

TRAFFIC IMPACT STUDY

**SOUTHGATE MEADOWS INC.
TOWNSHIP OF SOUTHGATE**

**GLENELG RESIDENTIAL DEVELOPMENT
PHASE 2**

PREPARED BY:

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Identification	Date	Description of Work
First Submission	September 2020	Submission to Township

1 EXECUTIVE SUMMARY

C.F. Crozier & Associates Inc. (Crozier) was retained by Southgate Meadows Inc. ("the Developer") to complete a Traffic Impact Study (TIS) in support of a County Official Plan Amendment, Township Official Plan Amendment, Zoning By-law Amendment and Draft Plan of Subdivision Application for a Settlement Boundary Expansion for Phase 2 of the proposed Glenelg residential development located in the west end of the Community of Dundalk, Township of Southgate, County of Grey.

Glenelg Phase 2 proposes 83 single detached homes and 66 townhouses, in addition to 6 partial lots. Access to the site is proposed through an internal connection to the Phase 1 lands (Corbett Street) and then to Glenelg Street through the two Glenelg Phase 1 entrances. A secondary emergency connection is proposed through Park Block 97 to allow for a secondary route into/out of the development in the event that Corbett Street becomes blocked.

Glenelg Phase 2 is forecasted to generate 100 and 132 two-way trips in the weekday a.m. and p.m. peak hours, respectively. Based on the site generated traffic and background traffic volumes on the roadway, auxiliary turn-lanes are not warranted at the site accesses. The site access intersection was modelled with shared lanes on all approaches.

Analysis of traffic operations at the study intersections indicate the following:

- The study intersections are currently operating with excellent traffic operations under 2018 existing conditions, with a Level of Service (LOS) B or better at all study intersections.
- The study intersections are anticipated to continue operating with excellent traffic operations under 2030 future background conditions. These operations account for background growth on the road network and the trips generated by Glenelg Phase 1 and Edgewood Greens.
- The addition of the site generated traffic is expected to have a minimal impact on the operations of the boundary road network. All intersections are expected to continue operating well with a LOS "C" or better.
 - The site generated traffic is expected to result in a maximum increase in control delay of two seconds and a maximum increase in volume-to-capacity ratio of 0.1.

Sight distance analyses at the proposed Glenelg Street site accesses were completed as part of the Glenelg Phase 1 Traffic Impact Study (Crozier, September 2018). The analysis was based on the standards outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), and the available sight distances were found to be acceptable.

It is concluded that the traffic generated by Phase 2 of the proposed Glenelg residential development will not materially affect the operations of the boundary road network.

The analysis undertaken within was prepared using the Draft Plan completed by MHBC Planning (September 24, 2020). Any minor changes to the Plan will not materially affect the conclusions contained within this report.

The Glenelg Phase 2 Draft Plan and associated development applications can be supported from a traffic operations and safety perspective.

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	ii
2	INTRODUCTION	1
2.1	Background	1
2.2	Purpose	1
2.3	Development Proposal	1
3	EXISTING CONDITIONS.....	2
3.1	Development Lands	2
3.2	Study Area	2
3.3	Boundary Road Network	2
3.4	Key Intersections	3
3.5	Active Transportation Network.....	3
3.6	Traffic Data	3
3.7	Intersection Operations.....	3
4	FUTURE BACKGROUND CONDITIONS.....	4
4.1	Horizon Years	4
4.2	Growth Rate	4
4.3	Future Roadway Improvements	4
4.4	Background Development Trip Generation.....	5
4.5	Intersection Operations.....	7
5	SITE GENERATED TRAFFIC	8
5.1	Trip Generation	8
5.2	Trip Distribution and Assignment	9
6	TOTAL FUTURE CONDITIONS	10
6.1	Basis of Assessment	10
6.2	Auxiliary Lane Assessment	10
6.3	Intersection Operations.....	10
7	SIGHT DISTANCE ANALYSIS.....	11
8	CONCLUSIONS.....	11

List of Tables

Table 1: Development Site Statistics	1
Table 2: Boundary Road Network Summary	2
Table 3: Peak Hour Factors	3
Table 4: 2018 Existing Level of Service	4
Table 5: Glenelg Phase 1 Trip Generation	5
Table 6: Edgewood Greens Trip Generation	6
Table 7: 2025 Future Background Level of Service	7
Table 8: 2030 Future Background Level of Service	8
Table 9: Glenelg Phase 2 Trip Generation	9
Table 10: 2025 Future Total Level of Service	10
Table 11: 2030 Future Total Level of Service	11

List of Appendices

Appendix A:	Township of Southgate Zoning By-Law Excerpts
Appendix B:	Township of Southgate Official Plan Excerpts
Appendix C:	Traffic Data
Appendix D:	Level of Service Definitions
Appendix E:	Detailed Capacity Analysis Worksheets
Appendix F:	Industrial Access TIS Excerpts
Appendix G:	Glenelg Phase 1 TIS Excerpts
Appendix H:	Edgewood Greens TIS Excerpts
Appendix I:	ITE Trip Generation Manual, 10 th Edition Excerpts
Appendix J:	TTS Data

List of Figures

Figure 1:	Glenelg Phase 2 Draft Plan
Figure 2:	Site Location Plan
Figure 3:	Boundary Road Network
Figure 4:	2018 Existing Traffic Volumes
Figure 5:	Glenelg Phase 1 Background Traffic Volumes
Figure 6:	Edgewood Greens Background Traffic Volumes
Figure 7:	2025 Future Background Traffic Volumes
Figure 8:	2030 Future Background Traffic Volumes
Figure 9:	Trip Distribution
Figure 10:	Trip Assignment
Figure 11:	2025 Future Total Traffic Volumes
Figure 12:	2030 Future Total Traffic Volumes

2 INTRODUCTION

2.1 Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Southgate Meadows Inc. ("the Developer") to complete a Traffic Impact Study (TIS) in support of a County Official Plan Amendment, Township Official Plan Amendment, Zoning By-law Amendment and Draft Plan of Subdivision Application for a Settlement Boundary Expansion for Phase 2 of the proposed Glenelg residential development located in the west end of the Community of Dundalk, Township of Southgate, County of Grey (the site).

In September 2018, Crozier completed a TIS to support Phase 1 of the Glenelg Residential Development. Phase 1 is located directly south of the Phase 2 lands fronting Glenelg Street. The Phase 1 Official Plan Amendment, Zoning By-law Amendment and Draft Plan Applications have been approved and a Redline Draft Plan Application has also recently been submitted and approved. Phase 1 of the development is currently undergoing detailed design and working towards registration. The scope of this TIS is consistent with that of the Phase 1 TIS.

2.2 Purpose

The purpose of the study was to assess the impacts of the proposed development on the boundary road network and to recommend any mitigation measures, if warranted.

The study reviews the following main aspects of the proposed residential development from a transportation engineering perspective:

- Existing, future background, and future total traffic operations at the study intersections
- Forecasted trip generation of the proposed development
- Auxiliary lane requirements at the proposed site accesses

2.3 Development Proposal

The site statistics proposed on the Draft Plan have been summarized in **Table 1** below. The Draft Plan prepared by MHBC Planning (September 24, 2020) has been included as **Figure 1**. It has been assumed that for the purposes of this analysis, the entire Phase 2 development will be built out concurrently.

Table 1: Development Site Statistics

Development Type	Unit Type	Draft Plan (September 24, 2020)
Residential	Single Detached	83
	Townhomes	66
	Partial Lots	6

For the purpose of this analysis, the six partial lots were assessed as single detached units. Access to the site will be provided by two accesses to Glenelg Street through the previous Glenelg Phase 1 lands and are spaced approximately 220 metres apart. The internal roads within Phase 2 are described as Corbett Street, Aitchison Avenue, Street "A" and Street "B". Street "A" and Aitchison Avenue provide connectivity to the Phase 1 lands.

It is highlighted that while there are two entrances to the boundary road network, the majority of the Phase 2 lands (just over 100 units) are connected to Phase 1 by one access point (Corbett Street). Accordingly, an emergency access is proposed through Park Block 97 to allow for a secondary route into/out of the development in the event that Corbett Street becomes blocked.

3 EXISTING CONDITIONS

3.1 Development Lands

The site is approximately 18.36 hectares (45.4 acres) in size and is legally described as Part of Lots 225 and 226, Concession 2, southwest of the Toronto and Sydenham Road, Township of Southgate, County of Grey. The location of the site is reflected on the development Site Location Plan included as **Figure 2**.

The site is currently zoned "Deferred Development" and "Environmental Protection" per the Township of Southgate Zoning By-law (2009). The site is designated "Rural" and "Hazard Lands" per the Township of Southgate Official Plan (2009). A map of the Township of Southgate Zoning has been included in **Appendix A** and Map 1 to Schedule A – Dundalk from the Township of Southgate Official Plan has been included in **Appendix B**.

3.2 Study Area

The site are bounded by the Glenelg Phase 1 lands and Glenelg Street to the south, the CP Rail Trail to the east, Ida Street and residential properties to the west and agricultural lands to the north.

The study area encompasses the boundary road network surrounding the site and is described in Section 3.3.

3.3 Boundary Road Network

The boundary road network is described in **Table 2** below. With skewed directions, the directional orientation of the road network is ambiguous. To provide clarity throughout this report, Ida Street and Dundalk Street have been given a north-south orientation while Glenelg Street, Grey Street and County Road 9/Main Street West have been given an east-west orientation.

Table 2: Boundary Road Network Summary

Road	Direction	Lanes	Posted Speed (km/h)	Classification	Jurisdiction
Ida Street	North/South	2	50 km/h	Local Road	Township of Southgate
Glenelg Street	East/West	2	50 km/h	Local Road	Township of Southgate
County Road 9/ Main Street West	East/West	2	50 km/h	County Highway	County of Grey
Dundalk Street	North/South	2	Assumed 50 km/h	Local Road	Township of Southgate
Grey Street South	East/West	2	Assumed 50 km/h	Local Road	Township of Southgate

3.4 Key Intersections

The following are the key intersections contained within this study area. **Figure 3** illustrates the existing traffic controls and lane configurations at each intersection.

- Ida Street and Glenelg Street
- Dundalk Street and Main Street West
- Glenelg Street and Grey Street and Dundalk Street
- Ida Street and County Road 9/Main Street West

3.5 Active Transportation Network

There are two existing paved sidewalks in the study area that run along both sides of Main Street West. These sidewalks are 1.5 metres wide and start near the intersection of Main Street and Dundalk Street and continues east past the boundaries of the study area. There are no dedicated cycling facilities existing within the study area; similarly, there is no public transit available in Dundalk.

3.6 Traffic Data

Turning movement counts for the key intersections, were undertaken by Spectrum Traffic Data Inc. staff from 7:00 a.m. to 10:00 a.m. and 4:00 p.m. to 7:00 p.m. on Thursday September 6, 2018.

The traffic count data is summarized in **Appendix C. Figure 4** illustrates the 2018 existing traffic volumes.

Peak hour factors (PHF) associated with the weekday a.m. and p.m. peak hours were calculated for each intersection within the study area based on the existing traffic volumes.

Table 3 outlines the PHFs as calculated and applied to the model for their respective intersections.

Table 3: Peak Hour Factors

Intersection	Peak Hour	Peak Hour Factor
Glenelg Street and Ida Street	Weekday A.M. (8:00-9:00)	0.78
	Weekday P.M. (4:15-5:15)	0.87
Glenelg Street/Grey Street and Dundalk Street	Weekday A.M. (8:15-9:15)	0.76
	Weekday P.M. (4:45-5:45)	0.82
Main Street West (Grey County Road 9) and Dundalk Street	Weekday A.M. (8:00-9:00)	0.91
	Weekday P.M. (5:00-6:00)	0.90
Main Street West (Grey County Road 9) and Ida Street	Weekday A.M. (7:45-8:45)	0.94
	Weekday P.M. (5:00-6:00)	0.88

3.7 Intersection Operations

The operations of the critical intersections were analyzed on the basis of the traffic volumes illustrated in **Figure 4. Table 4** summarizes the 2018 traffic operations.

The intersection of Glenelg Street/Grey Street and Dundalk Street can not be modelled by typical modelling software due to its configuration. Accordingly, the intersection was modelled as a t-

intersection, and trips to/from Grey Street South were redistributed to Glenelg Street and Dundalk Street. Given the Level of Service "B" or better through all scenarios, this approach is deemed acceptable.

The operations of the critical intersections in the study area were analyzed using Synchro 9 Software. Level of Service (LOS) definitions are included in **Appendix D** and detailed capacity analysis worksheets are included in **Appendix E**.

Table 4: 2018 Existing Level of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²
Glenelg Street and Ida Street	Stop (Two-way)	A.M.	A	8.5s (WB)	0.01 (WB)
		P.M.	A	8.7s (WB)	0.03 (WB)
Glenelg Street/Grey Street and Dundalk Street	Stop (Two-way)	A.M.	A	8.6s (NB)	0.01 (NB)
		P.M.	A	8.7s (NB)	0.02 (NB)
Main Street West (Grey County Road 9) and Dundalk Street	Stop (Two-way)	A.M.	A	9.9s (SB)	0.05 (SB)
		P.M.	B	10.5s (SB)	0.03 (SB)
Main Street West (Grey County Road 9) and Ida Street	Stop (Two-way)	A.M.	B	10.8s (SB)	0.06 (SB)
		P.M.	B	11.7s (SB)	0.08 (SB)

Note¹: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection.

The metrics summarized above indicate that the boundary road network is currently operating at a LOS "B" or better during all time periods with minimal delays and reserve capacity for increases in traffic volumes.

4 FUTURE BACKGROUND CONDITIONS

4.1 Horizon Years

It is anticipated that the development will be completed within five years. Accordingly, the years of 2025 and 2030 are analyzed, representing five and ten years beyond the study date.

4.2 Growth Rate

Similar to the Phase 1 TIS, a growth rate of 1.5 percent compounded annually was applied to the boundary road network. This growth rate is also consistent with the rate used in the Traffic Impact Studies completed for the Flato North and Flato East ("Edgewood Greens") developments located at the eastern limits of Dundalk.

4.3 Future Roadway Improvements

A review the Grey County Transportation Master Plan (July 7, 2015), as well as the 2020 budget for the Township of Southgate, reveals there are currently no planned major road reconstruction projects in the study area.

4.4 Background Development Trip Generation

4.4.1 Industrial Access Road

It is noted that the Township of Southgate completed a Municipal Class Environmental Assessment for the Dundalk Industrial Access Road in September 2018. The Industrial Access Road would facilitate the development of industrial and commercial employment lands, south of the Community of Dundalk.

Triton Engineering completed a Traffic Impact Study to determine the impacts of the Access Road on the intersection of Main Street West (Grey County Road 9) and Ida Street. Since there are no current applications to develop these lands, the Traffic Impact Study (Triton, 2017) analyzed the intersection under the 2024 and 2029 horizon years assuming both 50 percent build-out and 100 percent build-out. The findings noted that if the development is 100 percent built-out by 2029, the northbound movements would operate at a LOS E in the p.m. peak hour.

Since there are no planning proposals at this time for development in this area, the following analysis did not account for traffic generated by the future industrial/commercial employment lands.

Relevant excerpts from the Industrial Access Traffic Impact Study have been included in **Appendix F** for reference.

4.4.2 Glenelg Phase 1

Glenelg Phase 1 is located south of the proposed Phase 2 lands and includes the two primary accesses to Glenelg Street. A Redline Draft Plan has recently been approved for Glenelg Phase 1. The Redline Draft Plan proposes 118 single detached units and 65 townhouse units. It has been assumed that the Phase 1 lands will be fully built-out and occupied prior to the 2025 horizon year. The Glenelg Phase 1 Redline Draft Plan as well as excerpts from the original Glenelg Phase 1 TIS have been included as **Appendix G**.

The trip generation of the Redline Phase 1 development was established using the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition using Land Use Categories (LUC) 210 "Single Family Detached Dwelling" and LUC 220 "Multifamily Housing (Low-Rise)". The Glenelg Phase 1 trip generation is summarized in **Table 5**.

