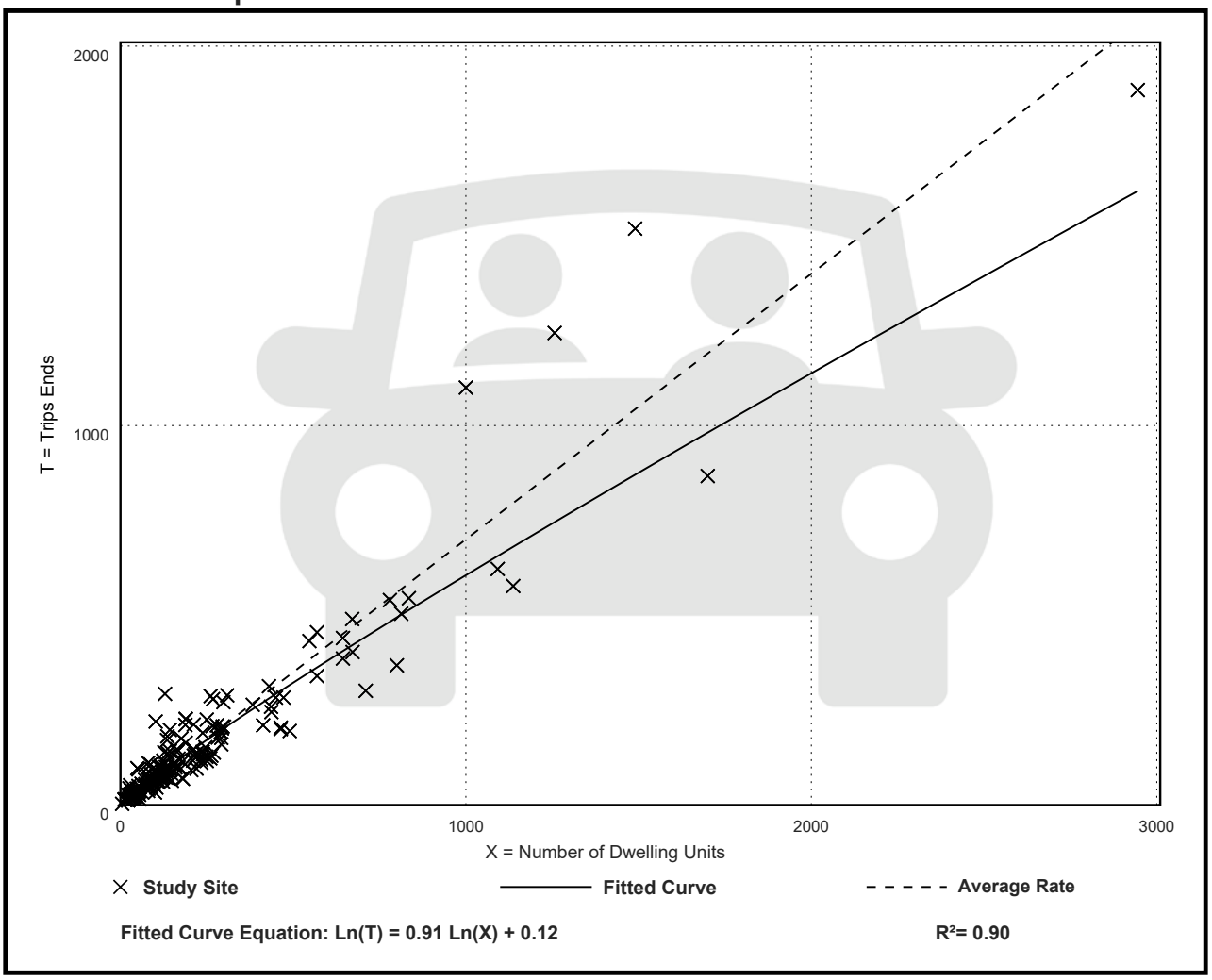
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



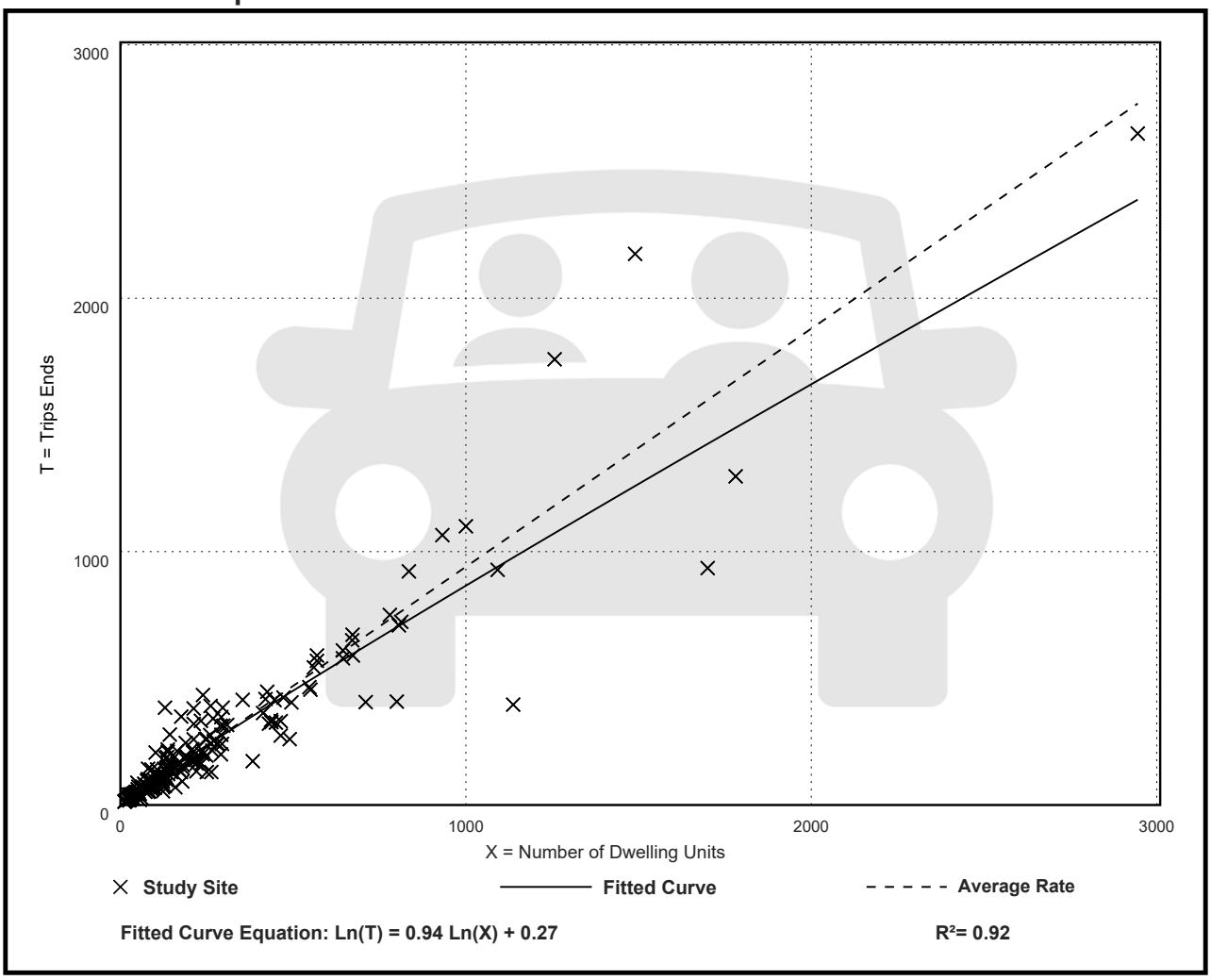
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Land Use: 215
Single-Family Attached Housing

Description

Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Additional Data

The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Utah, Virginia, and Wisconsin.

Source Numbers

168, 204, 211, 237, 305, 306, 319, 321, 357, 390, 418, 525, 571, 583, 638, 735, 868, 869, 870, 896, 912, 959, 1009, 1046, 1056, 1058, 1077

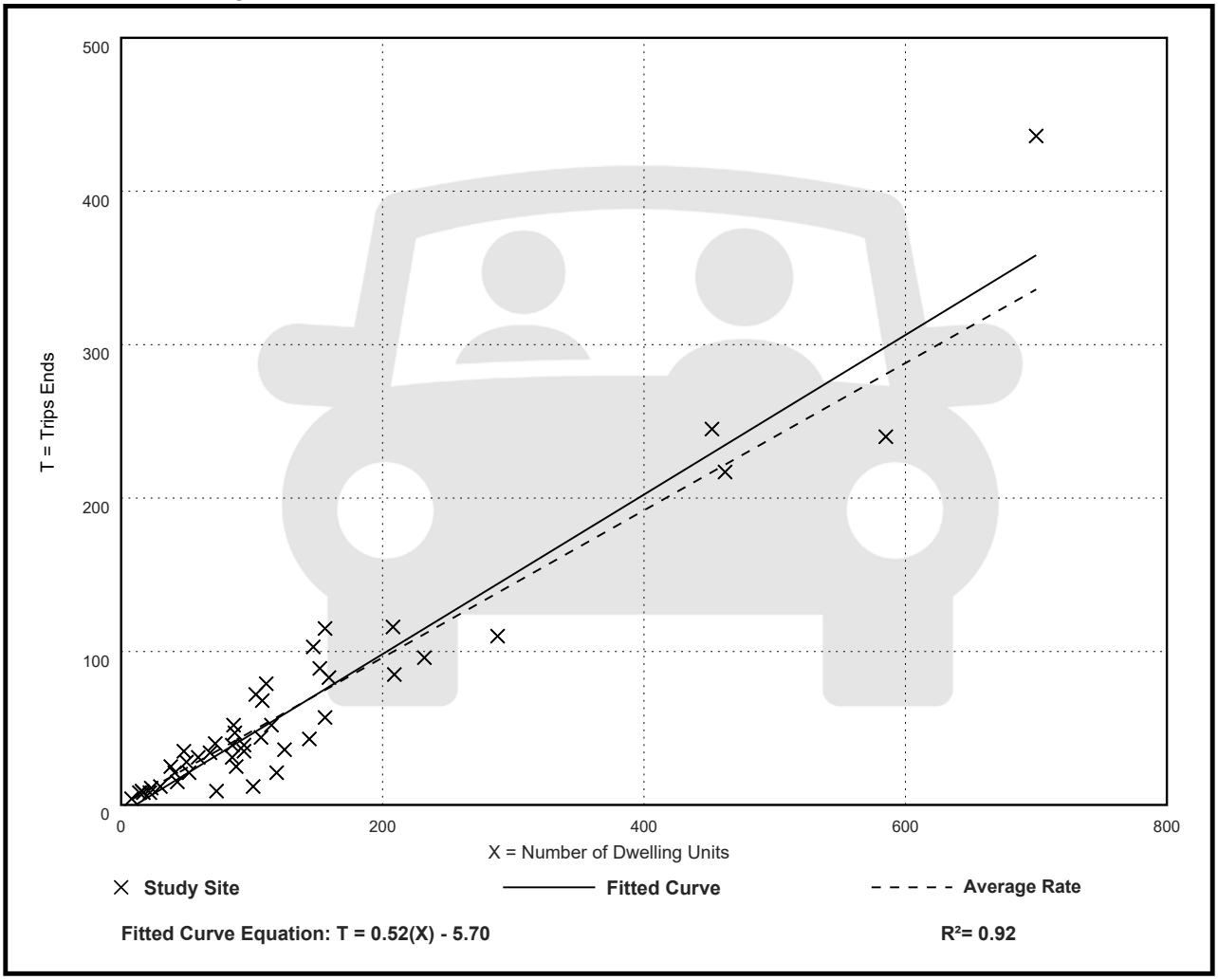
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