Table 5: 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 trips generated by the Redline Glenelg Phase 1 Draft Plan were distributed to the boundary road network based on the trip distribution described in the original Glenelg Phase 1 TIS (Crozier, September 2018). The trips generated by the Glenelg Phase 1 residential development are illustrated in **Figure 5**.

4.4.3 Edgewood Greens (Flato East and North)

For consistency with the Glenelg Phase 1 TIS, the future background traffic analysis includes trips generated by the Dundalk Meadows Flato East and Flato North developments. It is noted that the development is now referred to as Edgewood Greens and a commercial component is now being envisioned within the eastern portion of the development.

The Edgewood Greens residential development is proposed to consist of:

- 515 Single-detached Units
- 118 Semi-detached Units
- 101 Townhouse Units
- Commercial Building with a GFA of 1,635 m² (17,599 ft²)

It is highlighted that some of the units contained within Edgewood Greens have been constructed and occupied. However, these units were not constructed and occupied at the time of the 2018 turning movement counts. Accordingly, the trips generated by these units have been included in the trip generation forecasts.

For conservative analysis purposes, it is assumed that Edgewood Greens will be fully built out by the first horizon year (2025). The trip generation for Edgewood Greens was adopted from the latest Traffic Impact Study Update (Crozier, January 2020).

The trip generation for the Edgewood Greens development is summarized in **Table 6**.

Table 6: Edgewood Greens Trip Generation

Development	Unit Type	Number of Units	Roadway Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Edgewood Greens	LUC 210: Single Family Detached Housing	515	Weekday A.M.	92	278	370
			Weekday P.M.	309	181	490
	LUC 220: Multifamily Housing (Low-Rise)	219	Weekday A.M.	23	77	100
			Weekday P.M.	75	44	119
	LUC 820: Shopping Centre	17,599 ft²	Weekday A.M.	10	7	17
			Weekday P.M.	21	23	44
Total			Weekday A.M.	125	362	487
			Weekday P.M.	405	248	653

The Edgewood Greens Traffic Impact Study Update (Crozier, January 2020) assumed that 30 percent of trips would travel to and from the west on Main Street West (Grey County Road 9) towards downtown Dundalk. It is assumed that 10 percent of trips would travel to and from Grey Road 9 past Ida Street, with the remaining 20 percent dispersing into downtown Dundalk. This assumption is consistent with the assumptions made by Triton Engineering in the TIS completed for the Industrial Access Road. It was assumed that of the remaining 20 percent dispersing into Downtown, five percent would continue past Dundalk Street, since the main downtown corridor is west of Dundalk Street.

The commercial portion of the development is located within the eastern limits of the Edgewood Greens development. Per the Edgewood Greens Traffic Impact Study Update (Crozier, January 2020) all pass-by trips were assumed to arrive from and depart to Highway 10 and were therefore not considered in the background trip generation. The TIS Update assumed that 50 percent of the primary trips would remain within the Edgewood Greens development, with the remaining 50 percent being

distributed to the west on Main Street and Victoria Street. Of the trips distributed to the west on Main Street, 10 percent were assumed to travel past Dundalk Street and then disperse into the surrounding neighbourhoods.

Relevant excerpts from the Traffic Impact Study Update (Crozier, January 2020) have been included in **Appendix H**. The trips generated by the Edgewood Greens development have been included in **Figure 6**.

4.5 Intersection Operations

The 2025 and 2030 future background traffic volumes are illustrated in **Figures 7 and 8**, respectively and account for the background growth rate of 1.5 percent and the trips generated by Glenelg Phase 1 and Edgewood Greens. The 2025 and 2030 future background traffic operations are outlined in **Table 7** and **Table 8**, respectively, with LOS definitions included in **Appendix D** and detailed capacity analyses included in **Appendix E**.

Table 7: 2025 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum v/c ratio
Glenelg Street and Ida Street	Stop (Two-way)	A.M.	A	8.8s (WB)	0.04 (WB)
		P.M.	A	8.9s (WB)	0.05 (WB)
Glenelg Street/Grey Street and Dundalk Street	Stop (Two-way)	A.M.	A	9.4s (NB)	0.04 (NB)
		P.M.	A	9.5s (NB)	0.11 (NB)
Main Street West (Grey County Road 9) and Dundalk Street	Stop (Two-way)	A.M.	B	12.9s (SB)	0.19 (SB)
		P.M.	B	13.7s (SB)	0.14 (SB)
Main Street West (Grey County Road 9) and Ida Street	Stop (Two-way)	A.M.	B	11.3s (SB)	0.09 (SB)
		P.M.	B	13.0s (SB)	0.16 (NB)
Glenelg Site Access	Stop (Two-way)	A.M.	A	9.2s (SB)	0.10 (SB)
		P.M.	A	9.4s (SB)	0.07 (SB)

Note¹: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection.

Table 8: 2030 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²
Glenelg Street and Ida Street	Stop (Two-way)	A.M.	A	8.8s (WB)	0.04 (WB)
		P.M.	A	8.9s (WB)	0.05 (WB)
Glenelg Street/Grey Street and Dundalk Street	Stop (Two-way)	A.M.	A	9.5s (NB)	0.04 (NB)
		P.M.	A	9.6s (NB)	0.11 (NB)
Main Street West (Grey County Road 9) and Dundalk Street	Stop (Two-way)	A.M.	B	13.3s (SB)	0.21 (SB)
		P.M.	B	14.2s (SB)	0.15 (SB)
Main Street West (Grey County Road 9) and Ida Street	Stop (Two-way)	A.M.	B	11.6s (SB)	0.10 (SB)
		P.M.	B	13.6s (SB)	0.18 (NB)
Glenelg Site Access	Stop (Two-way)	A.M.	A	9.2s (SB)	0.10 (SB)
		P.M.	A	9.5s (SB)	0.07 (SB)

Note¹: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection.

The metrics listed above indicate that the boundary road network is expected to continue operating at a LOS “B” or better under 2025 and 2030 future background conditions, with minimal delays and reserve capacity for increases in traffic volumes.

5 SITE GENERATED TRAFFIC

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements at the boundary road intersections.

5.1 Trip Generation

The trip generation of the single detached residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 210 “Single Family Detached Dwelling”.

The trip generation of the townhouse residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 220 “Multifamily Housing (Low-Rise)”.

The trip generation of Glenelg Phase 2 is summarized in **Table 9**. Relevant excerpts from the ITE Trip Generation Manual, 10th Edition are included in **Appendix I**.

Table 9: Glenelg Phase 2 Trip Generation

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

5.2 Trip Distribution and Assignment

Trips generated by Phase 2 of the Glenelg residential development were distributed to the boundary road network maintaining the distribution described in the Glenelg Phase 1 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, Simcoe County and Grey County areas. TTS data is not available for the Community of Dundalk, accordingly, the Township of Melancthon (abutting the Dundalk to the south and east) was selected as it is considered most 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
- 10% to/from the west on Ida Street
- 60% to/from the south on Highway 10
- 20% to/from Dundalk (downtown)
 - 15% to/from the east on Grey Road 9
 - 5% to/from the west on Main Street

Of the 20 percent remaining in Dundalk, five percent were assumed to travel south on Dundalk Street and then turn right to travel west on Main Street West. The remaining 15 percent were assumed to travel east on Grey Street South and use Proton Street North to access the main downtown commercial corridor.

The development was analyzed under a consolidated access configuration to provide a conservative analysis. The future operations of the site accesses to Glenelg Street are expected to be better than listed herein as traffic volumes will be dispersed across both accesses.

The trips generated by the proposed development were assigned to the boundary road network per the distributions illustrated in **Figure 9**. The corresponding trip assignment is illustrated in **Figure 10**.

6 TOTAL FUTURE CONDITIONS

6.1 Basis of Assessment

The traffic impacts arising from the proposed development were assessed on the basis of the site generated traffic illustrated in **Figure 10** being superimposed on the future background traffic volumes in **Figures 7 and 8**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 11 and 12** for the 2025 and 2030 horizon years, respectively.

6.2 Auxiliary Lane Assessment

Traffic volumes at the consolidated Site Access do not meet the threshold to warrant auxiliary left-turn lanes. Accordingly, the future total traffic operations were analyzed under existing lane configurations; shared through/turn lanes on all approaches. The proposed site access was assessed under a shared left/right-turn lane configuration. Based on this geometry, it can be seen in the subsequent section that the access is anticipated to operate with excellent levels of service and minimal delay.

6.3 Intersection Operations

The 2025 and 2030 future total traffic operations of the boundary road network are summarized in **Table 10 and Table 11**. The LOS definitions are included in **Appendix D**, and the detailed capacity analysis worksheets are included in **Appendix E**.

Table 10: 2025 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²
Glenelg Street and Ida Street	Stop (Two-way)	A.M.	A	8.9s (WB)	0.06 (WB)
		P.M.	A	9.0s (WB)	0.06 (WB)
Glenelg Street/Grey Street and Dundalk Street	Stop (Two-way)	A.M.	A	9.9s (NB)	0.07 (NB)
		P.M.	B	10.3s (NB)	0.19 (NB)
Main Street West (Grey County Road 9) and Dundalk Street	Stop (Two-way)	A.M.	B	14.7s (SB)	0.31 (SB)
		P.M.	C	15.4s (SB)	0.23 (SB)
Main Street West (Grey County Road 9) and Ida Street	Stop (Two-way)	A.M.	B	11.2s (SB)	0.10 (SB)
		P.M.	B	13.1s (SB)	0.17 (NB)
Glenelg Street and Site Access	Stop (Two-way)	A.M.	A	9.8s (SB)	0.19 (SB)
		P.M.	B	10.3s (SB)	0.15 (SB)

Note¹: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection.

Table 11: 2030 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²
Glenelg Street and Ida Street	Stop (Two-way)	A.M.	A	8.9s (WB)	0.06 (WB)
		P.M.	A	9.1s (WB)	0.06 (WB)
Glenelg Street/Grey Street and Dundalk Street	Stop (Two-way)	A.M.	B	10.0s (NB)	0.07 (NB)
		P.M.	B	10.3s (NB)	0.20 (NB)
Main Street West (Grey County Road 9) and Dundalk Street	Stop (Two-way)	A.M.	C	15.3s (SB)	0.32 (SB)
		P.M.	C	16.2s (SB)	0.25 (SB)
Main Street West (Grey County Road 9) and Ida Street	Stop (Two-way)	A.M.	B	11.5s (SB)	0.11 (NB)
		P.M.	B	13.7s (SB)	0.18 (NB)
Glenelg Street and Site Access	Stop (Two-way)	A.M.	A	9.8s (SB)	0.20 (SB)
		P.M.	B	10.3s (SB)	0.15 (SB)

Note¹: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection.

The study intersections are expected to operate at a LOS "C" or better in the weekday a.m. and p.m. peak hours. The site generated traffic is expected to result in a maximum increase in control delay of two seconds, and a maximum increase in maximum volume-to-capacity ratio of 0.1 when compared with future background traffic operations.

These metrics indicate that the trips generated by the Glenelg Phase 2 residential development are anticipated to have a minimal impact on the operations of the boundary road network.

7 SIGHT DISTANCE ANALYSIS

Sight distance analyses at the proposed Glenelg Street site accesses were completed as part of the Glenelg Phase 1 Traffic Impact Study (Crozier, September 2018). The analysis was based on the standards outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), and the available sight distances were found to be acceptable.

8 CONCLUSIONS

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

- Under existing traffic conditions, the study intersections are operating very well at a LOS "B" or better during the weekday a.m. and p.m. peak hours;
- Examination of the 2025 and 2030 future background traffic conditions indicate that the study intersections are anticipated to continue operating efficiently at a LOS "B" or better in the weekday a.m. and p.m. peak hours;

- Auxiliary turn-lanes are not warranted at the site entrances as the volumes on Glenelg Street do not meet the minimum threshold;
- Examination of the 2030 future total traffic conditions indicate that the study intersections are anticipated to operate at a LOS "C" or better in the weekday a.m. and p.m. peak hours;
 - The site generated traffic is expected to result in a maximum increase in control delay of two seconds and a maximum increase in volume-to-capacity ratio of 0.1; and,
- A sight distance analysis at the proposed site accesses was completed as part of the Glenelg Phase 1 TIS (Crozier, September 2018). The analysis was based on the standards outlined in the TAC GDGCR, and the available sight distances were found to be acceptable.

It is concluded that the traffic generated by Phase 2 of the proposed Glenelg residential development will not materially affect the operations of the boundary road network.

The analysis undertaken within was prepared using the Draft Plan completed by MHBC Planning (September 24, 2020). Any minor changes to the Plan will not materially affect the conclusions contained within this report.

The Glenelg Phase 2 Draft Plan and associated development applications can be supported from a traffic operations and safety perspective.

Prepared by,

C.F. CROZIER & ASSOCIATES INC.



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Associate

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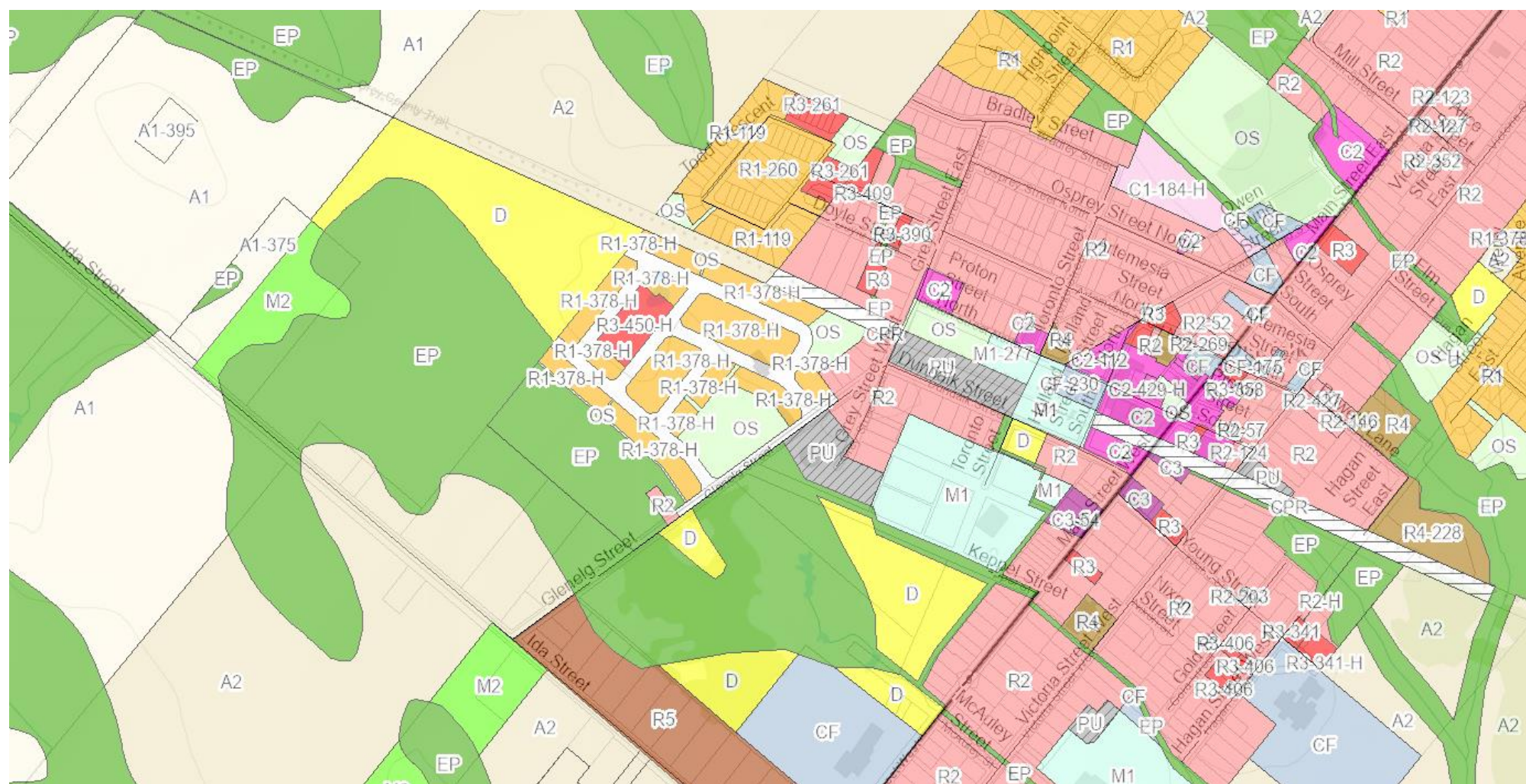
Scott J. Kerr
Transportation Technologist