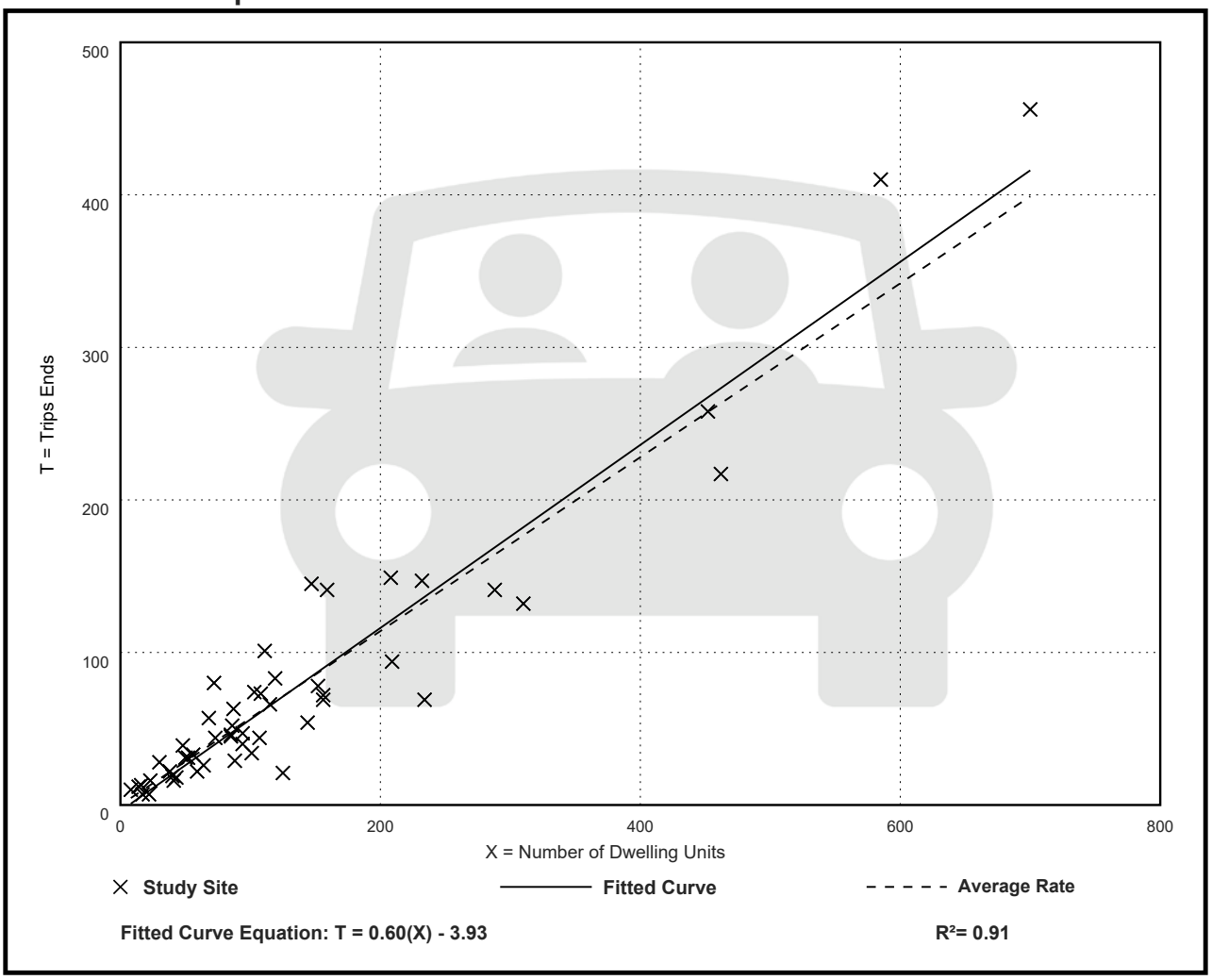
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



APPENDIX G

OTM Book 12 Signal Justification 1-3

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Dundalk and Main Street

What is the direction of the Main Road street? East-West

When was the data collected? 2032 FT

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	0	72	0	0	0	0	0	77	6	5	0	3	0
8:00	7	98	0	0	0	0	0	91	5	10	0	11	2
9:00	21	156	0	0	0	0	0	136	13	13	0	39	12
12:00	9	116	0	0	0	0	0	98	8	13	0	15	3
13:00	95	202	0	0	0	0	0	174	11	14	0	23	36
16:00	39	206	0	0	0	0	0	199	17	10	0	34	12
17:00	26	186	0	0	0	0	0	174	12	9	0	26	8
18:00	43	128	0	0	0	0	0	93	23	8	0	8	8
Total	**240**	**1,164**	**0**	**0**	**0**	**0**	**0**	**1,042**	**95**	**82**	**0**	**159**	**81**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	81	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	81		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									19
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	81	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	10	10	1	6	2	4	0	0	
Factored volume of total pedestrians	81		0		0		0		
Factored volume of delayed pedestrians	30		8		8		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									19
Net 8 Hour Volume of Delayed Pedestrians									12

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Dundalk and Main Street Count Date: 2032 FT

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:00	13:00	16:00	17:00	18:00		
1A	480	720	600	900	163	222	378	259	519	505	433	303		
	COMPLIANCE %				23	31	53	36	72	70	60	42	386	48
1B	180	255	180	255	8	21	52	28	37	44	35	16		
	COMPLIANCE %				3	8	20	11	15	17	14	6	95	12

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fullfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:00	13:00	16:00	17:00	18:00		
2A	480	720	600	900	155	201	326	231	482	461	398	287		
	COMPLIANCE %				22	28	45	32	67	64	55	40	353	44
2B	50	75	50	75	5	12	25	16	50	22	17	16		
	COMPLIANCE %				7	16	33	21	67	29	23	21	217	27

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% Fullfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	9:00	326	52	346	15 %	14 %
	13:00	482	37	270	14 %	
	16:00	461	44	280	16 %	
	17:00	398	35	309	11 %	

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

Intersection: Dundalk and Main Street

Count Date: 2032 FT

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	48	%	☐	☑
	B	Crossing Volume	12	%		
2. Delay to Cross Traffic	A	Main Road	44	%	☐	☑
	B	Crossing Road	27	%		
3. Combination	A	Justificaton 1	12	%	☐	☑
	B	Justification 2	27	%		
4. 4-Hr Volume			14	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Major Road:	County Road 9	Condition:	Free Flow	Date:	27-Jul-10
Minor Road:	Ida Street	Major Rd. Lanes:	1	Project No.:	324-2840
Horizon Year:	2032 Future total	Intersection Type:	Existing	Analyst:	Emma Howlett

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Stud

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE		COMPLIANCE	
						Sectional	
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Numerical	Percentage
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	576	864	720	1080	496	86%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	144	204	144	204	193	134%
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	576	864	720	1080	302	52%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	60	90	144	204	149	248%

Note:
Existing Intersection Requires 120 % Justification
Proposed Intersection Requires 150 % Justication

Signal Justification 7 Met: [ ] **Yes** [X] **No**

:

ies)

Entire Percentage
86%
52%

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Dundalk and Main Street

What is the direction of the Main Road street? East-West

When was the data collected? 2032 FT

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000** **AND** **Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	1	288	0	0	0	0	0	136	19	73	0	0	0
8:00	0	345	0	0	0	0	0	198	53	66	0	0	6
9:00	1	432	0	0	0	0	0	281	88	88	0	0	10
12:00	4	373	0	0	0	0	0	237	81	110	0	0	2
13:00	3	430	0	0	0	0	0	383	211	93	0	5	59
16:00	7	360	0	0	0	0	0	417	208	90	0	3	21
17:00	17	348	0	0	0	0	0	378	249	98	0	3	30
18:00	22	262	0	0	0	0	0	243	276	90	0	10	19
Total	**55**	**2,838**	**0**	**0**	**0**	**0**	**0**	**2,273**	**1,185**	**708**	**0**	**21**	**147**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	147	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	147		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									34
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	147	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	147		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									34
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Dundalk and Main Street Count Date: 2032 FT

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:00	13:00	16:00	17:00	18:00		
1A	480	720	600	900	517	662	890	805	1,125	1,085	1,093	903		
	COMPLIANCE %				72	92	100	100	100	100	100	100	764	95
1B	180	255	180	255	73	66	88	110	98	93	101	100		
	COMPLIANCE %				29	26	35	43	38	36	40	39	286	36

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fullfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:00	13:00	16:00	17:00	18:00		
2A	480	720	600	900	444	596	802	695	1,027	992	992	803		
	COMPLIANCE %				62	83	100	97	100	100	100	100	741	93
2B	50	75	50	75	73	72	98	112	152	111	128	109		
	COMPLIANCE %				97	96	100	100	100	100	100	100	793	99

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% Fullfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☑	NO ☐		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	13:00	1,027	98	97	100 %	88 %
	16:00	992	93	104	90 %	
	17:00	992	101	104	97 %	
	18:00	803	100	151	66 %	

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

Intersection: Dundalk and Main Street

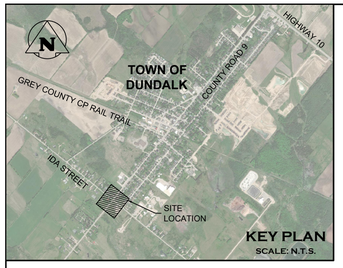
Count Date: 2032 FT

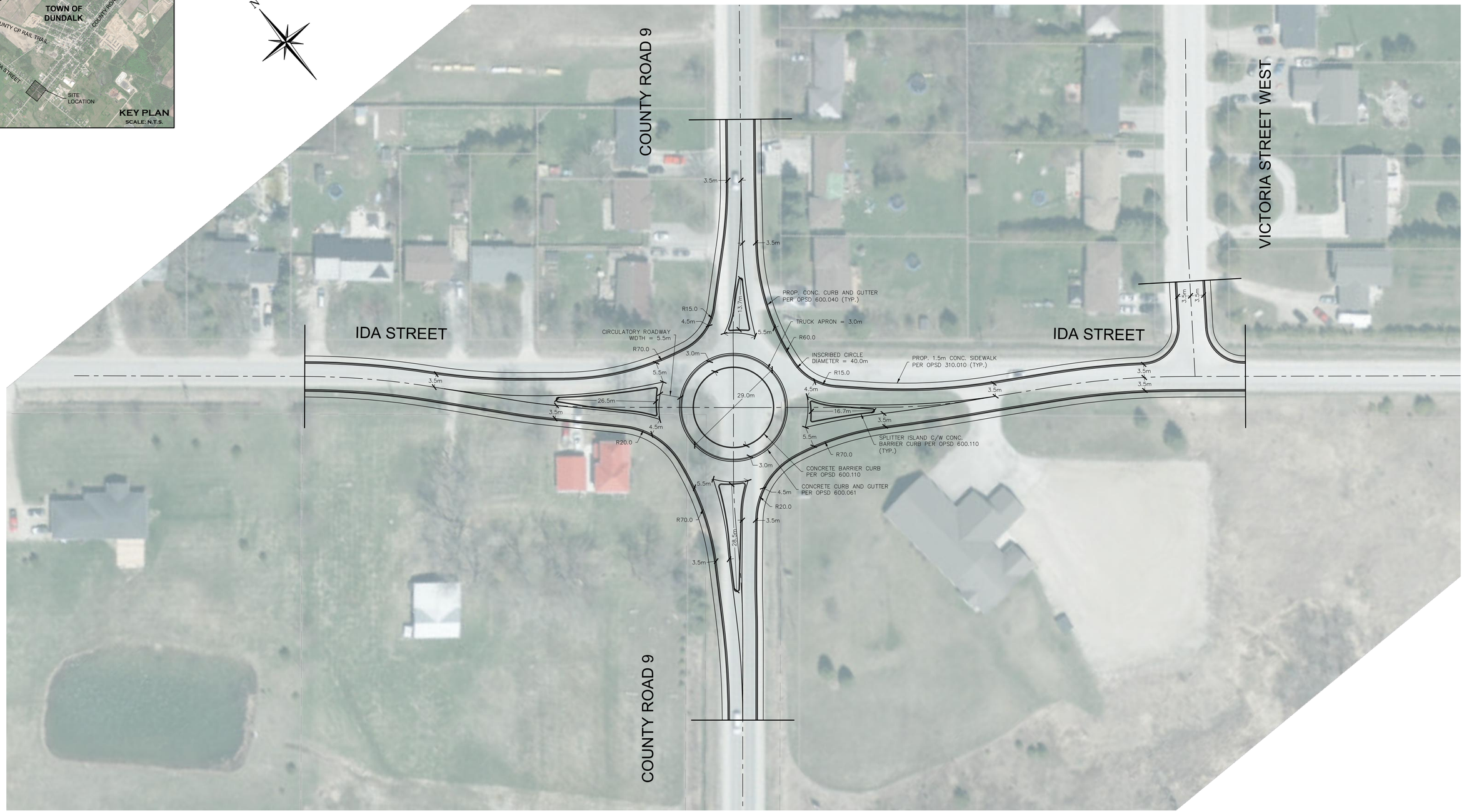
Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	95	%	☐	☑
	B	Crossing Volume	36	%		
2. Delay to Cross Traffic	A	Main Road	93	%	☐	☑
	B	Crossing Road	99	%		
3. Combination	A	Justificaton 1	36	%	☐	☑
	B	Justification 2	93	%		
4. 4-Hr Volume			88	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

APPENDIX H

Ida Street and County Road 9 Roundabout Concept





10 0m 10 20 30 40
SCALE: 1:500

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.
3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS

TBM#1–
TBM#2–
TBM#3–

•••ADD REFERENCE TO SURVEY/SOURCE

Town

No.	ISSUE	DATE: MMM/DD/YYYY
1.	ISSUED FOR TOWN REVIEW	08/22/2022

Engineer

PROFESSIONAL ENGINEERS ONTARIO — PRELIMINARY — NOT TO BE USED FOR CONSTRUCTION

Engineer

PROFESSIONAL ENGINEERS ONTARIO — PROVINCE OF ONTARIO

Project

GLENELG EXPANSION LANDS
TOWN OF DUNDALK

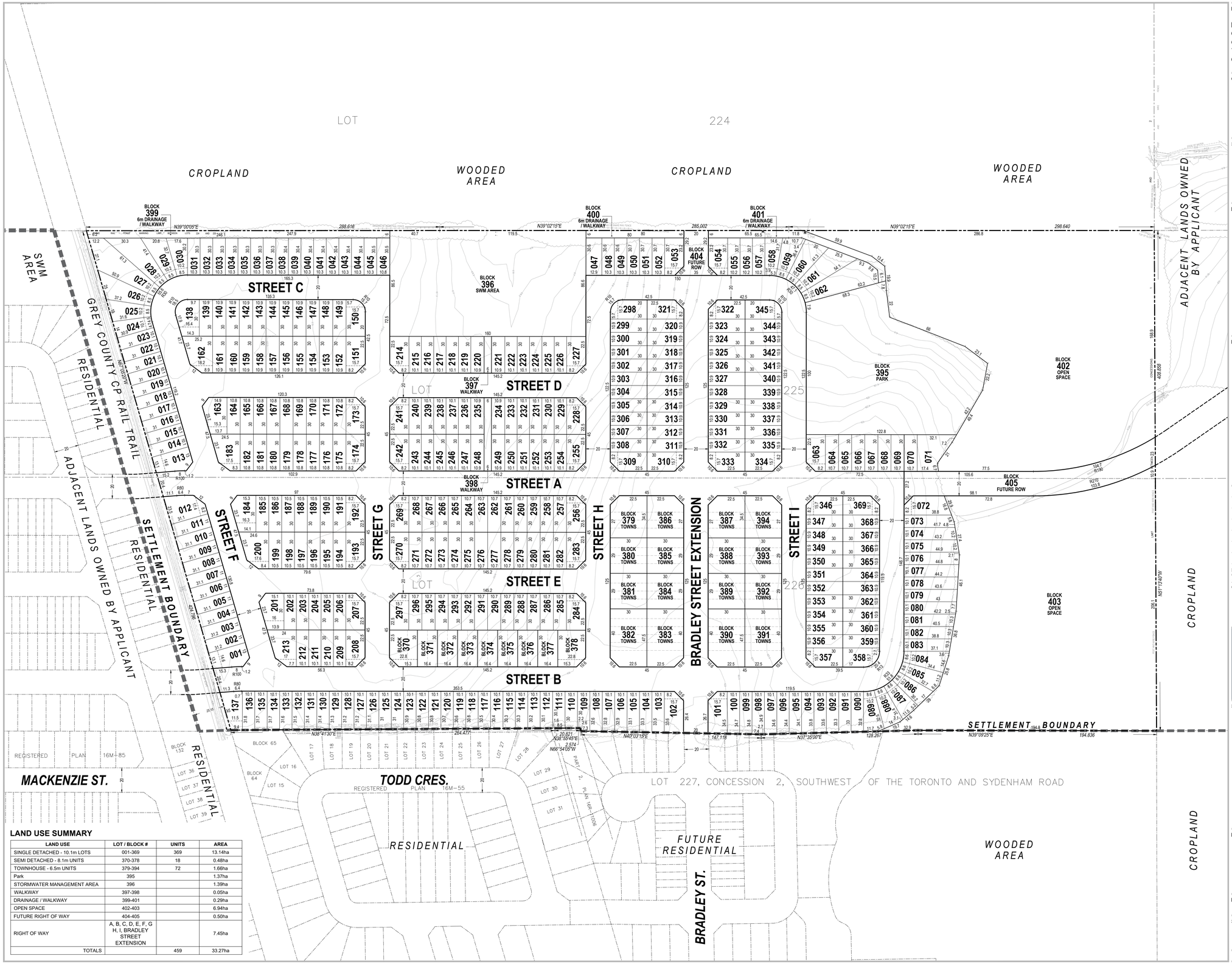
Drawing

CONCEPTUAL ROUNDABOUT PLAN

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
DE	DE		1060–5590
Check By	Check By	Scale	Drawing
SH	MF	1: 500	FIG.1

List of Figures



LEGAL DESCRIPTION

PART OF LOTS 225 AND 226
CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: AUGUST 18, 2022

SHAKIR REHMATULLAH - PRESIDENT
DUNDALK VILLAGE TWO INC.

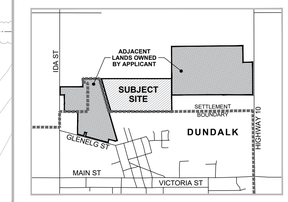
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: AUGUST 18, 2022

DAN DZALDOV - O.L.S.
SCHAEFFER DZALDOV BENNETT LTD.

KEY PLAN



LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- LOT LINE
- PARCEL FABRIC

LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SINGLE DETACHED - 10.1m LOTS	001-369	369	13.14ha
SEMI DETACHED - 8.1m UNITS	370-378	18	0.48ha
TOWNHOUSE - 6.5m UNITS	379-394	72	1.66ha
Park	395		1.37ha
STORMWATER MANAGEMENT AREA	396		1.39ha
WALKWAY	397-398		0.05ha
DRAINAGE / WALKWAY	399-401		0.29ha
OPEN SPACE	402-403		6.94ha
FUTURE RIGHT OF WAY	404-405		0.50ha
RIGHT OF WAY	A, B, C, D, E, F, G H, I, BRADLEY STREET EXTENSION		7.45ha
TOTALS		459	33.27ha

REVISION No.	DATE	ISSUED / REVISION	BY

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

- A. AS SHOWN
- B. AS SHOWN
- C. AS SHOWN
- D. 369 SINGLES, 18 SEMIS, & 72 TOWNHOUSES
- E. AS SHOWN
- F. AS SHOWN
- G. AS SHOWN
- H. MUNICIPAL WATER SUPPLY
- I. LOAM/SILT LOAM
- J. AS SHOWN
- K. ALL SERVICES AS REQUIRED (WATER, SANITARY, STORMWATER, HYDRO)
- L. AS SHOWN

113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM
PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC PLANNING

STAMP

DATE	AUG. 18, 2022
FILE No.	15184AT
SCALE	1:1,400 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.C.
OTHER	

PROJECT

GLENELG PHASE 3

DUNDALK VILLAGE TWO INC.
3621 HIGHWAY 7 EAST, SUITE 503
MARKHAM, ON L3R 0G6
P:(905) 479-9292 F:(905) 429-9165
WWW.FLATOGROUP.COM

NORTH

FILE NAME: DRAFT PLAN OF SUBDIVISION

DWG No. 1 of 1

SCALE BAR

0 7 14 21 28 35 52.5 70 105 140m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Southgate\15184AT\Drawings\Draft Plan\CAD\