MF/sk

J:\1000\1060-Flato Dev\5545-Glenelg Ph. 2\Reports\Traffic\5545_TIS (September 2020).docx

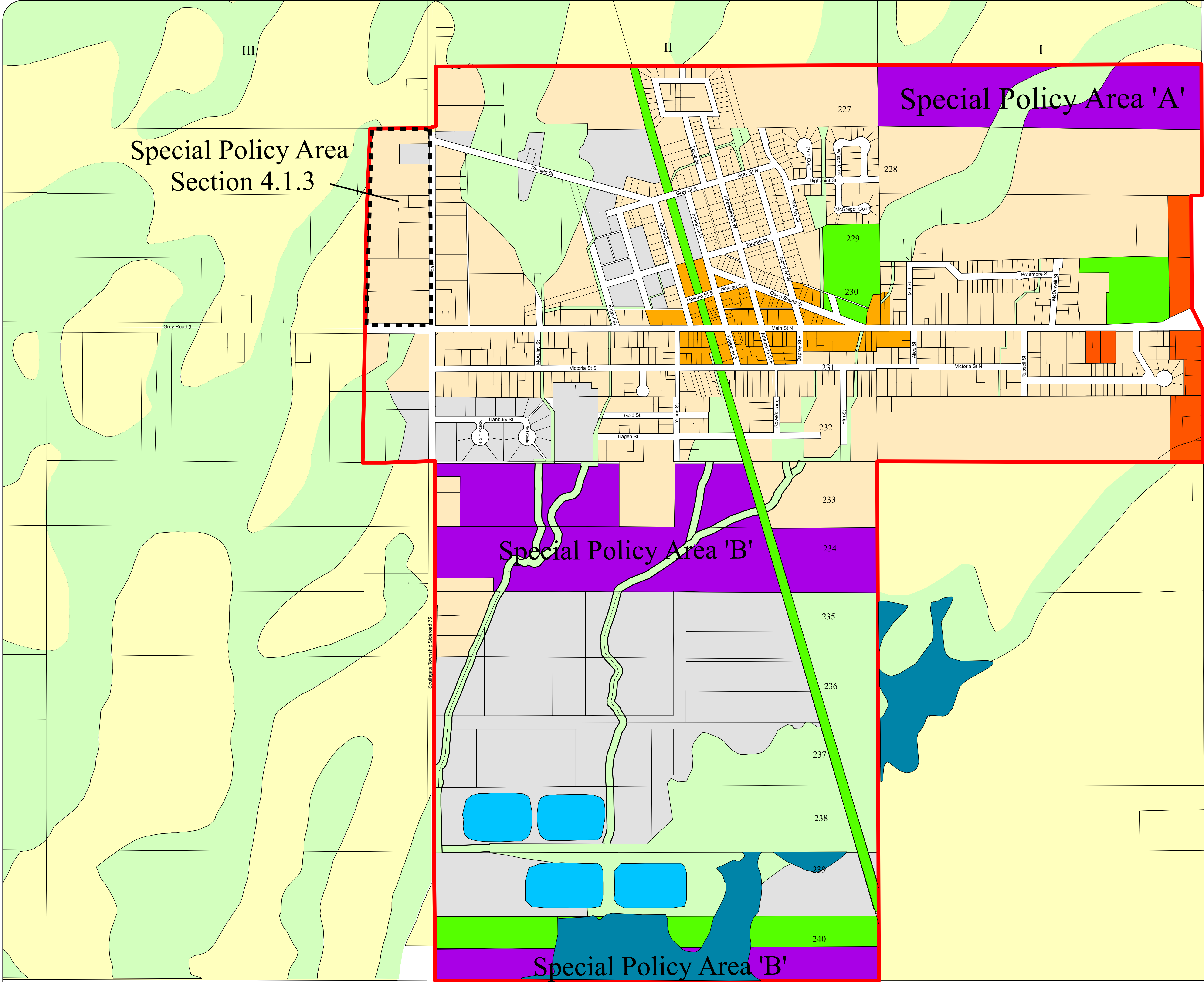
APPENDIX A

Township of Southgate Zoning By-Law Excerpts



APPENDIX B

Township of Southgate Official Plan Excerpts

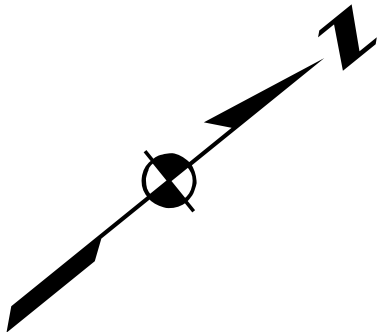


TOWNSHIP OF SOUTHGATE
OFFICIAL PLAN
LAND USE

MAP 1 TO SCHEDULE A
DUNDALK

LAND USE DESIGNATIONS

- Neighbourhood Area
- Downtown Commercial
- Arterial Commercial
- Industrial
- Public Space
- Special Policy Area
- Agriculture
- Rural
- Village Community
- Inland Lakes
- Space Extensive Industrial/Commercial
- Hazard Lands
- Mineral Aggregate Extraction
- Wetlands
- Major Open Space



CONSOLIDATED
FEBRUARY 2009

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Planning & Development
243 HURONTARIO STREET, COLLINGWOOD, ON
705.444.1830

APPENDIX C

Traffic Data



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

Start Time	N Approach IDA ST						E Approach GLENELG ST						S Approach IDA ST						W Approach GLENELG ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	0	4	0	0	0	4	3	0	1	0	0	4	0	7	1	0	0	8	0	0	0	0	0	0	16	
07:15:00	0	6	1	0	0	7	3	0	2	0	0	5	0	3	0	0	0	3	0	0	0	0	0	0	15	
07:30:00	0	8	0	0	0	8	1	0	1	1	0	3	1	0	0	0	0	1	0	0	0	0	0	0	12	
07:45:00	0	8	2	0	0	10	2	0	1	0	0	3	1	1	0	0	0	2	0	0	0	0	0	0	15	58
08:00:00	0	7	0	0	0	7	3	0	0	0	0	3	1	3	0	0	0	4	0	0	0	0	0	0	14	56
08:15:00	0	10	4	0	0	14	1	0	0	0	0	1	2	2	0	0	0	4	0	0	0	0	0	0	19	60
08:30:00	0	5	4	0	0	9	1	0	0	0	0	1	2	2	0	0	0	4	0	0	0	0	0	0	14	62
08:45:00	0	7	4	0	0	11	5	0	1	0	0	6	1	4	0	0	0	5	0	0	0	0	0	0	22	69
09:00:00	0	3	1	0	0	4	2	0	0	0	0	2	2	1	0	0	0	3	0	0	0	0	0	0	9	64
09:15:00	0	5	3	0	0	8	1	0	1	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	11	56
09:30:00	0	8	2	0	0	10	2	0	2	0	0	4	3	1	0	0	0	4	0	0	0	0	0	0	18	60
09:45:00	0	4	1	0	0	5	4	0	0	0	0	4	0	3	0	0	0	3	0	0	0	0	0	0	12	50
BREAK																										
16:00:00	0	4	3	0	0	7	2	0	0	0	0	2	4	8	0	0	0	12	0	0	0	0	0	0	21	
16:15:00	0	9	2	0	0	11	3	0	2	0	0	5	1	6	0	0	0	7	0	0	0	0	0	0	23	
16:30:00	0	7	1	0	0	8	5	0	2	0	0	7	2	9	0	0	0	11	0	0	0	0	0	0	26	
16:45:00	0	4	2	0	0	6	3	0	1	0	0	4	1	7	0	0	0	8	0	0	0	0	0	0	18	88
17:00:00	0	8	3	0	0	11	6	0	1	0	0	7	2	3	0	0	0	5	0	0	0	0	0	0	23	90
17:15:00	1	5	3	0	0	9	5	0	1	0	0	6	3	3	0	0	0	6	0	0	0	0	0	0	21	88
17:30:00	0	4	4	0	0	8	2	0	1	0	0	3	4	11	0	0	0	15	1	0	0	0	0	1	27	89
17:45:00	0	2	1	0	0	3	2	0	0	0	0	2	2	11	0	0	0	13	0	0	0	0	0	0	18	89
18:00:00	0	3	2	0	0	5	3	0	1	0	0	4	1	8	1	0	0	10	0	0	0	0	0	0	19	85
18:15:00	0	3	1	0	0	4	2	0	1	0	0	3	2	2	0	0	0	4	0	0	0	0	0	0	11	75
18:30:00	0	3	0	0	0	3	2	0	2	0	0	4	1	4	0	0	0	5	0	0	0	0	0	0	12	60
18:45:00	0	1	0	0	0	1	0	0	1	0	0	1	0	3	0	0	0	3	1	0	0	0	0	1	6	48
Grand Total	1	128	44	0	0	173	63	0	22	1	0	86	36	103	2	0	0	141	2	0	0	0	0	2	402	-
Approach%	0.6%	74%	25.4%	0%		-	73.3%	0%	25.6%	1.2%		-	25.5%	73%	1.4%	0%		-	100%	0%	0%	0%		-	-	-
Totals %	0.2%	31.8%	10.9%	0%		43%	15.7%	0%	5.5%	0.2%		21.4%	9%	25.6%	0.5%	0%		35.1%	0.5%	0%	0%	0%		0.5%	-	-
Heavy	0	6	0	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	-	-
Heavy %	0%	4.7%	0%	0%		-	0%	0%	0%	0%		-	0%	1%	0%	0%		-	0%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Turning Movement Count
Location Name: GLENELG ST & IDA ST
Date: Thu, Sep 06, 2018 Deployment Lead: Theo Daglis

Crozier & Associates

, ,



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (17.7 °C)

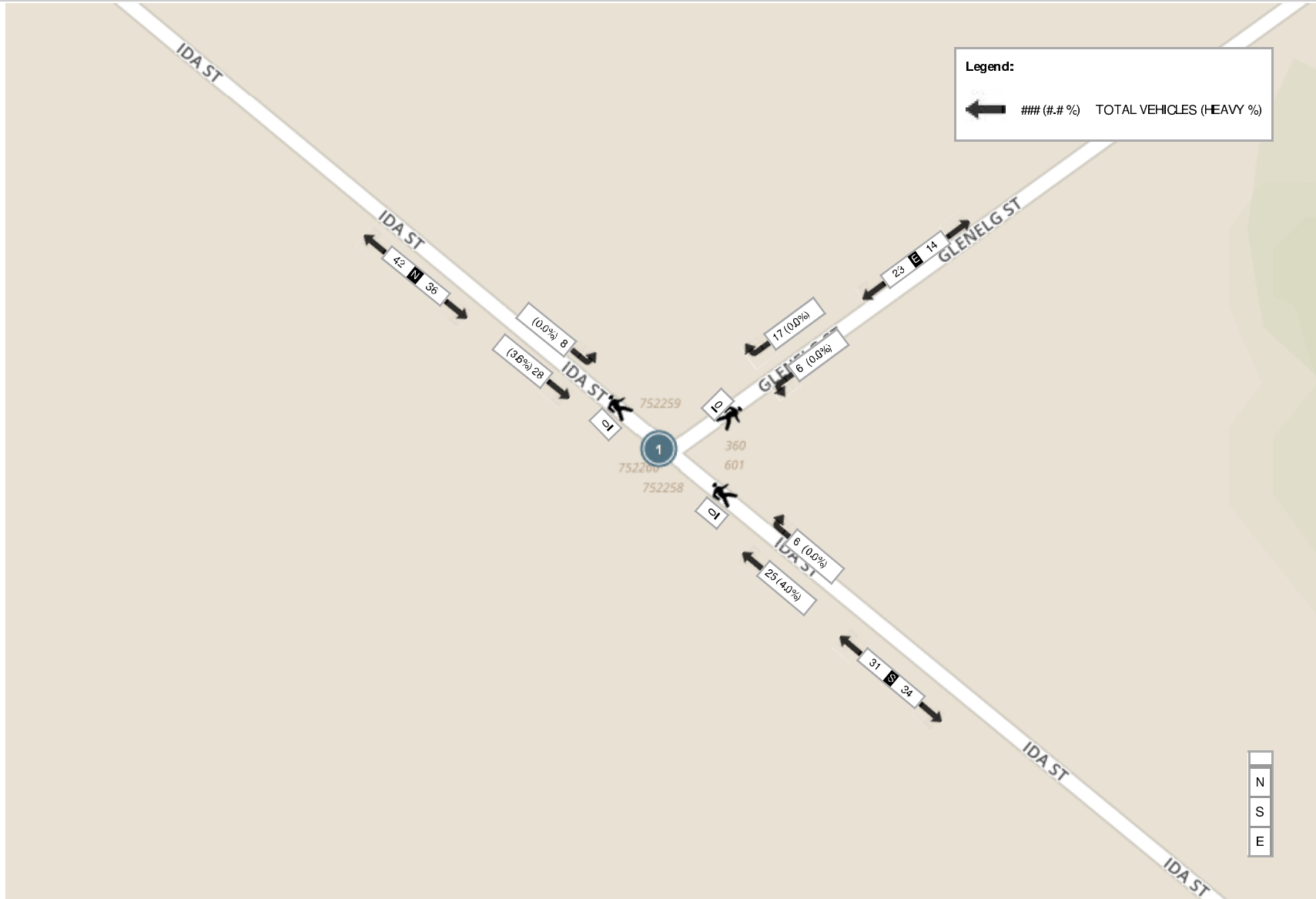
Start Time	N Approach IDA ST						E Approach GLENELG ST						S Approach IDA ST						W Approach GLENELG ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	0	7	0	0	0	7	3	0	0	0	0	3	1	3	0	0	0	4	0	0	0	0	0	0	14
08:15:00	0	10	4	0	0	14	1	0	0	0	0	1	2	2	0	0	0	4	0	0	0	0	0	0	19
08:30:00	0	5	4	0	0	9	1	0	0	0	0	1	2	2	0	0	0	4	0	0	0	0	0	0	14
08:45:00	0	7	4	0	0	11	5	0	1	0	0	6	1	4	0	0	0	5	0	0	0	0	0	0	22
Grand Total	0	29	12	0	0	41	10	0	1	0	0	11	6	11	0	0	0	17	0	0	0	0	0	0	69
Approach%	0%	70.7%	29.3%	0%	-	-	90.9%	0%	9.1%	0%	-	-	35.3%	64.7%	0%	0%	-	-	0%	0%	0%	0%	-	-	-
Totals %	0%	42%	17.4%	0%	59.4%	14.5%	0%	1.4%	0%	15.9%	8.7%	15.9%	0%	0%	24.6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
PHF	0	0.73	0.75	0	0.73	0.5	0	0.25	0	0.46	0.75	0.69	0	0	0.85	0	0	0	0	0	0	0	0	0	-
Heavy	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Heavy %	0%	3.4%	0%	0%	2.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Lights	0	26	11	0	37	10	0	1	0	11	4	11	0	0	15	0	0	0	0	0	0	0	0	0	-
Lights %	0%	89.7%	91.7%	0%	90.2%	100%	0%	100%	0%	100%	66.7%	100%	0%	0%	88.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Mediums	0	2	1	0	3	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	-
Mediums %	0%	6.9%	8.3%	0%	7.3%	0%	0%	0%	0%	0%	33.3%	0%	0%	0%	11.8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Articulated Trucks	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	3.4%	0%	0%	2.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-



Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (20.5 °C)