Project

GLENELG PHASE 3
TOWNSHIP OF SOUTHGATE, COUNTY OF GREY

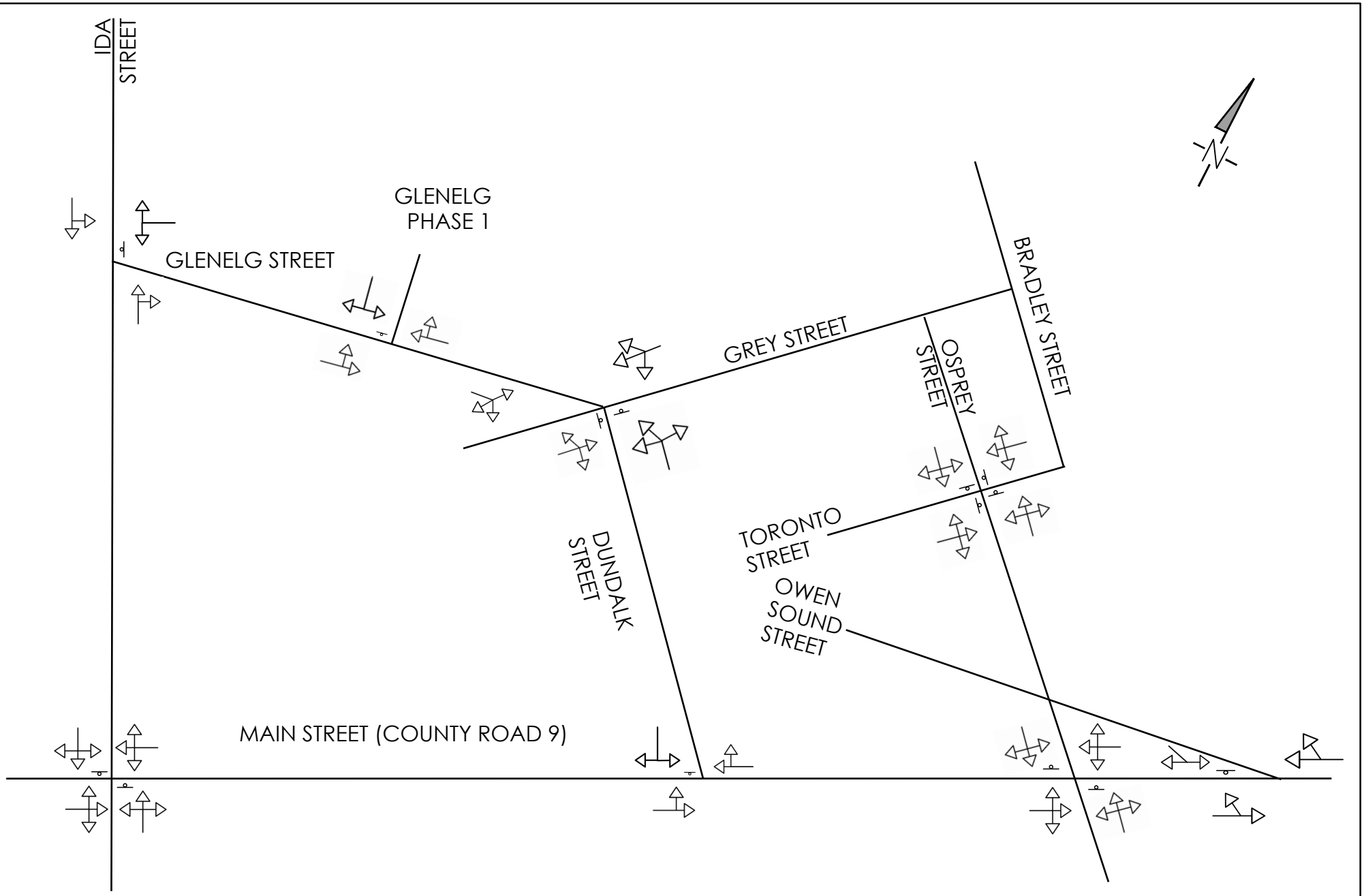
Drawing

SITE LOCATION PLAN

CROZIER
CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
E.H.	E.H.	1060-6220

Scale	Date	Check By	Drawing
N.T.S.	2022.08/15	E.H.	FIG. 2



Legend

STOP CONTROL

Project

GLENELG PHASE 3
TOWNSHIP OF SOUTHGATE, COUNTY OF GREY

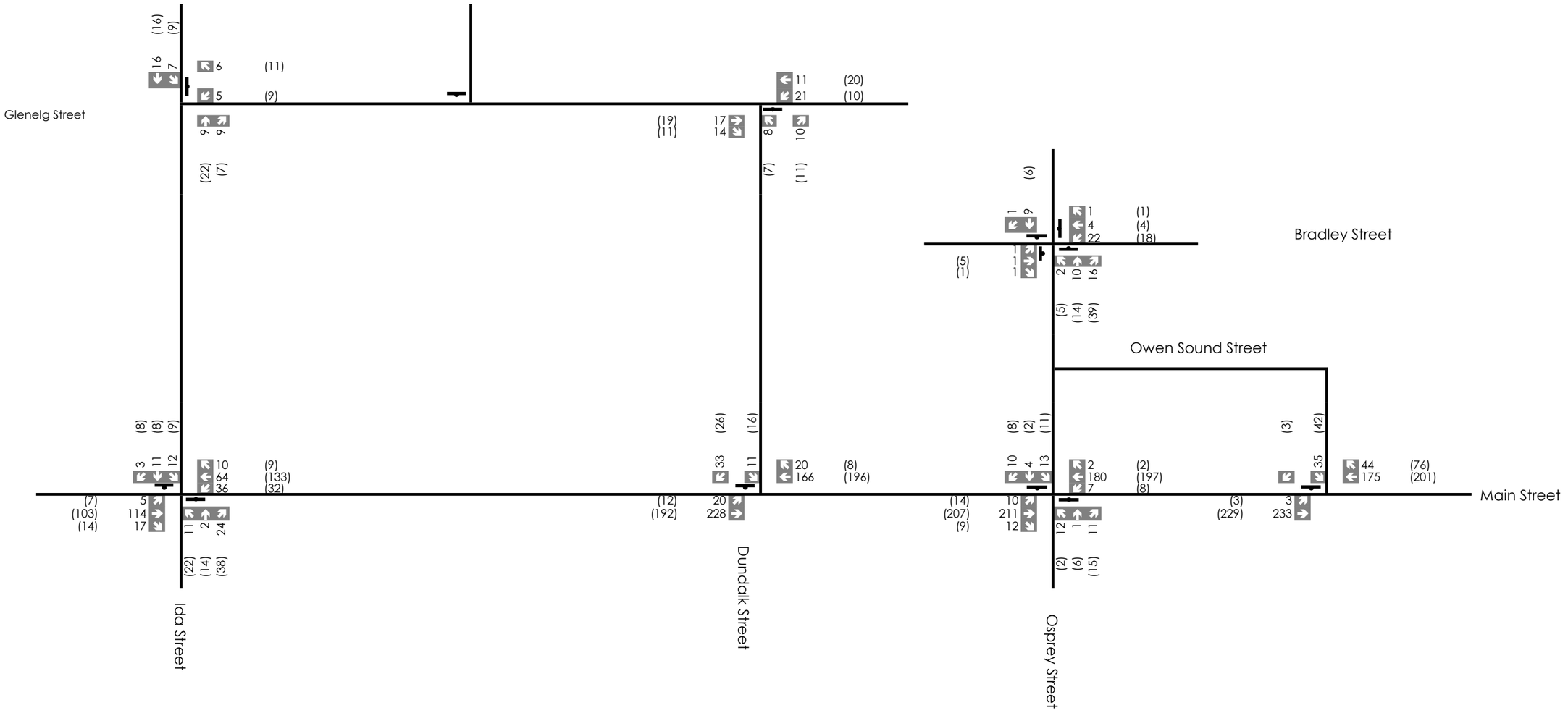
Drawing

EXISTING TRAFFIC CONTROLS AND LANE CONFIGURATION

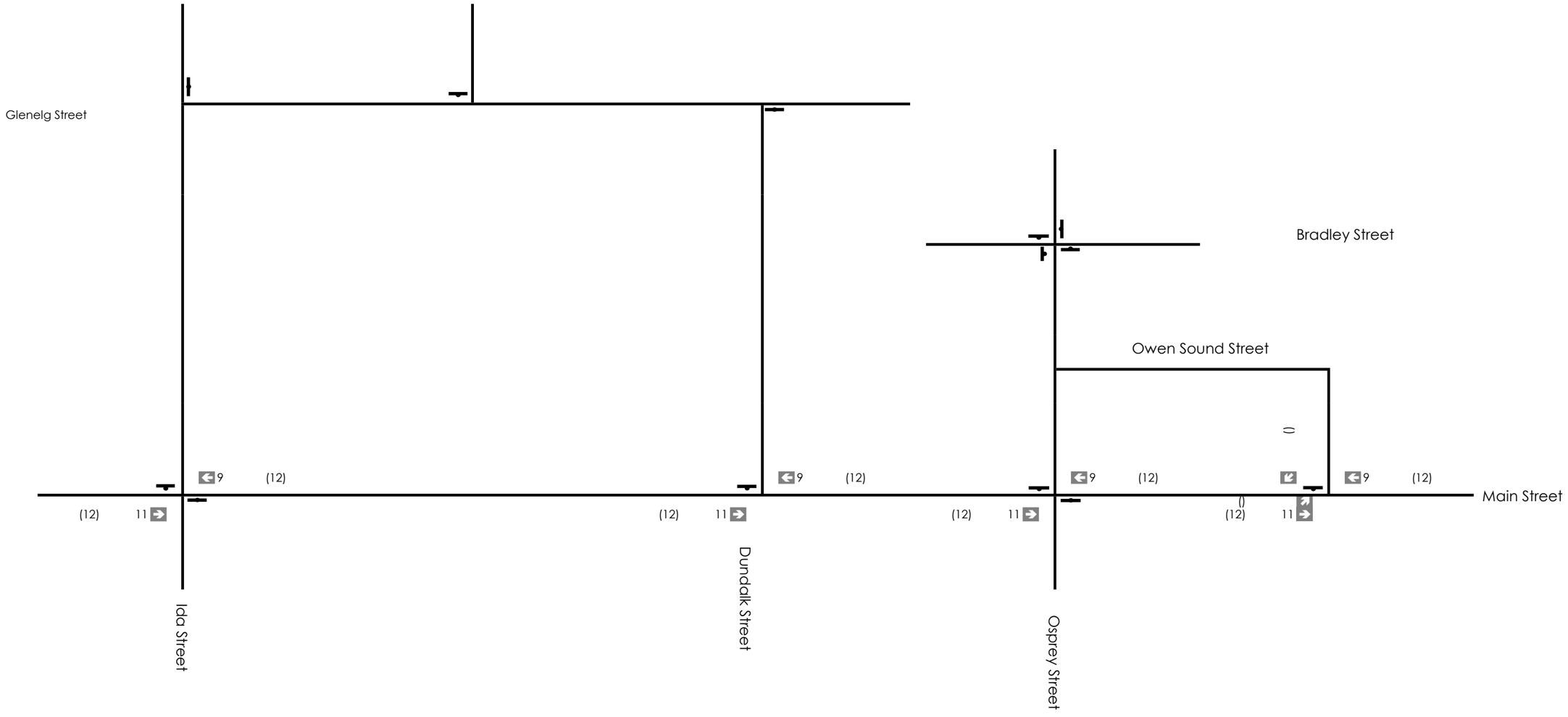
CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
E.H.	E.H.	1060-6220

Scale	Date	Check By	Drawing
N.T.S.	2022.08/15	E.H.	FIG. 3



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 4
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Existing Traffic Volumes		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.



Legend

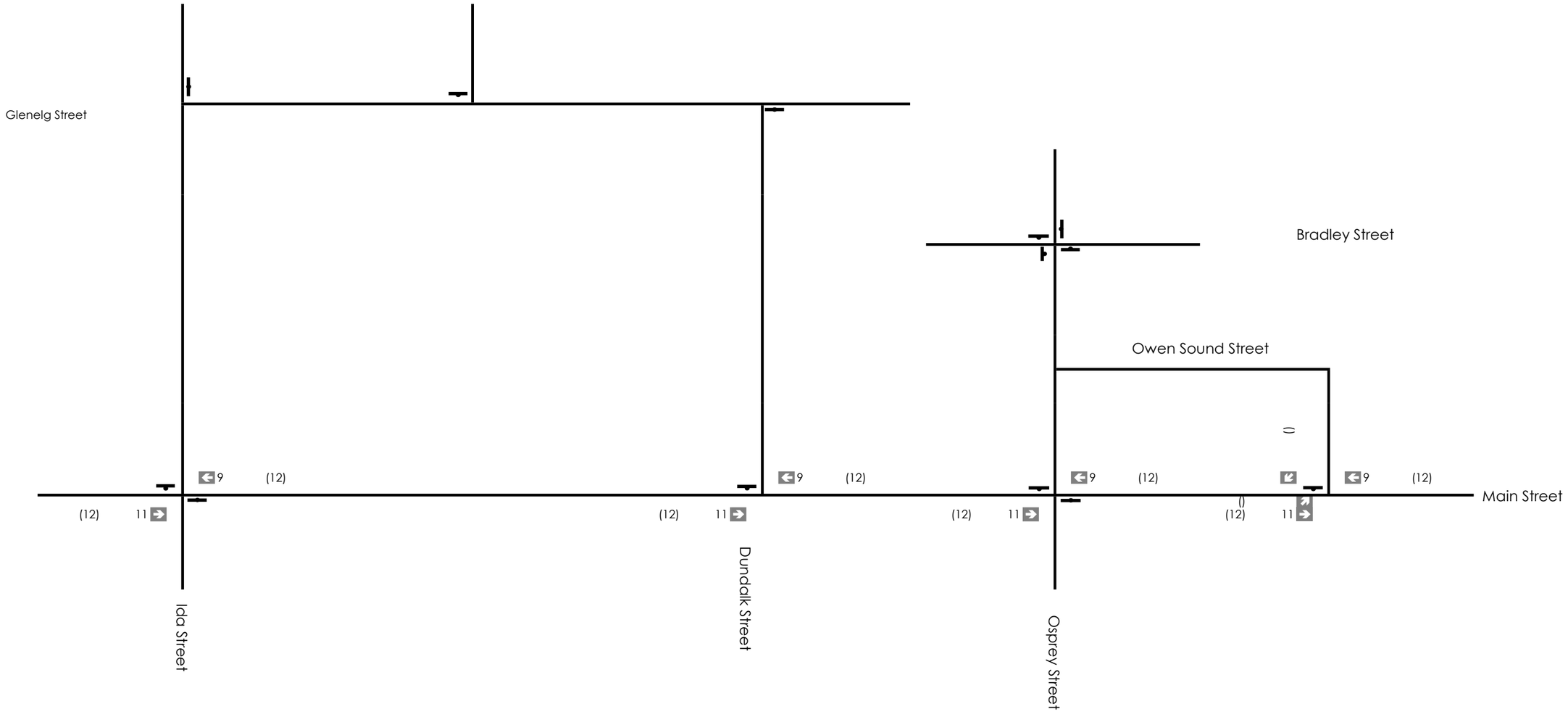
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Edgewood Greens Commercial Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 5
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

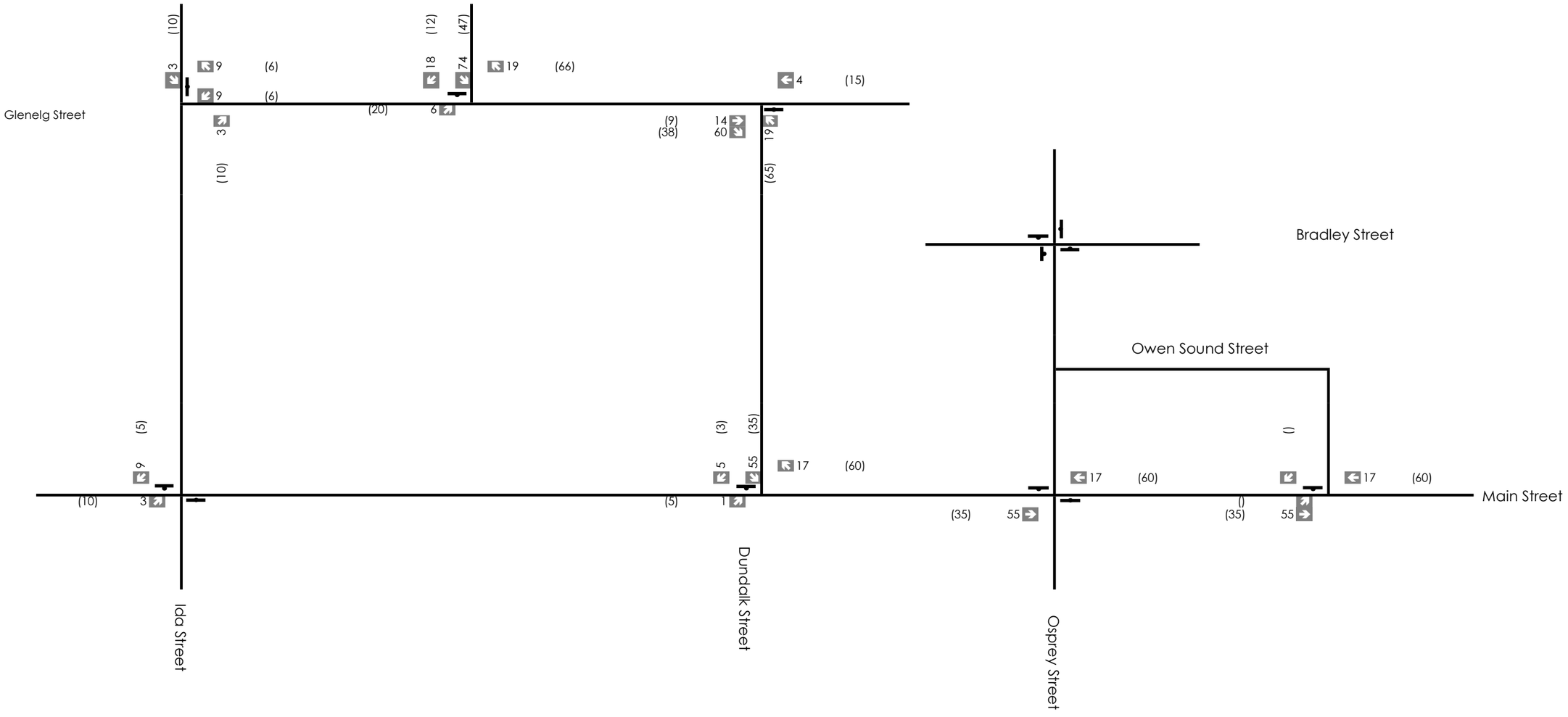
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Edgewood Greens Residential Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 6
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

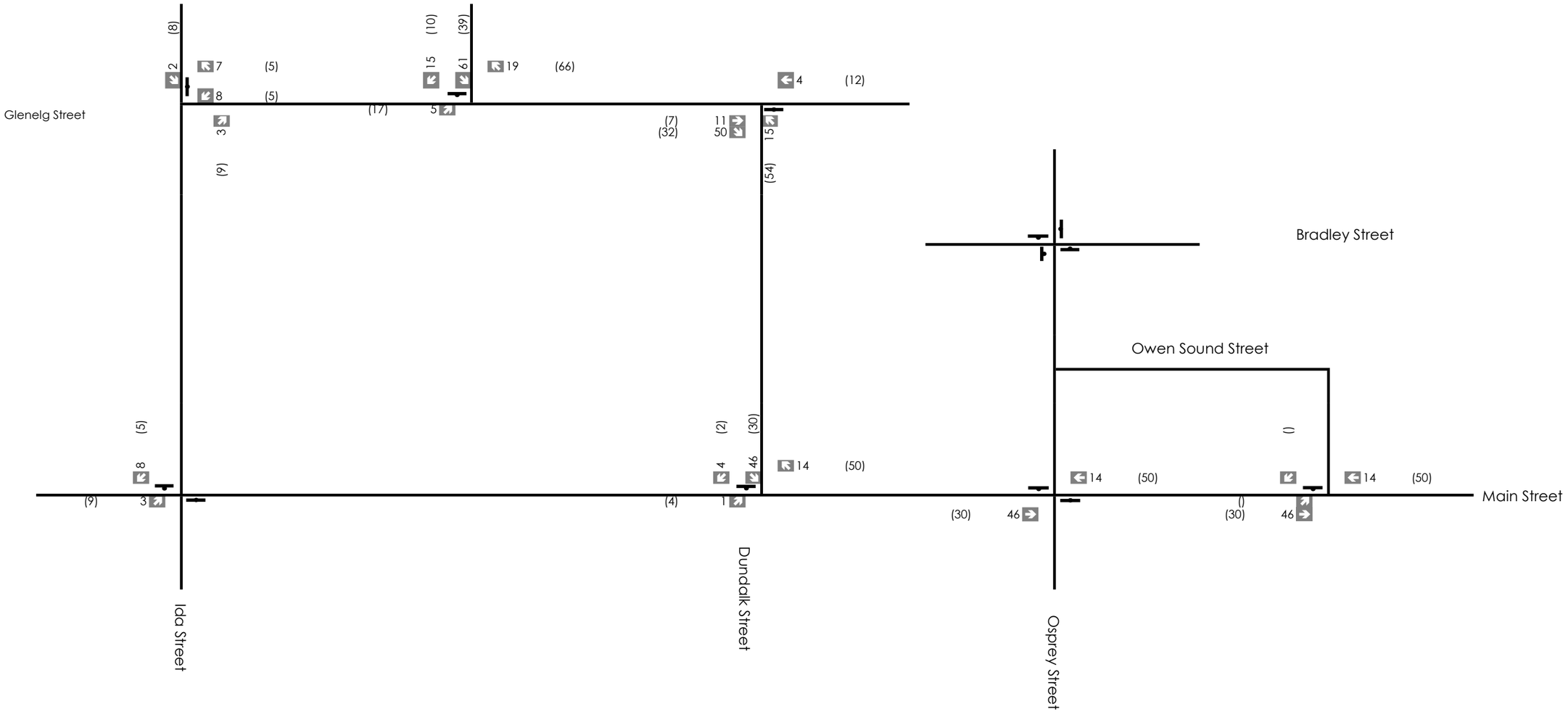
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Glenelg Phase 1 Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 7
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