Start Time	N Approach IDA ST						E Approach GLENELG ST						S Approach IDA ST						W Approach GLENELG ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	0	9	2	0	0	11	3	0	2	0	0	5	1	6	0	0	0	7	0	0	0	0	0	0	23
16:30:00	0	7	1	0	0	8	5	0	2	0	0	7	2	9	0	0	0	11	0	0	0	0	0	0	26
16:45:00	0	4	2	0	0	6	3	0	1	0	0	4	1	7	0	0	0	8	0	0	0	0	0	0	18
17:00:00	0	8	3	0	0	11	6	0	1	0	0	7	2	3	0	0	0	5	0	0	0	0	0	0	23
Grand Total	0	28	8	0	0	36	17	0	6	0	0	23	6	25	0	0	0	31	0	0	0	0	0	0	90
Approach%	0%	77.8%	22.2%	0%		-	73.9%	0%	26.1%	0%		-	19.4%	80.6%	0%	0%		-	0%	0%	0%	0%		-	-
Totals %	0%	31.1%	8.9%	0%		40%	18.9%	0%	6.7%	0%		25.6%	6.7%	27.8%	0%	0%		34.4%	0%	0%	0%	0%		0%	-
PHF	0	0.78	0.67	0		0.82	0.71	0	0.75	0		0.82	0.75	0.69	0	0		0.7	0	0	0	0		0	-
Heavy	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Heavy %	0%	3.6%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	4%	0%	0%		3.2%	0%	0%	0%	0%		0%	-
Lights	0	26	8	0		34	17	0	6	0		23	6	23	0	0		29	0	0	0	0		0	-
Lights %	0%	92.9%	100%	0%		94.4%	100%	0%	100%	0%		100%	100%	92%	0%	0%		93.5%	0%	0%	0%	0%		0%	-
Mediums	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Mediums %	0%	3.6%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	4%	0%	0%		3.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	3.6%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	4%	0%	0%		3.2%	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%	-

Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (20.5 °C)





Turning Movement Count (2 . GLENELG ST / GREY ST S & DUNDALK 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	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	0	0	0	0	0	0	3	0	1	0	0	4	1	0	0	0	0	1	0	0	0	0	0	0	5	
07:15:00	0	0	2	0	0	2	5	0	1	0	0	6	0	0	1	0	0	1	0	0	0	0	0	0	9	
07:30:00	0	0	2	0	0	2	3	0	0	0	0	3	0	1	0	0	0	1	1	0	0	0	0	1	7	
07:45:00	0	0	2	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	25
08:00:00	0	1	0	0	0	1	2	0	3	0	0	5	1	0	1	0	0	2	0	0	0	0	0	0	8	28
08:15:00	0	3	3	0	0	6	1	0	2	0	0	3	1	0	0	0	0	1	2	0	0	0	0	2	12	31
08:30:00	0	2	6	0	0	8	1	0	8	0	0	9	1	0	1	0	0	2	1	0	0	0	0	1	20	44
08:45:00	0	0	3	0	0	3	4	0	7	0	0	11	2	2	0	0	0	4	0	0	0	0	0	0	18	58
09:00:00	0	1	3	0	0	4	2	1	1	0	0	4	2	0	0	0	0	2	1	0	0	0	0	1	11	61
09:15:00	0	0	3	0	0	3	3	0	0	0	0	3	1	0	0	0	0	1	0	0	0	0	0	0	7	56
09:30:00	0	1	4	0	0	5	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	8	44
09:45:00	0	0	1	0	0	1	2	0	2	0	0	4	2	2	1	0	0	5	0	0	0	0	0	0	10	36
BREAK																										
16:00:00	0	0	7	0	0	7	3	0	0	0	0	3	5	1	0	0	1	6	0	0	0	0	0	0	16	
16:15:00	0	2	2	0	0	4	4	0	2	0	0	6	3	0	0	0	0	3	0	0	0	0	0	0	13	
16:30:00	0	1	2	0	0	3	6	0	2	0	0	8	1	1	0	0	0	2	0	0	0	0	0	0	13	
16:45:00	0	1	3	0	0	4	5	0	1	0	0	6	0	2	0	0	0	2	0	1	0	0	0	1	13	55
17:00:00	1	0	4	0	0	5	6	0	1	0	0	7	1	0	0	0	0	1	0	0	0	0	0	0	13	52
17:15:00	0	1	6	0	0	7	5	0	0	0	0	5	1	4	0	0	0	5	0	0	0	0	0	0	17	56
17:30:00	1	0	6	0	0	7	1	0	1	0	0	2	2	2	0	0	0	4	0	0	0	0	0	0	13	56
17:45:00	0	1	4	0	0	5	3	2	1	0	0	6	1	0	0	0	0	1	0	0	0	0	0	0	12	55
18:00:00	0	0	3	0	0	3	3	1	1	0	0	5	0	1	0	0	0	1	0	1	0	0	0	1	10	52
18:15:00	0	0	3	0	0	3	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	6	41
18:30:00	0	0	1	0	0	1	4	0	1	0	0	5	1	1	1	0	0	3	0	2	0	0	0	2	11	39
18:45:00	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	29
Grand Total	2	15	70	0	0	87	75	4	35	0	0	114	26	17	5	0	1	48	5	4	0	0	2	9	258	-
Approach%	2.3%	17.2%	80.5%	0%		-	65.8%	3.5%	30.7%	0%		-	54.2%	35.4%	10.4%	0%		-	55.6%	44.4%	0%	0%		-	-	-
Totals %	0.8%	5.8%	27.1%	0%		33.7%	29.1%	1.6%	13.6%	0%		44.2%	10.1%	6.6%	1.9%	0%		18.6%	1.9%	1.6%	0%	0%		3.5%	-	-
Heavy	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Heavy %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-





Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast (17.7 °C)

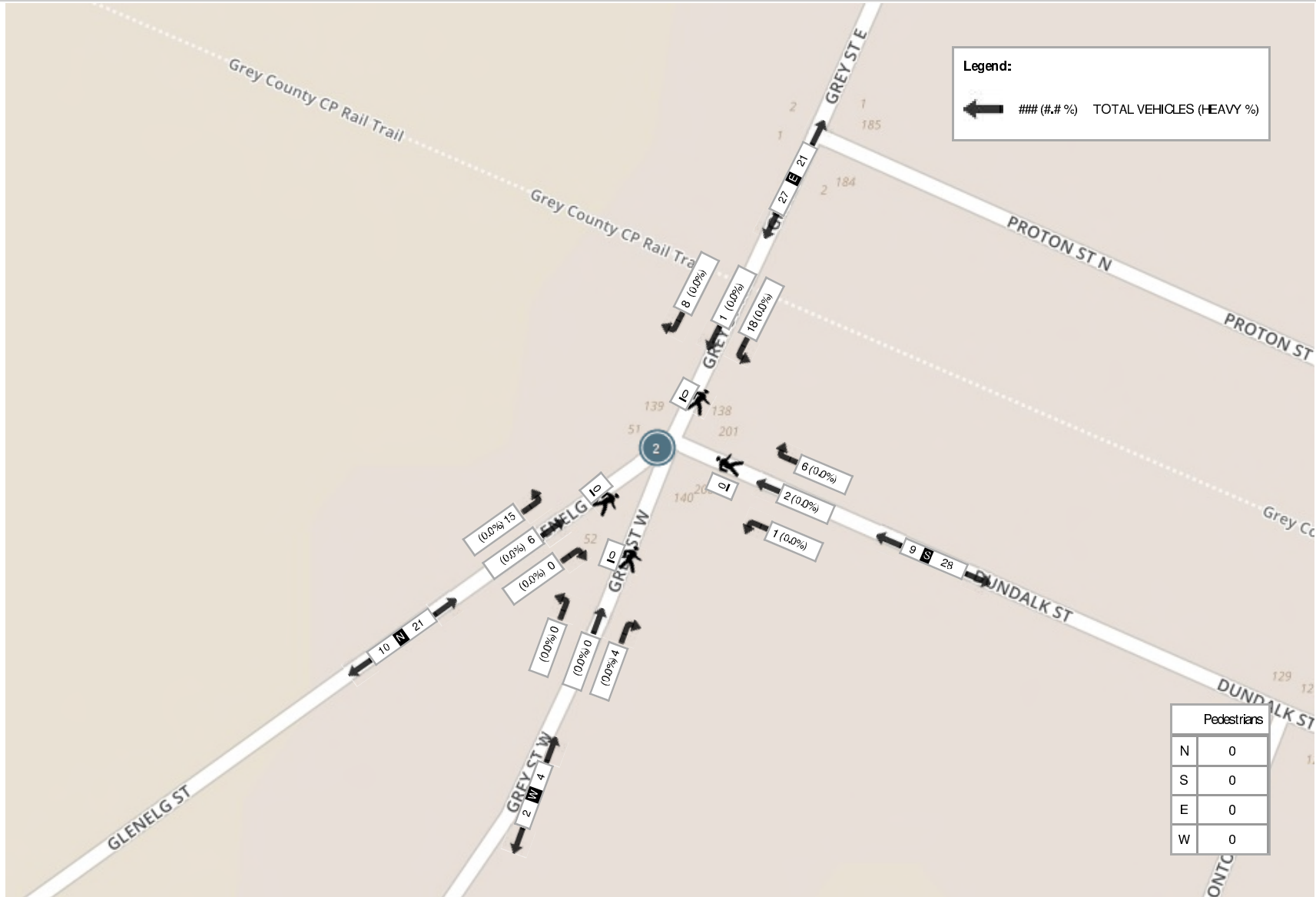
Start Time	N Approach GLENELG ST						E Approach GREY ST S						S Approach DUNDALK ST						W Approach GREY ST S						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	0	3	3	0	0	6	1	0	2	0	0	3	1	0	0	0	0	1	2	0	0	0	0	2	12
08:30:00	0	2	6	0	0	8	1	0	8	0	0	9	1	0	1	0	0	2	1	0	0	0	0	1	20
08:45:00	0	0	3	0	0	3	4	0	7	0	0	11	2	2	0	0	0	4	0	0	0	0	0	0	18
09:00:00	0	1	3	0	0	4	2	1	1	0	0	4	2	0	0	0	0	2	1	0	0	0	0	1	11
Grand Total	0	6	15	0	0	21	8	1	18	0	0	27	6	2	1	0	0	9	4	0	0	0	0	4	61
Approach%	0%	28.6%	71.4%	0%		-	29.6%	3.7%	66.7%	0%		-	66.7%	22.2%	11.1%	0%		-	100%	0%	0%	0%		-	-
Totals %	0%	9.8%	24.6%	0%		34.4%	13.1%	1.6%	29.5%	0%		44.3%	9.8%	3.3%	1.6%	0%		14.8%	6.6%	0%	0%	0%		6.6%	-
PHF	0	0.5	0.63	0		0.66	0.5	0.25	0.56	0		0.61	0.75	0.25	0.25	0		0.56	0.5	0	0	0		0.5	-
Heavy	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-
Heavy %	-	-	-	-		%	-	-	-	-		%	-	-	-	-		%	-	-	-	-		%	-
Lights	0	5	13	0		18	8	1	16	0		25	6	2	1	0		9	3	0	0	0		3	-
Lights %	0%	83.3%	86.7%	0%		85.7%	100%	100%	88.9%	0%		92.6%	100%	100%	100%	0%		100%	75%	0%	0%	0%		75%	-
Mediums	0	1	2	0		3	0	0	0	0		0	0	0	0	0		0	1	0	0	0		1	-
Mediums %	0%	16.7%	13.3%	0%		14.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	25%	0%	0%	0%		25%	-
Bicycles on Road	0	0	0	0		0	0	0	2	0		2	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	11.1%	0%		7.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



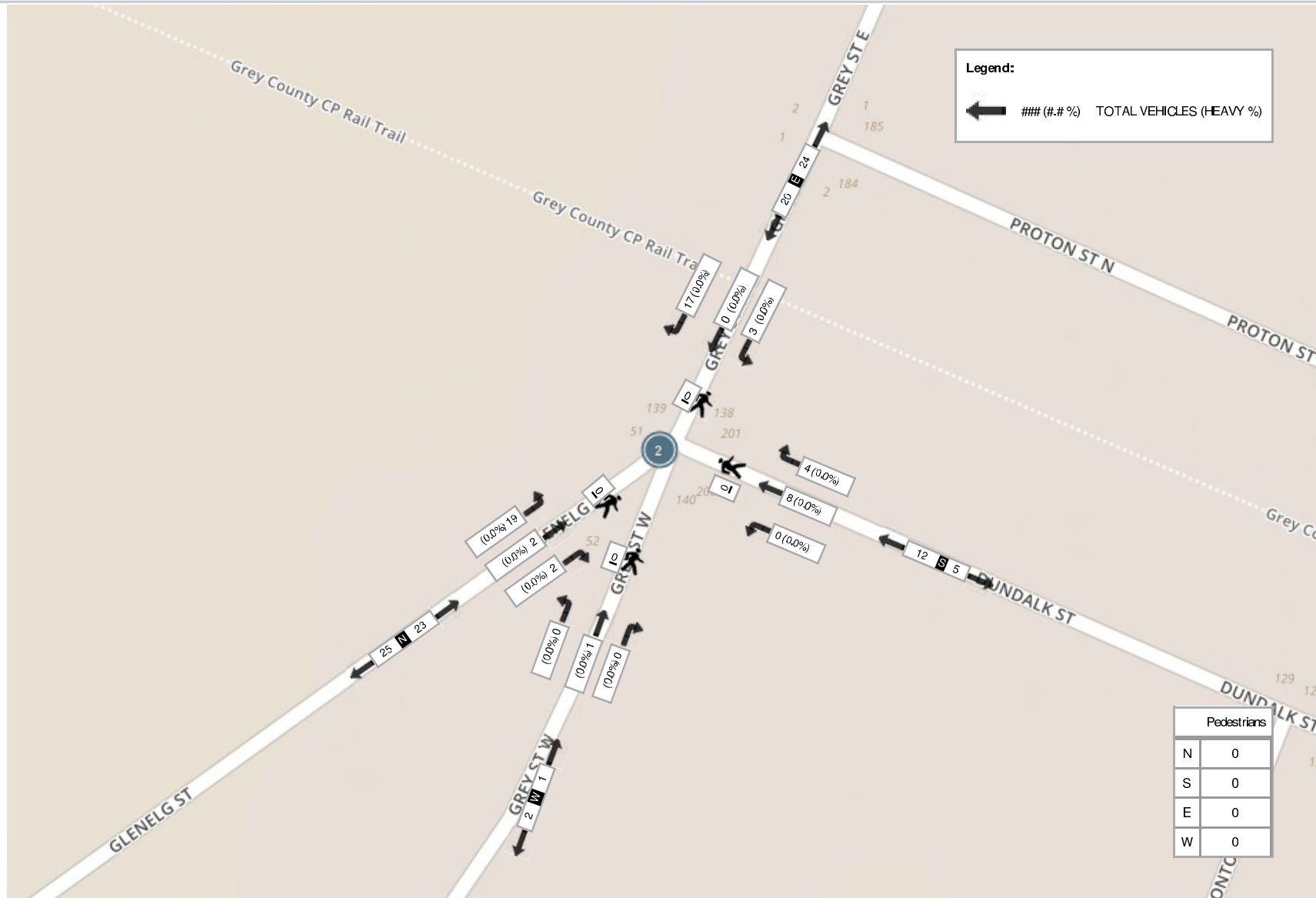
Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (20.5 °C)