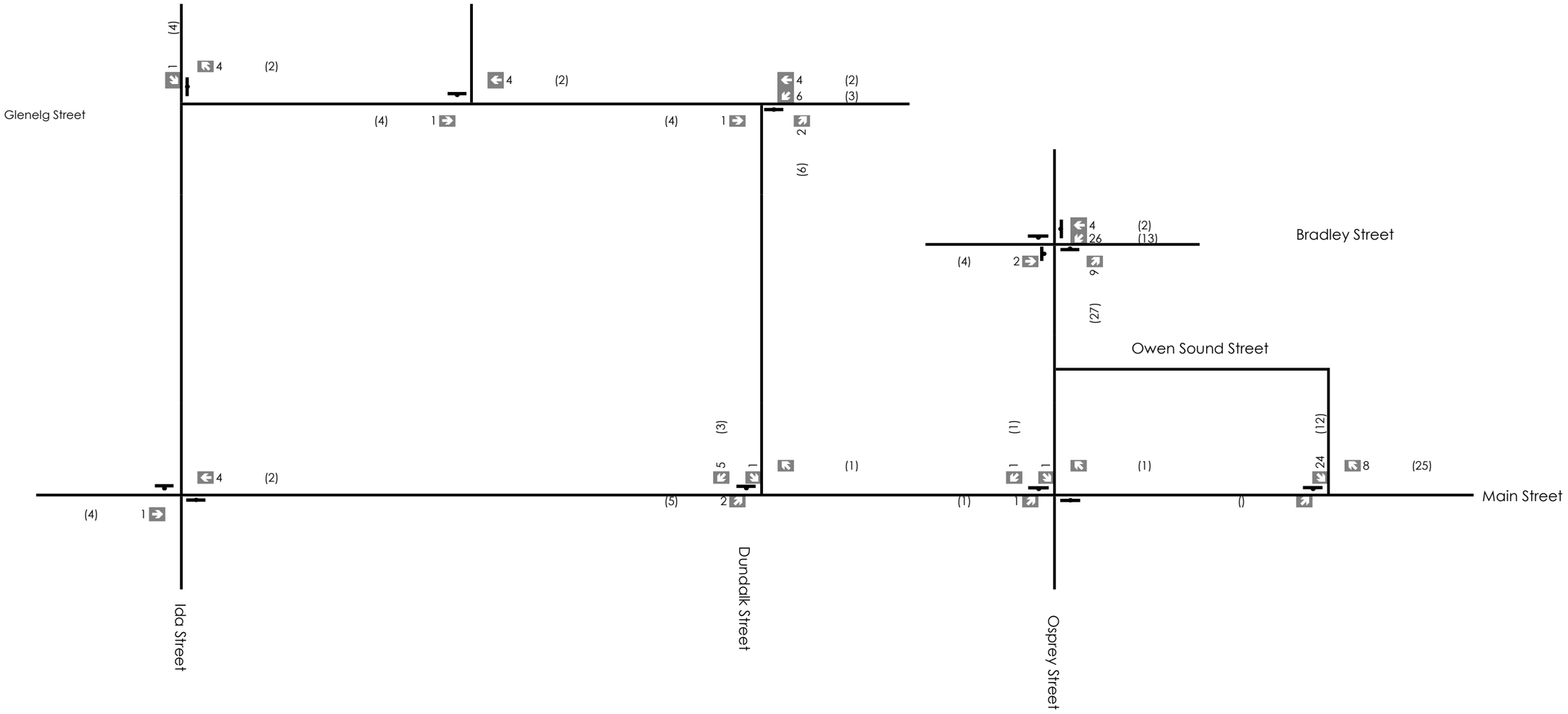
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: Glenelg Phase 2 Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 8
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Background Development: White Rose Phase 3 Trip Assignment

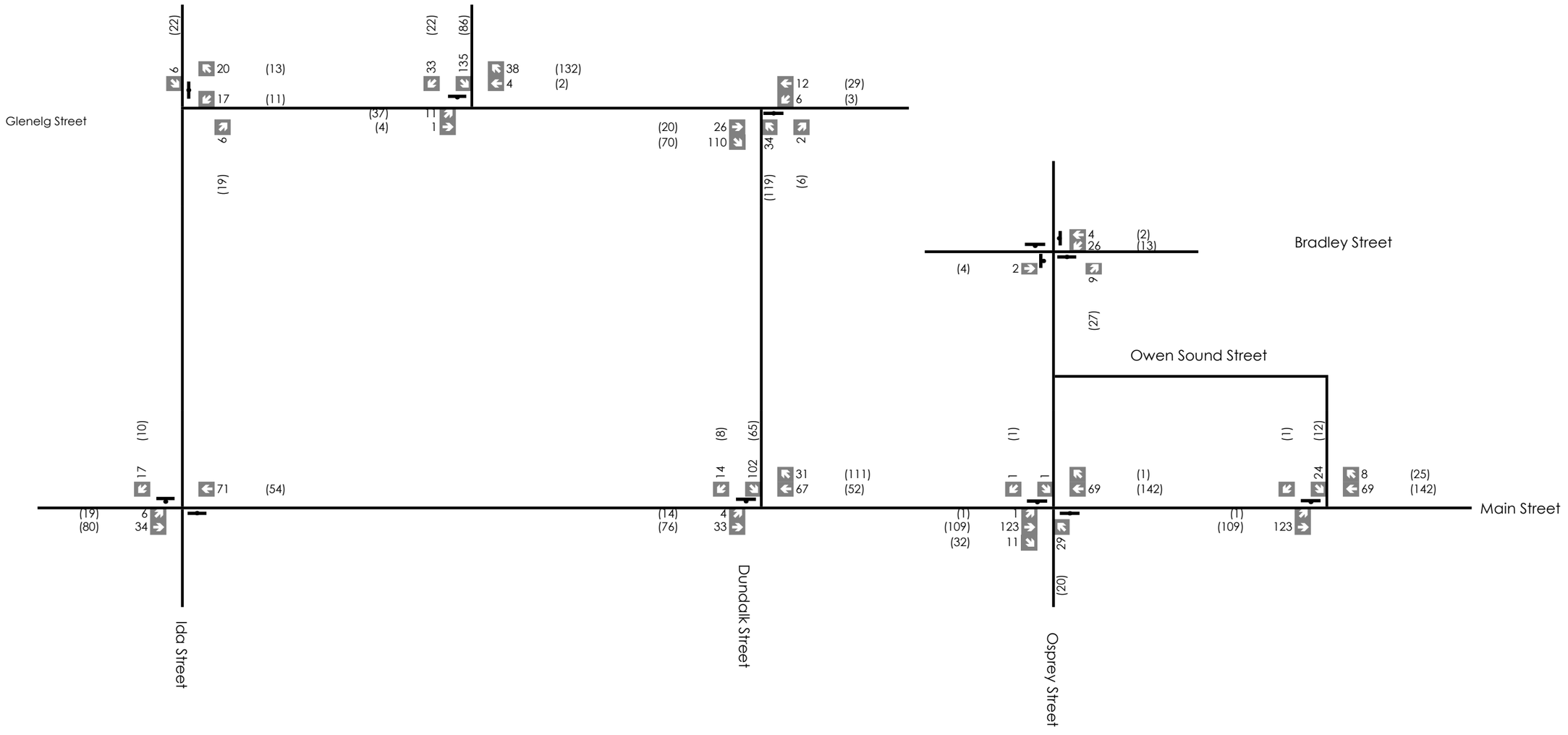
CROZIER CONSULTING ENGINEERS

Figure 9

Project No. 1060-6220

Date. 2022/08/31

Analyst. E.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 10
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Background Development Total Trip Assignment		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.

Legend

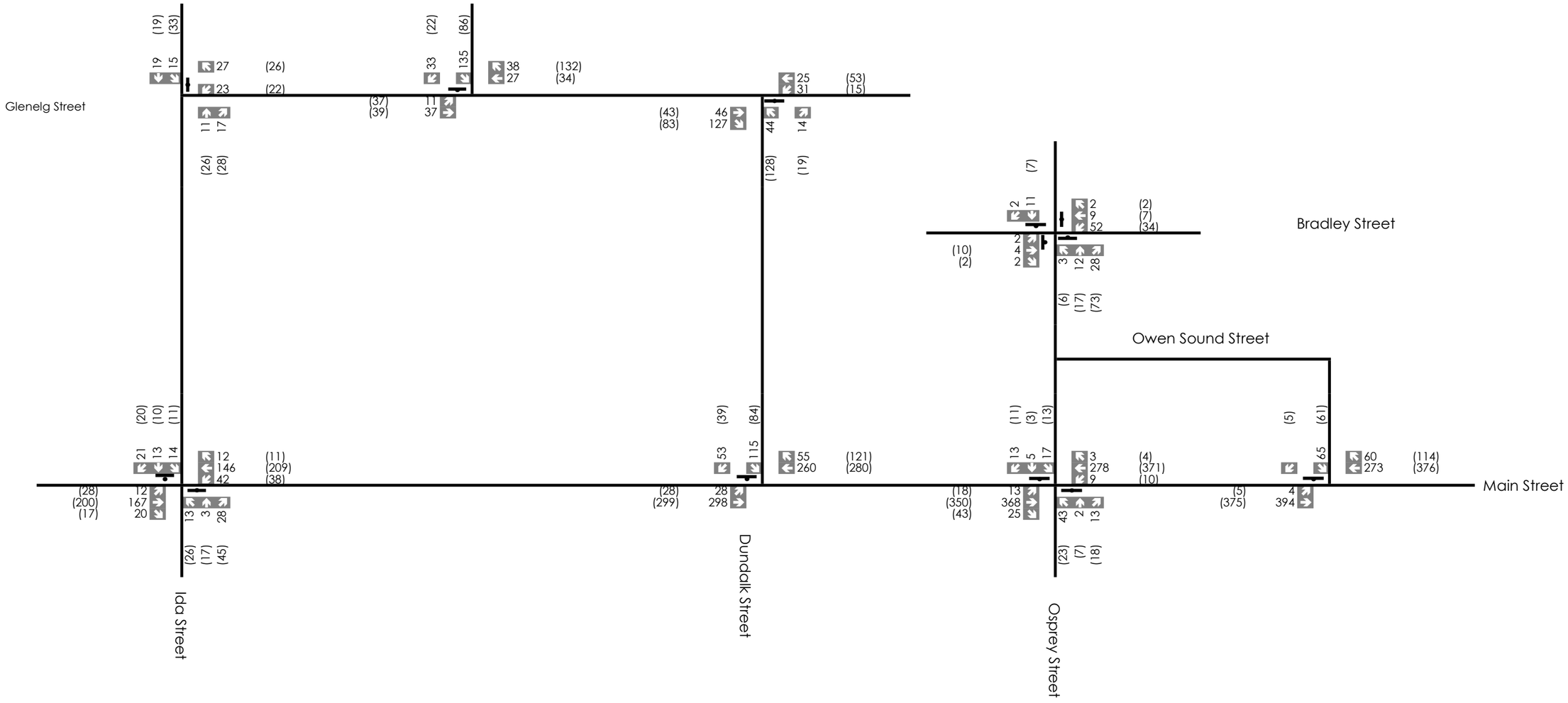
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Background 2027 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 11
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