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	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	0	1	3	0	0	4	5	0	1	0	0	6	0	2	0	0	0	2	0	1	0	0	0	1	13
17:00:00	1	0	4	0	0	5	6	0	1	0	0	7	1	0	0	0	0	1	0	0	0	0	0	0	13
17:15:00	0	1	6	0	0	7	5	0	0	0	0	5	1	4	0	0	0	5	0	0	0	0	0	0	17
17:30:00	1	0	6	0	0	7	1	0	1	0	0	2	2	2	0	0	0	4	0	0	0	0	0	0	13
Grand Total	2	2	19	0	0	23	17	0	3	0	0	20	4	8	0	0	0	12	0	1	0	0	0	1	56
Approach%	8.7%	8.7%	82.6%	0%		-	85%	0%	15%	0%		-	33.3%	66.7%	0%	0%		-	0%	100%	0%	0%		-	-
Totals %	3.6%	3.6%	33.9%	0%		41.1%	30.4%	0%	5.4%	0%		35.7%	7.1%	14.3%	0%	0%		21.4%	0%	1.8%	0%	0%		1.8%	-
PHF	0.5	0.5	0.79	0		0.82	0.71	0	0.75	0		0.71	0.5	0.5	0	0		0.6	0	0.25	0	0		0.25	-
Heavy	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-
Heavy %	-	-	-	-		%	-	-	-	-		%	-	-	-	-		%	-	-	-	-		%	-
Lights	2	2	18	0		22	17	0	3	0		20	4	8	0	0		12	0	1	0	0		1	-
Lights %	100%	100%	94.7%	0%		95.7%	100%	0%	100%	0%		100%	100%	100%	0%	0%		100%	0%	100%	0%	0%		100%	-
Mediums	0	0	1	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Mediums %	0%	0%	5.3%	0%		4.3%	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	-
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	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast (17.7 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (20.5 °C)





Turning Movement Count (3 . MAIN ST (GREY RD 9) & DUNDALK 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	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	1	0	0	1	1	0	20	0	0	20	36	0	0	0	36	57	
07:15:00	2	2	0	0	4	1	20	0	0	21	31	0	0	0	31	56	
07:30:00	1	3	0	0	4	2	27	0	0	29	27	2	0	0	29	62	
07:45:00	1	0	0	0	1	0	27	0	0	27	36	3	0	1	39	67	242
08:00:00	5	0	0	0	5	2	35	0	0	37	34	1	0	0	35	77	262
08:15:00	5	4	0	7	9	1	40	0	0	41	53	1	0	0	54	104	310
08:30:00	8	3	0	10	11	0	35	0	0	35	48	3	0	0	51	97	345
08:45:00	9	1	0	1	10	1	31	0	0	32	49	8	0	0	57	99	377
09:00:00	3	0	0	0	3	0	23	0	0	23	41	4	0	0	45	71	371
09:15:00	3	1	0	0	4	1	22	0	0	23	24	5	0	0	29	56	323
09:30:00	1	1	0	0	2	1	9	0	0	10	21	1	0	0	22	34	260
09:45:00	2	1	0	0	3	3	20	0	2	23	26	3	0	0	29	55	216
BREAK																	
16:00:00	6	1	0	2	7	1	38	0	0	39	36	7	0	2	43	89	
16:15:00	7	0	0	1	7	2	33	0	0	35	60	5	0	0	65	107	
16:30:00	4	0	0	2	4	3	41	0	0	44	47	3	0	1	50	98	
16:45:00	3	2	0	0	5	1	32	0	0	33	34	4	0	0	38	76	370
17:00:00	1	3	0	4	4	1	46	0	0	47	41	1	0	0	42	93	374
17:15:00	6	3	0	1	9	3	52	0	0	55	42	2	0	1	44	108	375
17:30:00	2	0	0	2	2	4	52	0	0	56	56	0	0	1	56	114	391
17:45:00	2	4	0	2	6	1	45	0	0	46	41	1	0	1	42	94	409
18:00:00	4	0	0	2	4	2	37	0	0	39	30	1	0	0	31	74	390
18:15:00	1	1	0	8	2	0	29	0	0	29	37	0	0	1	37	68	350
18:30:00	0	1	0	2	1	1	39	0	0	40	40	2	0	4	42	83	319



18:45:00	1	4	0	0	5	2	23	0	1	25	40	2	0	0	42	72	297
Grand Total	78	35	0	45	113	33	776	0	3	809	930	59	0	12	989	1911	-
Approach%	69%	31%	0%		-	4.1%	95.9%	0%		-	94%	6%	0%		-	-	-
Totals %	4.1%	1.8%	0%		5.9%	1.7%	40.6%	0%		42.3%	48.7%	3.1%	0%		51.8%	-	-
Heavy	0	0	0		-	0	28	0		-	25	0	0		-	-	-
Heavy %	0%	0%	0%		-	0%	3.6%	0%		-	2.7%	0%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (17.7 °C)

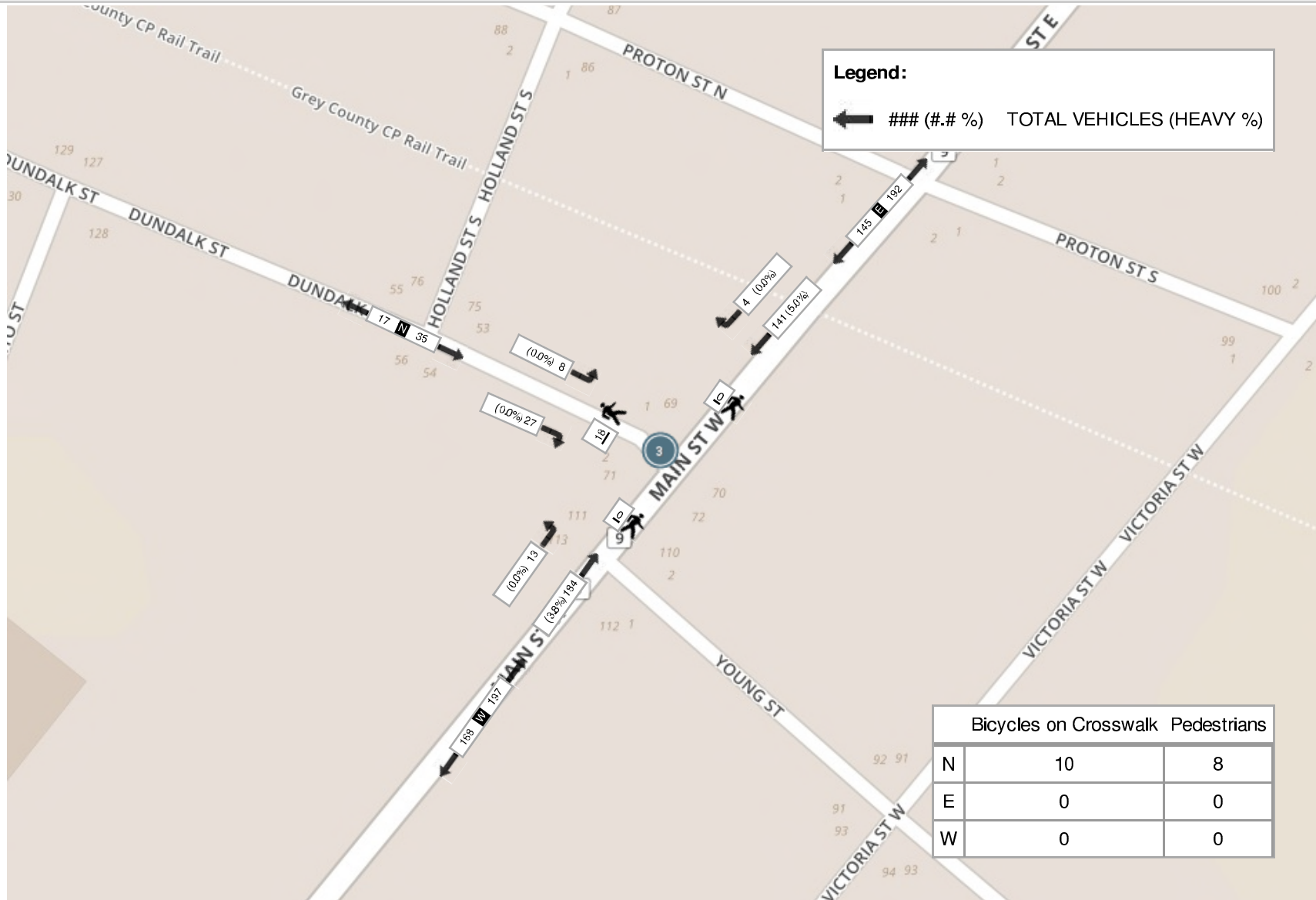
Start Time	N Approach DUNDALK ST					E Approach MAIN ST (GREY RD 9)					W Approach MAIN ST (GREY RD 9)					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	5	0	0	0	5	2	35	0	0	37	34	1	0	0	35	77
08:15:00	5	4	0	7	9	1	40	0	0	41	53	1	0	0	54	104
08:30:00	8	3	0	10	11	0	35	0	0	35	48	3	0	0	51	97
08:45:00	9	1	0	1	10	1	31	0	0	32	49	8	0	0	57	99
Grand Total	27	8	0	18	35	4	141	0	0	145	184	13	0	0	197	377
Approach%	77.1%	22.9%	0%		-	2.8%	97.2%	0%		-	93.4%	6.6%	0%		-	-
Totals %	7.2%	2.1%	0%		9.3%	1.1%	37.4%	0%		38.5%	48.8%	3.4%	0%		52.3%	-
PHF	0.75	0.5	0		0.8	0.5	0.88	0		0.88	0.87	0.41	0		0.86	-
Heavy	0	0	0		0	0	7	0		7	7	0	0		7	-
Heavy %	0%	0%	0%		0%	0%	5%	0%		4.8%	3.8%	0%	0%		3.6%	-
Lights	26	7	0		33	4	124	0		128	162	13	0		175	-
Lights %	96.3%	87.5%	0%		94.3%	100%	87.9%	0%		88.3%	88%	100%	0%		88.8%	-
Mediums	1	1	0		2	0	9	0		9	14	0	0		14	-
Mediums %	3.7%	12.5%	0%		5.7%	0%	6.4%	0%		6.2%	7.6%	0%	0%		7.1%	-
Articulated Trucks	0	0	0		0	0	7	0		7	7	0	0		7	-
Articulated Trucks %	0%	0%	0%		0%	0%	5%	0%		4.8%	3.8%	0%	0%		3.6%	-
Bicycles on Road	0	0	0		0	0	1	0		1	1	0	0		1	-
Bicycles on Road %	0%	0%	0%		0%	0%	0.7%	0%		0.7%	0.5%	0%	0%		0.5%	-
Pedestrians	-	-	-	8	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	44.4%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	10	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	55.6%	-	-	-	-	0%	-	-	-	-	0%	-	-



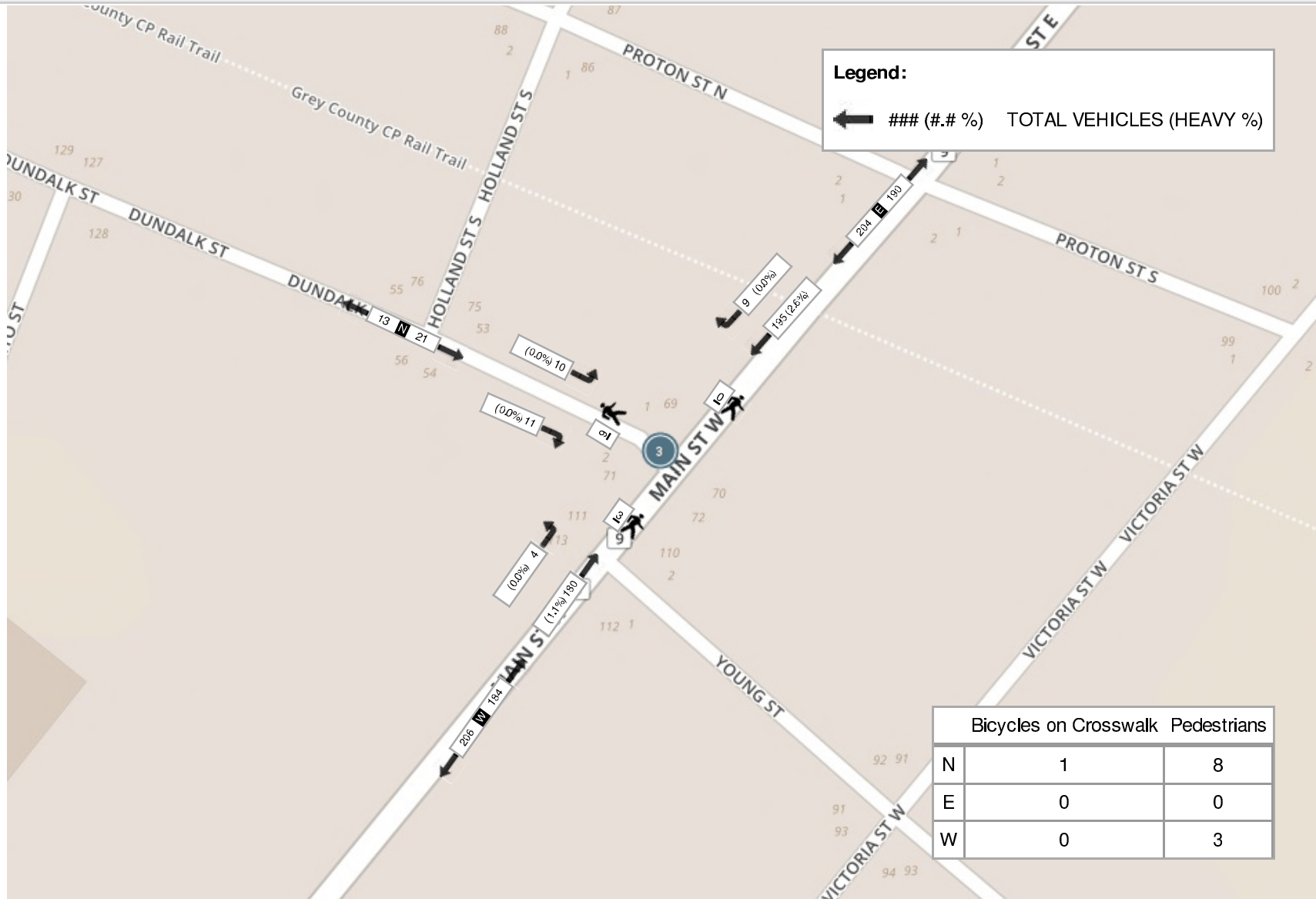
Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (20.5 °C)

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	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	1	3	0	4	4	1	46	0	0	47	41	1	0	0	42	93
17:15:00	6	3	0	1	9	3	52	0	0	55	42	2	0	1	44	108
17:30:00	2	0	0	2	2	4	52	0	0	56	56	0	0	1	56	114
17:45:00	2	4	0	2	6	1	45	0	0	46	41	1	0	1	42	94
Grand Total	11	10	0	9	21	9	195	0	0	204	180	4	0	3	184	409
Approach%	52.4%	47.6%	0%		-	4.4%	95.6%	0%		-	97.8%	2.2%	0%		-	-
Totals %	2.7%	2.4%	0%		5.1%	2.2%	47.7%	0%		49.9%	44%	1%	0%		45%	-
PHF	0.46	0.63	0		0.58	0.56	0.94	0		0.91	0.8	0.5	0		0.82	-
Heavy	0	0	0		0	0	5	0		5	2	0	0		2	-
Heavy %	0%	0%	0%		0%	0%	2.6%	0%		2.5%	1.1%	0%	0%		1.1%	-
Lights	11	10	0		21	9	183	0		192	172	4	0		176	-
Lights %	100%	100%	0%		100%	100%	93.8%	0%		94.1%	95.6%	100%	0%		95.7%	-
Mediums	0	0	0		0	0	7	0		7	4	0	0		4	-
Mediums %	0%	0%	0%		0%	0%	3.6%	0%		3.4%	2.2%	0%	0%		2.2%	-
Articulated Trucks	0	0	0		0	0	5	0		5	2	0	0		2	-
Articulated Trucks %	0%	0%	0%		0%	0%	2.6%	0%		2.5%	1.1%	0%	0%		1.1%	-
Bicycles on Road	0	0	0		0	0	0	0		0	2	0	0		2	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	1.1%	0%	0%		1.1%	-
Pedestrians	-	-	-	8	-	-	-	-	0	-	-	-	-	3	-	-
Pedestrians%	-	-	-	66.7%	-	-	-	-	0%	-	-	-	-	25%	-	-
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	8.3%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (17.7 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (20.5 °C)





Turning Movement Count (4 . MAIN ST (GREY RD 9) & IDA 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	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	2	4	1	0	0	7	4	13	5	0	0	22	2	3	2	0	0	7	2	19	1	0	1	22	58		
07:15:00	1	2	4	0	0	7	2	9	4	0	0	15	3	2	2	0	0	7	5	20	0	0	0	25	54		
07:30:00	3	5	5	0	0	13	0	18	8	0	0	26	5	0	2	0	0	7	4	20	1	0	0	25	71		
07:45:00	2	7	4	0	0	13	1	14	8	0	0	23	6	1	0	0	0	7	3	24	0	0	0	27	70	253	
08:00:00	3	1	6	0	0	10	2	15	7	0	0	24	8	2	1	0	0	11	3	22	1	0	0	26	71	266	
08:15:00	2	4	5	0	0	11	1	17	6	1	0	25	4	1	1	0	0	6	8	27	2	0	0	37	79	291	
08:30:00	0	3	3	0	1	6	1	19	8	0	0	28	7	3	3	0	0	13	5	23	2	0	0	30	77	297	
08:45:00	2	3	4	0	0	9	5	14	1	0	2	20	2	2	2	0	0	6	2	27	0	0	0	29	64	291	
09:00:00	0	2	4	0	0	6	1	16	2	0	1	19	2	0	3	0	0	5	2	18	2	0	0	22	52	272	
09:15:00	1	2	2	0	0	5	1	15	4	0	0	20	3	0	2	0	0	5	3	17	1	0	0	21	51	244	
09:30:00	4	4	2	0	0	10	1	8	1	0	0	10	2	1	0	0	0	3	2	12	1	0	0	15	38	205	
09:45:00	1	2	2	0	0	5	2	9	2	0	0	13	3	1	4	0	0	8	3	16	1	0	0	20	46	187	
BREAK																											
16:00:00	0	2	2	0	0	4	2	24	6	0	0	32	7	8	7	0	0	22	1	23	1	0	0	25	83		
16:15:00	1	4	6	0	0	11	4	25	6	0	0	35	16	6	8	0	0	30	3	32	2	0	0	37	113		
16:30:00	1	1	7	0	0	9	6	21	7	0	0	34	10	10	5	0	0	25	2	24	0	0	0	26	94		
16:45:00	0	2	3	0	0	5	3	19	4	0	0	26	8	7	5	0	0	20	6	17	1	0	0	24	75	365	
17:00:00	1	12	1	0	0	14	5	28	3	0	0	36	6	4	7	0	0	17	4	26	0	0	0	30	97	379	
17:15:00	1	2	8	0	0	11	4	35	7	0	0	46	7	2	4	0	0	13	4	25	3	0	0	32	102	368	
17:30:00	2	5	5	0	0	12	7	36	3	0	0	46	8	7	7	0	0	22	5	25	3	0	0	33	113	387	
17:45:00	1	3	2	0	0	6	7	25	2	0	0	34	8	8	5	0	0	21	1	23	3	0	0	27	88	400	
18:00:00	2	4	1	0	0	7	2	19	3	0	2	24	6	9	6	0	0	21	2	20	2	0	0	24	76	379	
18:15:00	3	2	0	0	0	5	0	18	2	0	0	20	12	4	3	0	0	19	1	21	0	0	0	22	66	343	
18:30:00	0	2	3	0	0	5	2	31	4	0	0	37	10	3	7	0	0	20	2	23	1	0	0	26	88	318	
18:45:00	1	0	2	0	0	3	0	18	3	0	0	21	6	3	7	0	0	16	2	28	0	0	0	30	70	300	
Grand Total	34	78	82	0	1	194	63	466	106	1	5	636	151	87	93	0	0	331	75	532	28	0	1	635	1796	-	
Approach%	17.5%	40.2%	42.3%	0%		-	9.9%	73.3%	16.7%	0.2%		-	45.6%	26.3%	28.1%	0%		-	11.8%	83.8%	4.4%	0%		-	-	-	
Totals %	1.9%	4.3%	4.6%	0%		10.8%	3.5%	25.9%	5.9%	0.1%		35.4%	8.4%	4.8%	5.2%	0%		18.4%	4.2%	29.6%	1.6%	0%		35.4%	-	-	
Heavy	1	3	1	0		-	1	22	4	0		-	7	0	6	0		-	3	19	0	0		-	-	-	
Heavy %	2.9%	3.8%	1.2%	0%		-	1.6%	4.7%	3.8%	0%		-	4.6%	0%	6.5%	0%		-	4%	3.6%	0%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	





Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast (17.7 °C)

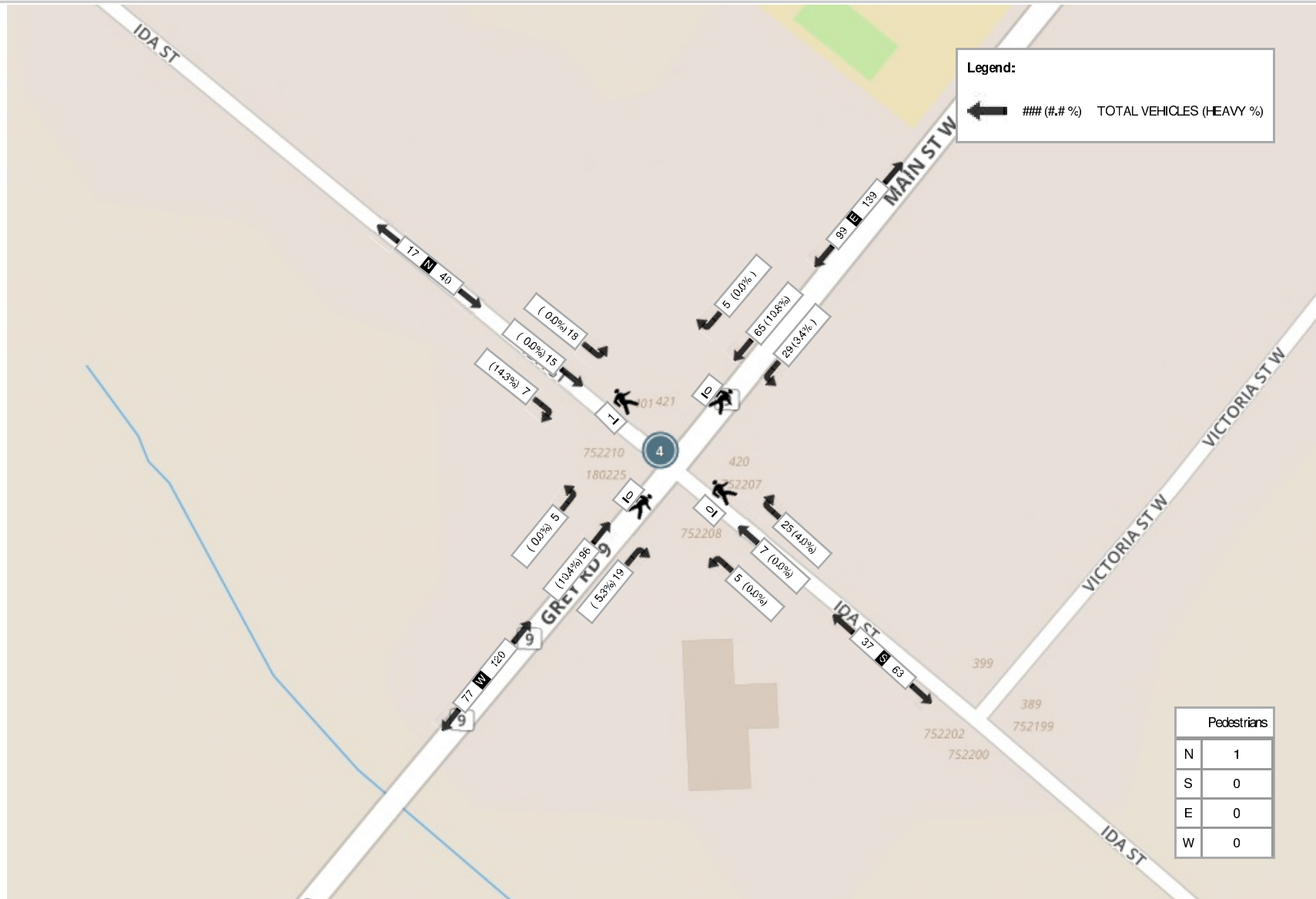
Start Time	N Approach IDA ST						E Approach MAIN ST (GREY RD 9)						S Approach IDA ST						W Approach MAIN ST (GREY RD 9)						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	2	7	4	0	0	13	1	14	8	0	0	23	6	1	0	0	0	7	3	24	0	0	0	27	70
08:00:00	3	1	6	0	0	10	2	15	7	0	0	24	8	2	1	0	0	11	3	22	1	0	0	26	71
08:15:00	2	4	5	0	0	11	1	17	6	1	0	25	4	1	1	0	0	6	8	27	2	0	0	37	79
08:30:00	0	3	3	0	1	6	1	19	8	0	0	28	7	3	3	0	0	13	5	23	2	0	0	30	77
Grand Total	7	15	18	0	1	40	5	65	29	1	0	100	25	7	5	0	0	37	19	96	5	0	0	120	297
Approach%	17.5%	37.5%	45%	0%	-	-	5%	65%	29%	1%	-	-	67.6%	18.9%	13.5%	0%	-	-	15.8%	80%	4.2%	0%	-	-	-
Totals %	2.4%	5.1%	6.1%	0%	13.5%	1.7%	21.9%	9.8%	0.3%	33.7%	8.4%	2.4%	1.7%	0%	12.5%	6.4%	32.3%	1.7%	0%	40.4%	-	-	-	-	-
PHF	0.58	0.54	0.75	0	0.77	0.63	0.86	0.91	0.25	0.89	0.78	0.58	0.42	0	0.71	0.59	0.89	0.63	0	0.81	-	-	-	-	-
Heavy	1	0	0	0	1	0	7	1	0	8	1	0	0	0	1	1	10	0	0	11	-	-	-	-	-
Heavy %	14.3%	0%	0%	0%	2.5%	0%	10.8%	3.4%	0%	8%	4%	0%	0%	0%	2.7%	5.3%	10.4%	0%	0%	9.2%	-	-	-	-	-
Lights	6	14	17	0	37	4	56	19	1	80	23	7	3	0	33	15	80	4	0	99	-	-	-	-	-
Lights %	85.7%	93.3%	94.4%	0%	92.5%	80%	86.2%	65.5%	100%	80%	92%	100%	60%	0%	89.2%	78.9%	83.3%	80%	0%	82.5%	-	-	-	-	-
Mediums	0	1	1	0	2	1	2	9	0	12	1	0	2	0	3	3	6	1	0	10	-	-	-	-	-
Mediums %	0%	6.7%	5.6%	0%	5%	20%	3.1%	31%	0%	12%	4%	0%	40%	0%	8.1%	15.8%	6.3%	20%	0%	8.3%	-	-	-	-	-
Articulated Trucks	1	0	0	0	1	0	7	1	0	8	1	0	0	0	1	1	10	0	0	11	-	-	-	-	-
Articulated Trucks %	14.3%	0%	0%	0%	2.5%	0%	10.8%	3.4%	0%	8%	4%	0%	0%	0%	2.7%	5.3%	10.4%	0%	0%	9.2%	-	-	-	-	-
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	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Pedestrians%	-	-	-	-	100%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-



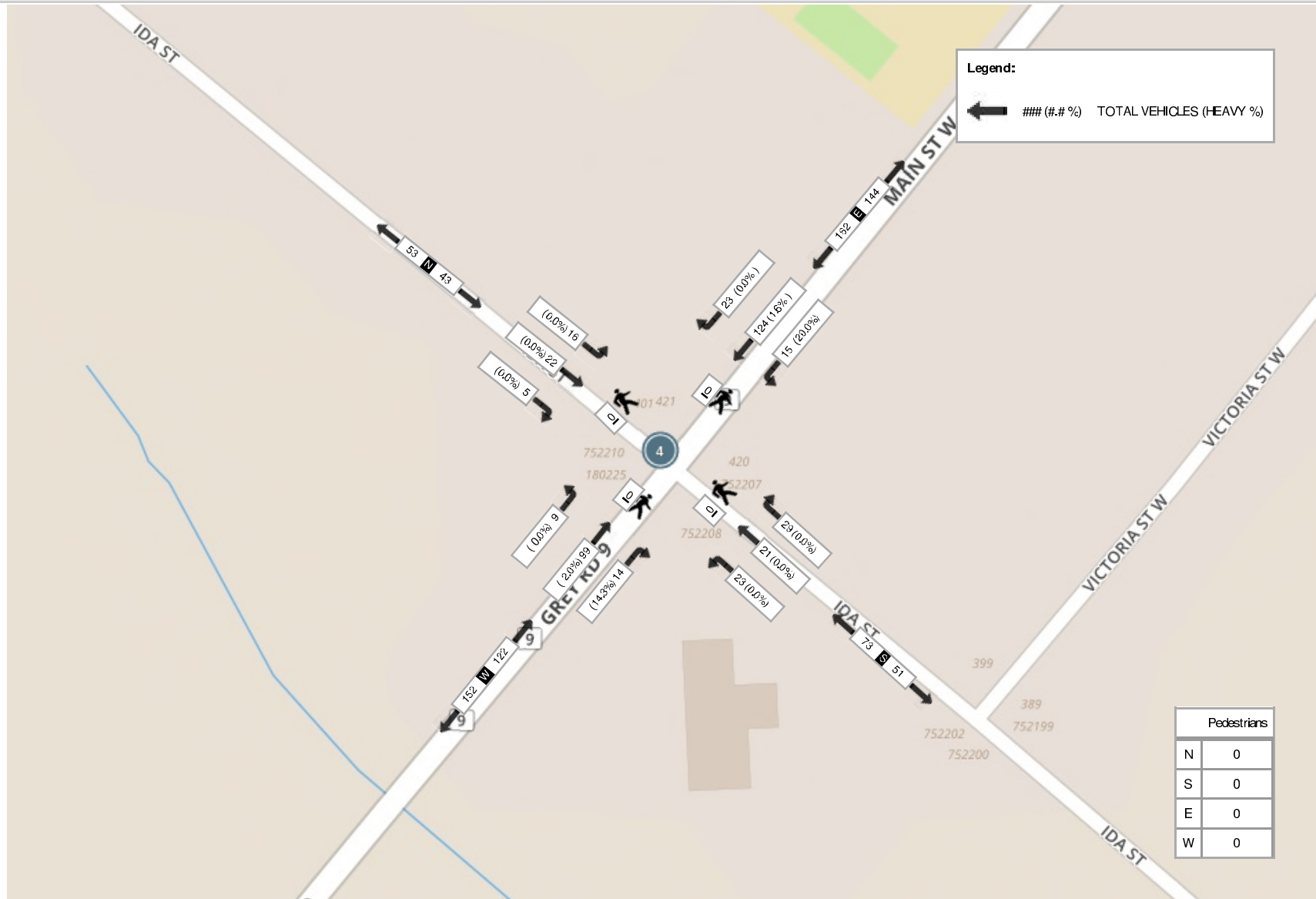
Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (20.5 °C)