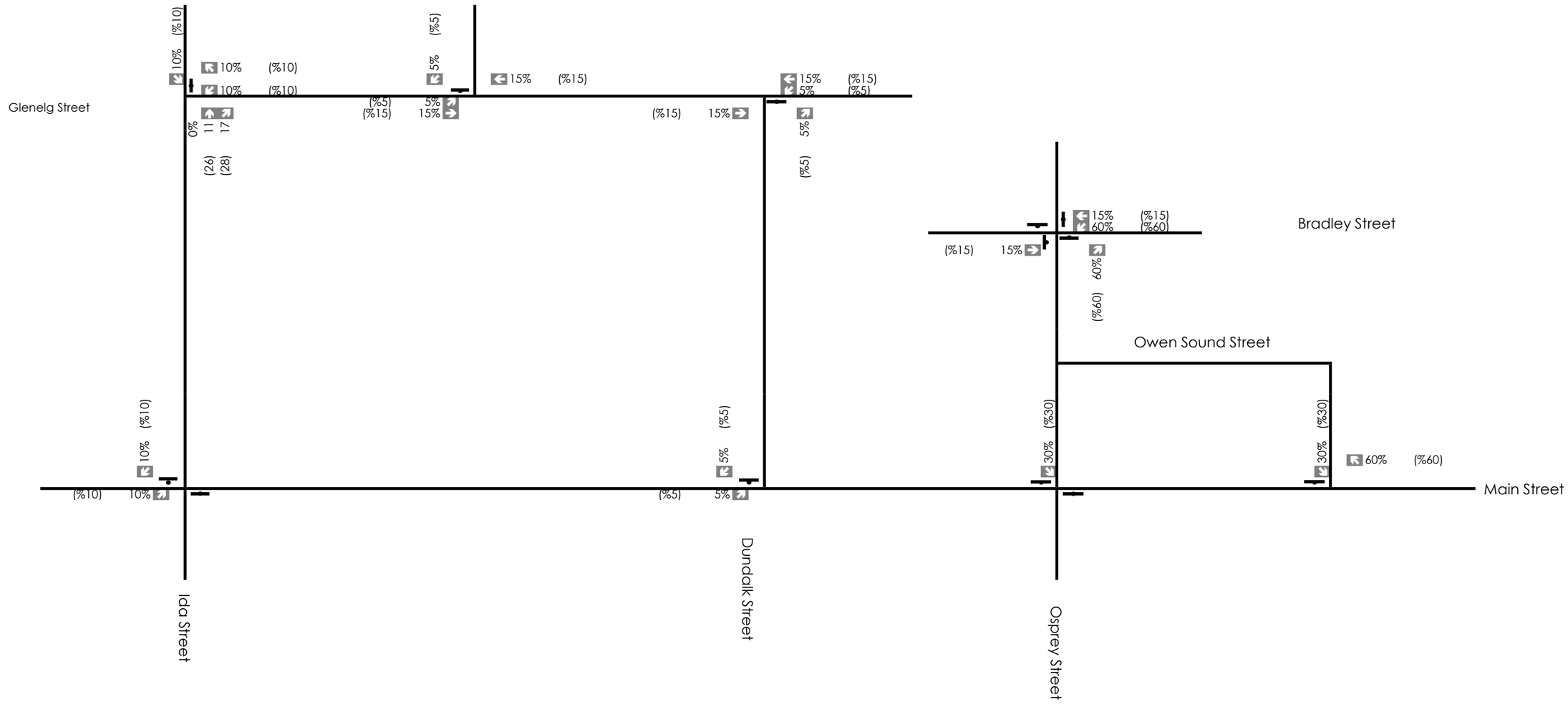
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

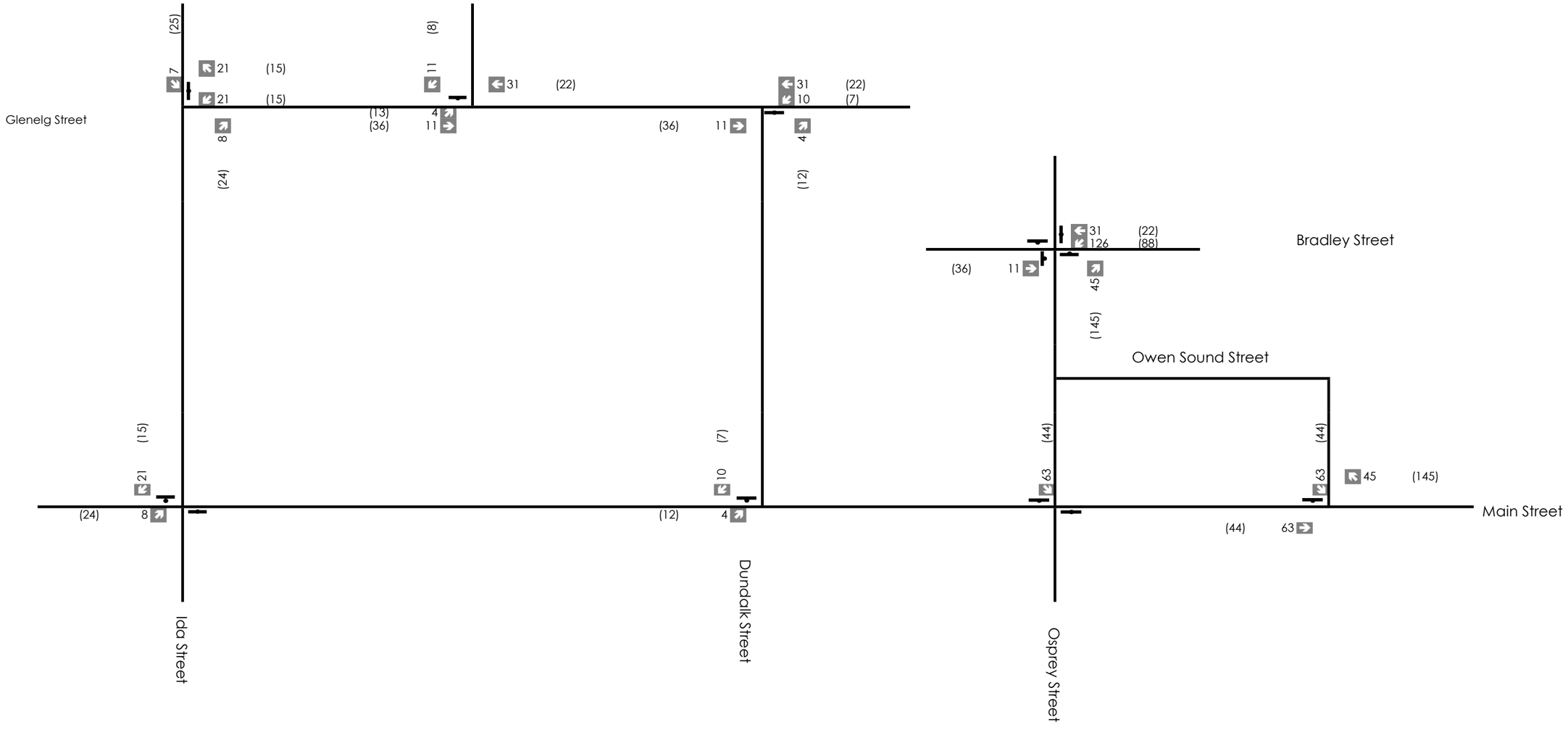
Future Background 2032 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 12
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 13
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Site Trip Distribution		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.



Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Site Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 14
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.

Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 15
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Future Total 2027 Traffic Volumes		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.

Legend

xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Future Total 2032 Traffic Volumes

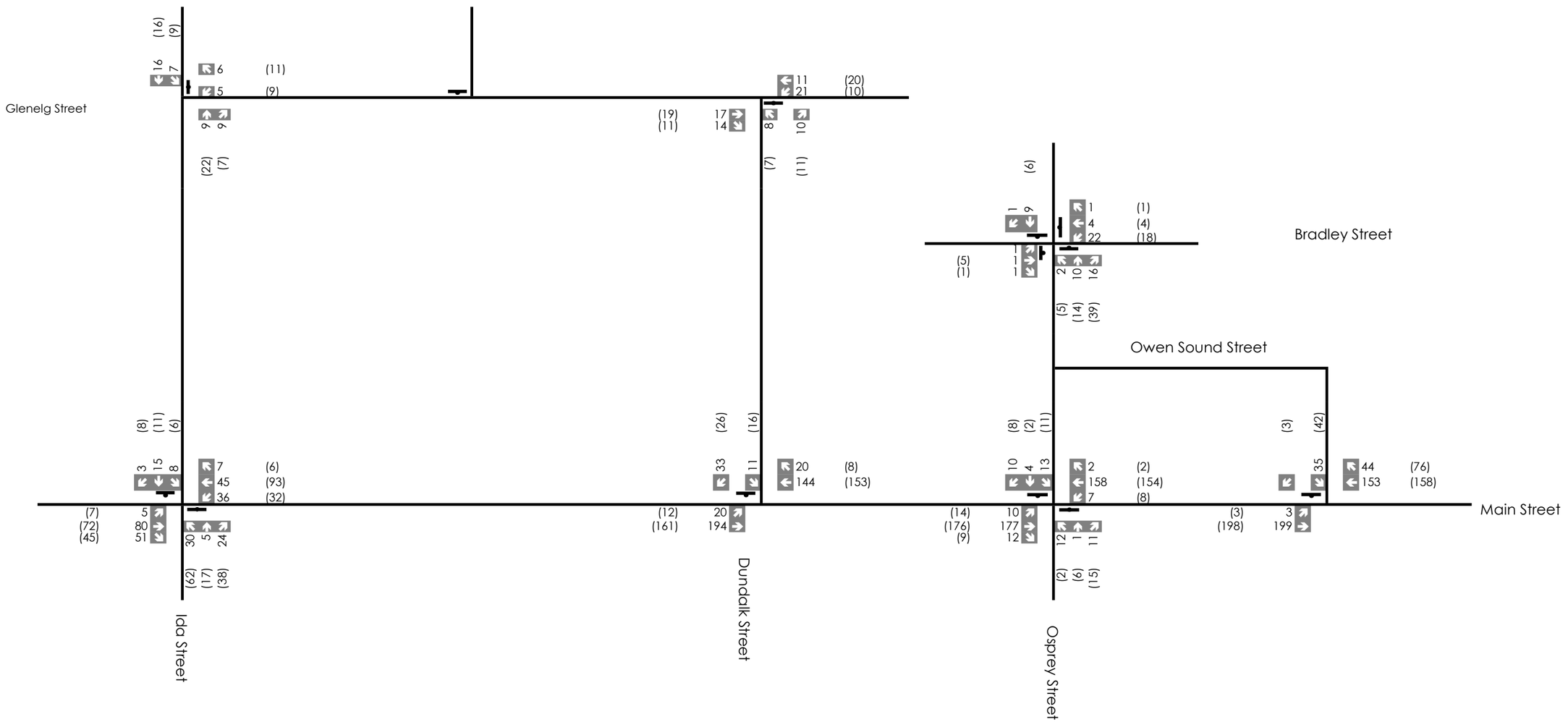
CROZIER CONSULTING ENGINEERS

Figure 16

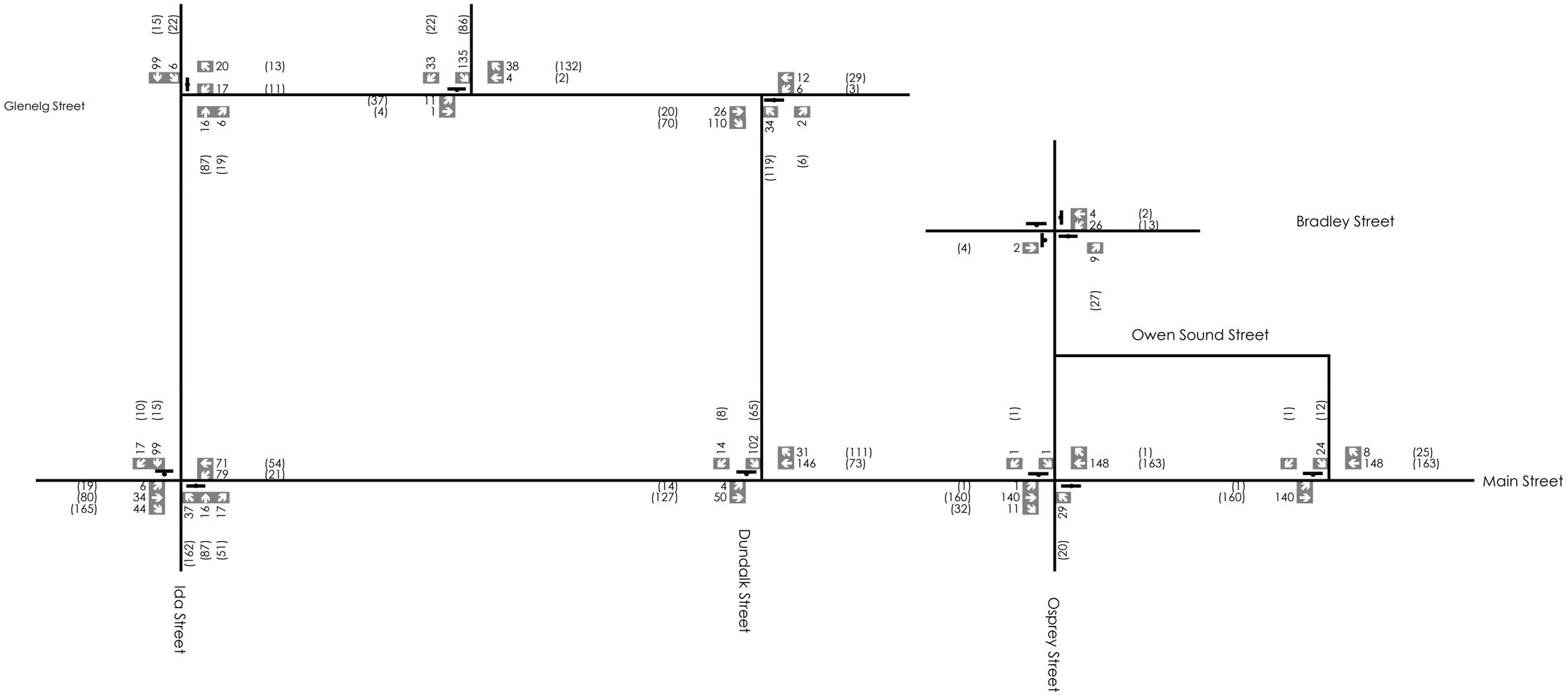
Project No. 1060-6220

Date. 2022/08/31

Analyst. E.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 17
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Eco Parkway Scenario Adjusted Existing Total Traffic Volumes		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.



Legend

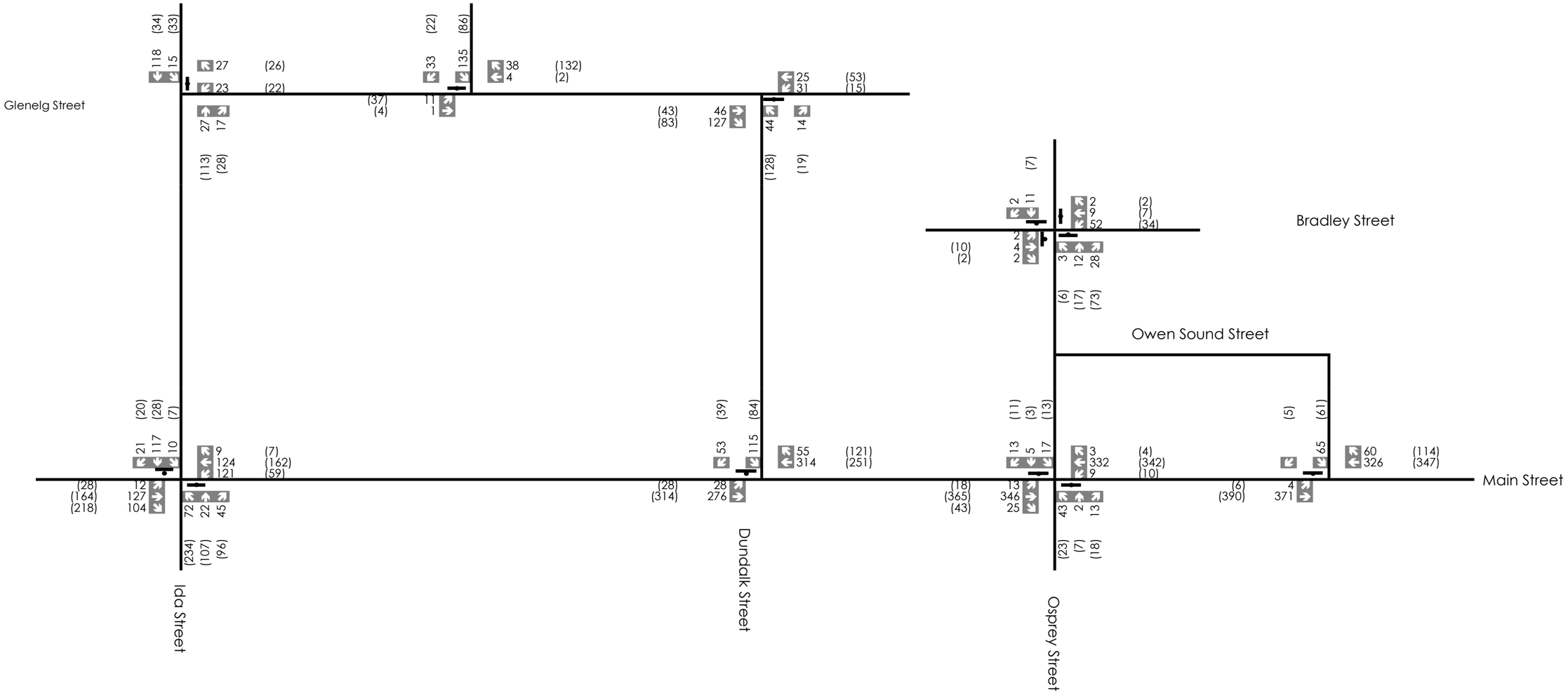
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Eco Parkway Industrial Lands Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 18
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend

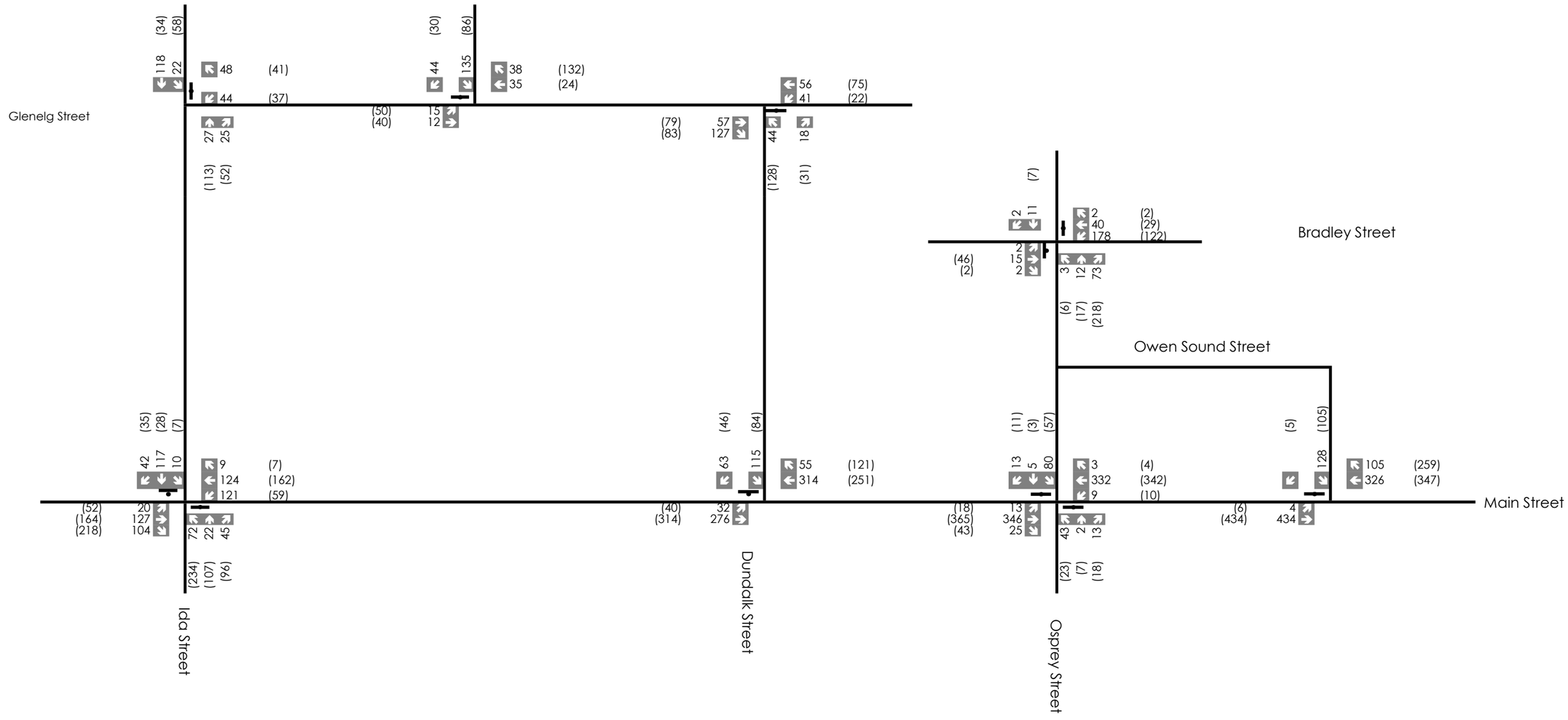
xx A.M. Peak Hour Traffic Volumes
(XX) P.M. Peak Hour Traffic Volumes
Stop Sign

Glenelg Phase 3

Eco Parkway Scenario Future Background 2032 Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 19
Project No. 1060-6220
Date. 2022/08/31
Analyst. E.H.



Legend	Glenelg Phase 3	CROZIER CONSULTING ENGINEERS	Figure 20
xx A.M. Peak Hour Traffic Volumes (XX) P.M. Peak Hour Traffic Volumes Stop Sign	Eco Parkway Scenario Future Total 2032 Traffic Volumes		Project No. 1060-6220 Date. 2022/08/31 Analyst. E.H.