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	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	1	12	1	0	0	14	5	28	3	0	0	36	6	4	7	0	0	17	4	26	0	0	0	30	97
17:15:00	1	2	8	0	0	11	4	35	7	0	0	46	7	2	4	0	0	13	4	25	3	0	0	32	102
17:30:00	2	5	5	0	0	12	7	36	3	0	0	46	8	7	7	0	0	22	5	25	3	0	0	33	113
17:45:00	1	3	2	0	0	6	7	25	2	0	0	34	8	8	5	0	0	21	1	23	3	0	0	27	88
Grand Total	5	22	16	0	0	43	23	124	15	0	0	162	29	21	23	0	0	73	14	99	9	0	0	122	400
Approach%	11.6%	51.2%	37.2%	0%		-	14.2%	76.5%	9.3%	0%		-	39.7%	28.8%	31.5%	0%		-	11.5%	81.1%	7.4%	0%		-	-
Totals %	1.3%	5.5%	4%	0%		10.8%	5.8%	31%	3.8%	0%		40.5%	7.3%	5.3%	5.8%	0%		18.3%	3.5%	24.8%	2.3%	0%		30.5%	-
PHF	0.63	0.46	0.5	0		0.77	0.82	0.86	0.54	0		0.88	0.91	0.66	0.82	0		0.83	0.7	0.95	0.75	0		0.92	-
Heavy	0	0	0	0		0	0	2	3	0		5	0	0	0	0		0	2	2	0	0		4	-
Heavy %	0%	0%	0%	0%		0%	0%	1.6%	20%	0%		3.1%	0%	0%	0%	0%		0%	14.3%	2%	0%	0%		3.3%	-
Lights	5	20	16	0		41	22	115	12	0		149	28	21	22	0		71	12	93	8	0		113	-
Lights %	100%	90.9%	100%	0%		95.3%	95.7%	92.7%	80%	0%		92%	96.6%	100%	95.7%	0%		97.3%	85.7%	93.9%	88.9%	0%		92.6%	-
Mediums	0	2	0	0		2	0	7	0	0		7	1	0	1	0		2	0	2	1	0		3	-
Mediums %	0%	9.1%	0%	0%		4.7%	0%	5.6%	0%	0%		4.3%	3.4%	0%	4.3%	0%		2.7%	0%	2%	11.1%	0%		2.5%	-
Articulated Trucks	0	0	0	0		0	0	2	3	0		5	0	0	0	0		0	2	2	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1.6%	20%	0%		3.1%	0%	0%	0%	0%		0%	14.3%	2%	0%	0%		3.3%	-
Bicycles on Road	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	0	2	0	0		2	-
Bicycles on Road %	0%	0%	0%	0%		0%	4.3%	0%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.6%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast (17.7 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (20.5 °C)



APPENDIX D

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 E

Detailed Capacity Analysis Worksheets

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street










2018 Existing - AM
09-17-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	10	11	6	12	29
Future Volume (Veh/h)	1	10	11	6	12	29
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	1	13	14	8	15	37
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	85	18			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85	18			22	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	913	1066			1607	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	14	22	52			
Volume Left	1	0	15			
Volume Right	13	8	0			
cSH	1054	1700	1607			
Volume to Capacity	0.01	0.01	0.01			
Queue Length 95th (m)	0.3	0.0	0.2			
Control Delay (s)	8.5	0.0	2.1			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	2.1			
Approach LOS	A					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		18.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

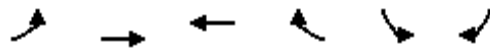
2018 Existing - AM
09-17-2020




						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	15	10	18	9	3	6
Future Volume (Veh/h)	15	10	18	9	3	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	20	13	24	12	4	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			33		86	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			33		86	26
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	99
cM capacity (veh/h)			1592		906	1055
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	33	36	12			
Volume Left	0	24	4			
Volume Right	13	0	8			
cSH	1700	1592	1000			
Volume to Capacity	0.02	0.02	0.01			
Queue Length 95th (m)	0.0	0.3	0.3			
Control Delay (s)	0.0	4.9	8.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.9	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			18.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2018 Existing - AM
09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	184	141	4	8	27
Future Volume (Veh/h)	13	184	141	4	8	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	14	202	155	4	9	30
Pedestrians					18	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	177				405	175
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177				405	175
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				98	97
cM capacity (veh/h)	1389				590	860
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	216	159	39			
Volume Left	14	0	9			
Volume Right	0	4	30			
cSH	1389	1700	778			
Volume to Capacity	0.01	0.09	0.05			
Queue Length 95th (m)	0.2	0.0	1.2			
Control Delay (s)	0.6	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	0.6	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			30.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Ida Street & Grey Road 9/Main Street W

2018 Existing - AM

09-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	96	19	29	65	5	5	7	25	18	15	7
Future Volume (Veh/h)	5	96	19	29	65	5	5	7	25	18	15	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	102	20	31	69	5	5	7	27	19	16	7
Pedestrians												1
Lane Width (m)												3.5
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	75			122			270	259	112	287	266	72
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	75			122			270	259	112	287	266	72
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			98			99	99	97	97	97	99
cM capacity (veh/h)	1536			1459			655	632	936	631	626	956
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	127	105	39	42								
Volume Left	5	31	5	19								
Volume Right	20	5	27	7								
cSH	1536	1459	820	667								
Volume to Capacity	0.00	0.02	0.05	0.06								
Queue Length 95th (m)	0.1	0.5	1.1	1.5								
Control Delay (s)	0.3	2.3	9.6	10.8								
Lane LOS	A	A	A	B								
Approach Delay (s)	0.3	2.3	9.6	10.8								
Approach LOS			A	B								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			24.3%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street

2018 Existing - PM

09-17-2020










						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	17	25	6	8	28
Future Volume (Veh/h)	6	17	25	6	8	28
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	20	29	7	9	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	82	32			36	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	32			36	
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	98			99	
cM capacity (veh/h)	919	1047			1588	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	27	36	41			
Volume Left	7	0	9			
Volume Right	20	7	0			
cSH	1011	1700	1588			
Volume to Capacity	0.03	0.02	0.01			
Queue Length 95th (m)	0.6	0.0	0.1			
Control Delay (s)	8.7	0.0	1.6			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.6			
Approach LOS	A					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			18.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

2018 Existing - PM

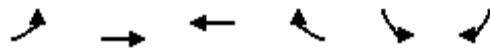
09-17-2020




						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	4	3	17	8	4
Future Volume (Veh/h)	20	4	3	17	8	4
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)	24	5	4	21	10	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			29		56	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			29		56	26
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1597		955	1055
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	29	25	15			
Volume Left	0	4	10			
Volume Right	5	0	5			
cSH	1700	1597	986			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	1.2	8.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.2	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		13.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2018 Existing - PM
09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	180	195	9	10	11
Future Volume (Veh/h)	4	180	195	9	10	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	200	217	10	11	12
Pedestrians		3			9	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	236				439	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236				439	234
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				98	99
cM capacity (veh/h)	1332				573	801
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	204	227	23			
Volume Left	4	0	11			
Volume Right	0	10	12			
cSH	1332	1700	673			
Volume to Capacity	0.00	0.13	0.03			
Queue Length 95th (m)	0.1	0.0	0.8			
Control Delay (s)	0.2	0.0	10.5			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	10.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			23.6%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

4: Ida Street & Grey Road 9/Main Street W

2018 Existing - PM

09-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	99	14	15	124	23	23	21	29	16	22	5
Future Volume (Veh/h)	9	99	14	15	124	23	23	21	29	16	22	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	112	16	17	141	26	26	24	33	18	25	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	167			128			346	341	120	373	336	154
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167			128			346	341	120	373	336	154
tC, single (s)	4.1			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	96	96	97	96	99
cM capacity (veh/h)	1423			1354			579	573	937	541	576	897
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	138	184	83	49								
Volume Left	10	17	26	18								
Volume Right	16	26	33	6								
cSH	1423	1354	680	588								
Volume to Capacity	0.01	0.01	0.12	0.08								
Queue Length 95th (m)	0.2	0.3	3.2	2.1								
Control Delay (s)	0.6	0.8	11.0	11.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.8	11.0	11.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			23.9%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street

2025 Future Background - AM

09-23-2020










						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	20	12	10	16	32
Future Volume (Veh/h)	10	20	12	10	16	32
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	26	15	13	21	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	104	22			28	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104	22			28	
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	98			99	
cM capacity (veh/h)	887	1062			1599	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	39	28	62			
Volume Left	13	0	21			
Volume Right	26	13	0			
cSH	996	1700	1599			
Volume to Capacity	0.04	0.02	0.01			
Queue Length 95th (m)	0.9	0.0	0.3			
Control Delay (s)	8.8	0.0	2.5			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.5			
Approach LOS	A					
Intersection Summary						
Average Delay		3.9				
Intersection Capacity Utilization		19.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

2025 Future Background - AM

09-23-2020

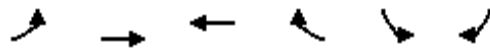
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	31	71	20	14	22	7
Future Volume (Veh/h)	31	71	20	14	22	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	41	93	26	18	29	9
Pedestrians						
Lane Width (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			134			88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			134			88
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			98			99
cM capacity (veh/h)			1463			976
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	134	44	38			
Volume Left	0	26	29			
Volume Right	93	0	9			
cSH	1700	1463	855			
Volume to Capacity	0.08	0.02	0.04			
Queue Length 95th (m)	0.0	0.4	1.1			
Control Delay (s)	0.0	4.5	9.4			
Lane LOS	A		A			
Approach Delay (s)	0.0	4.5	9.4			
Approach LOS	A		A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			18.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2025 Future Background - AM

09-23-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	222	210	22	64	35
Future Volume (Veh/h)	16	222	210	22	64	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	18	244	231	24	70	38
Pedestrians					18	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	273				541	261
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	273				541	261
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				86	95
cM capacity (veh/h)	1281				491	770
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	262	255	108			
Volume Left	18	0	70			
Volume Right	0	24	38			
cSH	1281	1700	562			
Volume to Capacity	0.01	0.15	0.19			
Queue Length 95th (m)	0.3	0.0	5.4			
Control Delay (s)	0.7	0.0	12.9			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			37.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 4: Ida Street & Grey Road 9/Main Street W

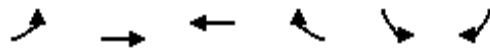
2025 Future Background - AM




09-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	119	21	32	108	6	6	8	28	20	17	17
Future Volume (Veh/h)	8	119	21	32	108	6	6	8	28	20	17	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	127	22	34	115	6	6	9	30	21	18	18
Pedestrians												1
Lane Width (m)												3.5
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	122			149			369	346	138	378	354	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			149			369	346	138	378	354	119
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			98			99	98	97	96	97	98
cM capacity (veh/h)	1477			1426			552	563	905	544	557	900
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	158	155	45	57								
Volume Left	9	34	6	21								
Volume Right	22	6	30	18								
cSH	1477	1426	750	627								
Volume to Capacity	0.01	0.02	0.06	0.09								
Queue Length 95th (m)	0.1	0.6	1.5	2.3								
Control Delay (s)	0.5	1.8	10.1	11.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.8	10.1	11.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			31.2%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Glenelg Street & Site Access

2025 Future Background - AM
09-23-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	20	13	23	74	18
Future Volume (Veh/h)	6	20	13	23	74	18
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)	7	22	14	25	80	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	39				62	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	39				62	26
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				92	98
cM capacity (veh/h)	1584				944	1055
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	29	39	100			
Volume Left	7	0	80			
Volume Right	0	25	20			
cSH	1584	1700	965			
Volume to Capacity	0.00	0.02	0.10			
Queue Length 95th (m)	0.1	0.0	2.6			
Control Delay (s)	1.8	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	1.8	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			18.1%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street

2025 Future Background - PM










09-17-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	25	28	17	19	31
Future Volume (Veh/h)	13	25	28	17	19	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	29	32	20	22	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	122	42			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	122	42			52	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	866	1034			1567	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	44	52	58			
Volume Left	15	0	22			
Volume Right	29	20	0			
cSH	970	1700	1567			
Volume to Capacity	0.05	0.03	0.01			
Queue Length 95th (m)	1.1	0.0	0.3			
Control Delay (s)	8.9	0.0	2.8			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.8			
Approach LOS	A					
Intersection Summary						
Average Delay		3.6				
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 2: Dundalk Street & Glenelg Street/Grey Street N

2025 Future Background - PM

09-17-2020

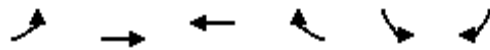
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	31	43	3	34	74	4
Future Volume (Veh/h)	31	43	3	34	74	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	38	52	4	41	90	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			90		113	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		113	64
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)			1518		886	1006
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	90	45	95			
Volume Left	0	4	90			
Volume Right	52	0	5			
cSH	1700	1518	892			
Volume to Capacity	0.05	0.00	0.11			
Queue Length 95th (m)	0.0	0.1	2.7			
Control Delay (s)	0.0	0.7	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.7	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			15.3%	ICU Level of Service		A
Analysis Period (min)			15			




HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2025 Future Background - PM

09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	260	252	70	46	15
Future Volume (Veh/h)	9	260	252	70	46	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	10	289	280	78	51	17
Pedestrians		3			9	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	367				637	331
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367				637	331
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				88	98
cM capacity (veh/h)	1193				437	708
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	299	358	68			
Volume Left	10	0	51			
Volume Right	0	78	17			
cSH	1193	1700	484			
Volume to Capacity	0.01	0.21	0.14			
Queue Length 95th (m)	0.2	0.0	3.7			
Control Delay (s)	0.3	0.0	13.7			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		32.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

4: Ida Street & Grey Road 9/Main Street W

2025 Future Background - PM

09-17-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	148	16	17	161	26	26	23	32	18	24	12
Future Volume (Veh/h)	20	148	16	17	161	26	26	23	32	18	24	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	23	168	18	19	183	30	30	26	36	20	27	14
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	213			186			486	474	177	508	468	198
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	213			186			486	474	177	508	468	198
tC, single (s)	4.1			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	95	96	95	94	98
cM capacity (veh/h)	1369			1287			454	477	871	429	480	848
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	209	232	92	61								
Volume Left	23	19	30	20								
Volume Right	18	30	36	14								
cSH	1369	1287	568	511								
Volume to Capacity	0.02	0.01	0.16	0.12								
Queue Length 95th (m)	0.4	0.3	4.4	3.1								
Control Delay (s)	1.0	0.8	12.6	13.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.0	0.8	12.6	13.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			26.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Glenelg Street & Site Access

2025 Future Background - PM

09-17-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	16	28	80	47	12
Future Volume (Veh/h)	20	16	28	80	47	12
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)	22	17	30	87	51	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	117				134	74
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	117				134	74
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				94	99
cM capacity (veh/h)	1484				851	994
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	39	117	64			
Volume Left	22	0	51			
Volume Right	0	87	13			
cSH	1484	1700	877			
Volume to Capacity	0.01	0.07	0.07			
Queue Length 95th (m)	0.3	0.0	1.8			
Control Delay (s)	4.3	0.0	9.4			
Lane LOS	A		A			
Approach Delay (s)	4.3	0.0	9.4			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		18.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street










2030 Future Background - AM

09-23-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	21	13	10	17	35
Future Volume (Veh/h)	10	21	13	10	17	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	27	17	13	22	45
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	112	24			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112	24			30	
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	97			99	
cM capacity (veh/h)	877	1059			1596	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	30	67			
Volume Left	13	0	22			
Volume Right	27	13	0			
cSH	992	1700	1596			
Volume to Capacity	0.04	0.02	0.01			
Queue Length 95th (m)	1.0	0.0	0.3			
Control Delay (s)	8.8	0.0	2.5			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.5			
Approach LOS	A					
Intersection Summary						
Average Delay		3.8				
Intersection Capacity Utilization		19.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 2: Dundalk Street & Glenelg Street/Grey Street N

2030 Future Background - AM
09-23-2020

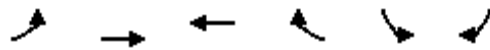
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	32	72	22	15	22	7
Future Volume (Veh/h)	32	72	22	15	22	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	42	95	29	20	29	9
Pedestrians						
Lane Width (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			137		168	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		168	90
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	99
cM capacity (veh/h)			1459		811	974
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	137	49	38			
Volume Left	0	29	29			
Volume Right	95	0	9			
cSH	1700	1459	845			
Volume to Capacity	0.08	0.02	0.04			
Queue Length 95th (m)	0.0	0.5	1.1			
Control Delay (s)	0.0	4.5	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.5	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			18.7%	ICU Level of Service	A	
Analysis Period (min)			15			




HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2030 Future Background - AM

















09-23-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	238	223	22	65	37
Future Volume (Veh/h)	17	238	223	22	65	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	262	245	24	71	41
Pedestrians					18	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	287				575	275
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	287				575	275
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				85	95
cM capacity (veh/h)	1266				468	756
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	281	269	112			
Volume Left	19	0	71			
Volume Right	0	24	41			
cSH	1266	1700	544			
Volume to Capacity	0.02	0.16	0.21			
Queue Length 95th (m)	0.3	0.0	5.8			
Control Delay (s)	0.7	0.0	13.3			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	13.3			
Approach LOS			B			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			39.0%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis 4: Ida Street & Grey Road 9/Main Street W

2030 Future Background - AM
09-23-2020

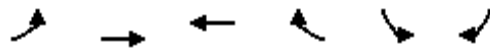
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	127	23	35	114	6	6	8	30	22	18	17
Future Volume (Veh/h)	9	127	23	35	114	6	6	8	30	22	18	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	135	24	37	121	6	6	9	32	23	19	18
Pedestrians												1
Lane Width (m)												3.5
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	128			159			392	369	147	402	378	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	128			159			392	369	147	402	378	125
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			97			99	98	96	96	96	98
cM capacity (veh/h)	1469			1414			530	545	895	521	538	894
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	169	164	47	60								
Volume Left	10	37	6	23								
Volume Right	24	6	32	18								
cSH	1469	1414	739	602								
Volume to Capacity	0.01	0.03	0.06	0.10								
Queue Length 95th (m)	0.2	0.6	1.5	2.5								
Control Delay (s)	0.5	1.9	10.2	11.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.9	10.2	11.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			33.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Glenelg Street & Site Access

2030 Future Background - AM

09-23-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	22	14	23	74	18
Future Volume (Veh/h)	6	22	14	23	74	18
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)	7	24	15	25	80	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	40				66	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40				66	28
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	98
cM capacity (veh/h)	1583				941	1054
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	31	40	100			
Volume Left	7	0	80			
Volume Right	0	25	20			
cSH	1583	1700	961			
Volume to Capacity	0.00	0.02	0.10			
Queue Length 95th (m)	0.1	0.0	2.6			
Control Delay (s)	1.7	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	1.7	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization		18.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street










2030 Future Background - PM

09-17-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	26	30	17	20	33
Future Volume (Veh/h)	13	26	30	17	20	33
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	30	34	20	23	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	128	44			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	44			54	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	858	1032			1564	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	45	54	61			
Volume Left	15	0	23			
Volume Right	30	20	0			
cSH	967	1700	1564			
Volume to Capacity	0.05	0.03	0.01			
Queue Length 95th (m)	1.1	0.0	0.3			
Control Delay (s)	8.9	0.0	2.8			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.8			
Approach LOS	A					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			19.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Dundalk Street & Glenelg Street/Grey Street N

2030 Future Background - PM
09-17-2020

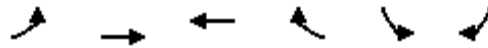
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	33	43	4	35	75	5
Future Volume (Veh/h)	33	43	4	35	75	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	40	52	5	43	91	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			92		119	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		119	66
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	99
cM capacity (veh/h)			1515		879	1003
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	92	48	97			
Volume Left	0	5	91			
Volume Right	52	0	6			
cSH	1700	1515	885			
Volume to Capacity	0.05	0.00	0.11			
Queue Length 95th (m)	0.0	0.1	2.8			
Control Delay (s)	0.0	0.8	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.8	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			16.3%	ICU Level of Service		A
Analysis Period (min)			15			




HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2030 Future Background - PM

09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	275	269	71	47	16
Future Volume (Veh/h)	10	275	269	71	47	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	306	299	79	52	18
Pedestrians		3			9	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387				676	350
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				676	350
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				87	97
cM capacity (veh/h)	1173				415	690
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	317	378	70			
Volume Left	11	0	52			
Volume Right	0	79	18			
cSH	1173	1700	462			
Volume to Capacity	0.01	0.22	0.15			
Queue Length 95th (m)	0.2	0.0	4.0			
Control Delay (s)	0.4	0.0	14.2			
Lane LOS	A		B			
Approach Delay (s)	0.4	0.0	14.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			33.8%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis 4: Ida Street & Grey Road 9/Main Street W

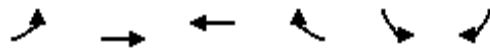
2030 Future Background - PM

09-17-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	156	17	18	171	27	27	25	35	19	26	12
Future Volume (Veh/h)	21	156	17	18	171	27	27	25	35	19	26	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	24	177	19	20	194	31	31	28	40	22	30	14
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	225			196			513	500	186	538	494	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	225			196			513	500	186	538	494	210
tC, single (s)	4.1			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			93	94	95	95	94	98
cM capacity (veh/h)	1356			1276			433	460	861	405	464	836
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	220	245	99	66								
Volume Left	24	20	31	22								
Volume Right	19	31	40	14								
cSH	1356	1276	553	486								
Volume to Capacity	0.02	0.02	0.18	0.14								
Queue Length 95th (m)	0.4	0.4	4.9	3.5								
Control Delay (s)	1.0	0.8	12.9	13.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.0	0.8	12.9	13.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			27.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Glenelg Street & Site Access

2030 Future Background - PM
09-17-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰		↰	
Traffic Volume (veh/h)	20	17	30	80	47	12
Future Volume (Veh/h)	20	17	30	80	47	12
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)	22	18	33	87	51	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	120				138	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120				138	76
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				94	99
cM capacity (veh/h)	1480				847	990
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	40	120	64			
Volume Left	22	0	51			
Volume Right	0	87	13			
cSH	1480	1700	872			
Volume to Capacity	0.01	0.07	0.07			
Queue Length 95th (m)	0.3	0.0	1.8			
Control Delay (s)	4.2	0.0	9.5			
Lane LOS	A		A			
Approach Delay (s)	4.2	0.0	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization		18.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street










2025 Future Total - AM
09-23-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	27	12	13	18	32
Future Volume (Veh/h)	18	27	12	13	18	32
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	23	35	15	17	23	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	110	24			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	110	24			32	
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			99	
cM capacity (veh/h)	878	1059			1593	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	58	32	64			
Volume Left	23	0	23			
Volume Right	35	17	0			
cSH	979	1700	1593			
Volume to Capacity	0.06	0.02	0.01			
Queue Length 95th (m)	1.4	0.0	0.3			
Control Delay (s)	8.9	0.0	2.7			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.7			
Approach LOS	A					
Intersection Summary						
Average Delay		4.5				
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

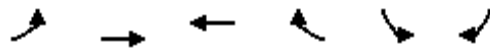
2025 Future Total - AM
09-23-2020




						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	42	121	20	18	37	7
Future Volume (Veh/h)	42	121	20	18	37	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	55	159	26	24	49	9
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			214		210	134
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			214		210	134
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	99
cM capacity (veh/h)			1368		767	920
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	214	50	58			
Volume Left	0	26	49			
Volume Right	159	0	9			
cSH	1700	1368	788			
Volume to Capacity	0.13	0.02	0.07			
Queue Length 95th (m)	0.0	0.4	1.8			
Control Delay (s)	0.0	4.1	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.1	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			26.3%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2025 Future Total - AM
09-23-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	222	210	36	110	39
Future Volume (Veh/h)	17	222	210	36	110	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	244	231	40	121	43
Pedestrians					18	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	289				551	269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	289				551	269
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				75	94
cM capacity (veh/h)	1264				484	762
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	263	271	164			
Volume Left	19	0	121			
Volume Right	0	40	43			
cSH	1264	1700	535			
Volume to Capacity	0.02	0.16	0.31			
Queue Length 95th (m)	0.3	0.0	9.8			
Control Delay (s)	0.7	0.0	14.7			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	14.7			
Approach LOS			B			
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			40.8%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

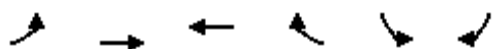
4: Ida Street & Grey Road 9/Main Street W

2025 Future Total - AM
09-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	119	21	32	108	6	6	8	28	20	17	25
Future Volume (Veh/h)	11	119	21	32	108	6	6	8	28	20	17	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	12	127	22	34	115	6	6	9	30	21	18	27
Pedestrians												1
Lane Width (m)												3.5
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	122			149			384	352	138	384	360	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			149			384	352	138	384	360	119
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			98			99	98	97	96	97	97
cM capacity (veh/h)	1477			1426			533	557	905	538	551	900
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	161	155	45	66								
Volume Left	12	34	6	21								
Volume Right	22	6	30	27								
cSH	1477	1426	743	649								
Volume to Capacity	0.01	0.02	0.06	0.10								
Queue Length 95th (m)	0.2	0.6	1.5	2.6								
Control Delay (s)	0.6	1.8	10.2	11.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	1.8	10.2	11.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			29.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Glenelg Street & Site Access

2025 Future Total - AM
09-23-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	20	13	42	135	33
Future Volume (Veh/h)	11	20	13	42	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	22	14	46	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	60				83	37
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	60				83	37
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				84	97
cM capacity (veh/h)	1556				917	1041
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	34	60	183			
Volume Left	12	0	147			
Volume Right	0	46	36			
cSH	1556	1700	939			
Volume to Capacity	0.01	0.04	0.19			
Queue Length 95th (m)	0.2	0.0	5.5			
Control Delay (s)	2.6	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	2.6	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization		24.5%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street










2025 Future Total - PM
09-17-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	30	28	26	27	31
Future Volume (Veh/h)	18	30	28	26	27	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	21	34	32	30	31	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	145	47			62	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	145	47			62	
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			98	
cM capacity (veh/h)	835	1028			1554	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	55	62	67			
Volume Left	21	0	31			
Volume Right	34	30	0			
cSH	945	1700	1554			
Volume to Capacity	0.06	0.04	0.02			
Queue Length 95th (m)	1.4	0.0	0.5			
Control Delay (s)	9.0	0.0	3.5			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	3.5			
Approach LOS	A					
Intersection Summary						
Average Delay		4.0				
Intersection Capacity Utilization		19.8%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

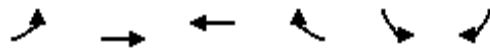
2025 Future Total - PM
09-17-2020




						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	38	75	3	46	128	4
Future Volume (Veh/h)	38	75	3	46	128	4
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)	46	91	4	56	156	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			137		156	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		156	92
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		81	99
cM capacity (veh/h)			1459		838	971
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	137	60	161			
Volume Left	0	4	156			
Volume Right	91	0	5			
cSH	1700	1459	842			
Volume to Capacity	0.08	0.00	0.19			
Queue Length 95th (m)	0.0	0.1	5.3			
Control Delay (s)	0.0	0.5	10.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.5	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization			20.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2025 Future Total - PM
09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	260	252	120	76	17
Future Volume (Veh/h)	13	260	252	120	76	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	289	280	133	84	19
Pedestrians		3			9	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	422				672	358
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422				672	358
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				80	97
cM capacity (veh/h)	1139				415	683
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	303	413	103			
Volume Left	14	0	84			
Volume Right	0	133	19			
cSH	1139	1700	448			
Volume to Capacity	0.01	0.24	0.23			
Queue Length 95th (m)	0.3	0.0	6.7			
Control Delay (s)	0.5	0.0	15.4			
Lane LOS	A		C			
Approach Delay (s)	0.5	0.0	15.4			
Approach LOS			C			
Intersection Summary						
Average Delay		2.1				
Intersection Capacity Utilization		37.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

4: Ida Street & Grey Road 9/Main Street W

2025 Future Total - PM
09-25-2020




												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	148	16	17	161	26	26	23	32	18	24	17
Future Volume (Veh/h)	29	148	16	17	161	26	26	23	32	18	24	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	33	168	18	19	183	30	30	26	36	20	27	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	213			186			512	494	177	528	488	198
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	213			186			512	494	177	528	488	198
tC, single (s)	4.1			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	94	96	95	94	98
cM capacity (veh/h)	1369			1287			432	461	871	413	464	848
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	219	232	92	66								
Volume Left	33	19	30	20								
Volume Right	18	30	36	19								
cSH	1369	1287	550	512								
Volume to Capacity	0.02	0.01	0.17	0.13								
Queue Length 95th (m)	0.6	0.3	4.5	3.3								
Control Delay (s)	1.3	0.8	12.9	13.1								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.3	0.8	12.9	13.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			29.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Glenelg Street & Site Access

2025 Future Total - PM
09-17-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	16	28	146	86	22
Future Volume (Veh/h)	37	16	28	146	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	17	30	159	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	189				206	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	189				206	110
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				88	97
cM capacity (veh/h)	1397				764	950
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	57	189	117			
Volume Left	40	0	93			
Volume Right	0	159	24			
cSH	1397	1700	796			
Volume to Capacity	0.03	0.11	0.15			
Queue Length 95th (m)	0.7	0.0	3.9			
Control Delay (s)	5.4	0.0	10.3			
Lane LOS	A		B			
Approach Delay (s)	5.4	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			29.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street

2030 Future Total - AM
09-23-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	28	13	13	19	35
Future Volume (Veh/h)	18	28	13	13	19	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	23	36	17	17	24	45
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	118	26			34	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118	26			34	
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			98	
cM capacity (veh/h)	869	1056			1591	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	59	34	69			
Volume Left	23	0	24			
Volume Right	36	17	0			
cSH	974	1700	1591			
Volume to Capacity	0.06	0.02	0.02			
Queue Length 95th (m)	1.5	0.0	0.3			
Control Delay (s)	8.9	0.0	2.6			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.6			
Approach LOS	A					
Intersection Summary						
Average Delay		4.4				
Intersection Capacity Utilization		19.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

2030 Future Total - AM
09-23-2020




	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	43	122	22	19	37	7
Future Volume (Veh/h)	43	122	22	19	37	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	57	161	29	25	49	9
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			218		220	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			218		220	138
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	99
cM capacity (veh/h)			1364		756	916
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	218	54	58			
Volume Left	0	29	49			
Volume Right	161	0	9			
cSH	1700	1364	777			
Volume to Capacity	0.13	0.02	0.07			
Queue Length 95th (m)	0.0	0.5	1.8			
Control Delay (s)	0.0	4.2	10.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	4.2	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay		2.4				
Intersection Capacity Utilization		26.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2030 Future Total - AM
09-23-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	238	223	36	111	41
Future Volume (Veh/h)	18	238	223	36	111	41
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	20	262	245	40	122	45
Pedestrians					18	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	303				585	283
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	303				585	283
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				74	94
cM capacity (veh/h)	1249				462	749
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	282	285	167			
Volume Left	20	0	122			
Volume Right	0	40	45			
cSH	1249	1700	515			
Volume to Capacity	0.02	0.17	0.32			
Queue Length 95th (m)	0.4	0.0	10.6			
Control Delay (s)	0.7	0.0	15.3			
Lane LOS	A		C			
Approach Delay (s)	0.7	0.0	15.3			
Approach LOS			C			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			42.7%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis
4: Ida Street & Grey Road 9/Main Street W

2030 Future Total - AM

09-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	127	23	35	114	6	6	8	30	22	18	25
Future Volume (Veh/h)	12	127	23	35	114	6	6	8	30	22	18	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	135	24	37	121	6	6	9	32	23	19	27
Pedestrians												1
Lane Width (m)												3.5
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	128			159			408	375	147	408	384	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	128			159			408	375	147	408	384	125
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			97			99	98	96	96	96	97
cM capacity (veh/h)	1469			1414			512	539	895	515	533	894
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	172	164	47	69								
Volume Left	13	37	6	23								
Volume Right	24	6	32	27								
cSH	1469	1414	732	624								
Volume to Capacity	0.01	0.03	0.06	0.11								
Queue Length 95th (m)	0.2	0.6	1.6	2.8								
Control Delay (s)	0.6	1.9	10.3	11.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	1.9	10.3	11.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay	3.7											
Intersection Capacity Utilization	31.5%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

10: Glenelg Street & Site Access

2030 Future Total - AM
09-23-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	↩
Traffic Volume (veh/h)	11	22	14	42	135	33
Future Volume (Veh/h)	11	22	14	42	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	24	15	46	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	61				86	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	61				86	38
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				84	97
cM capacity (veh/h)	1555				913	1040
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	36	61	183			
Volume Left	12	0	147			
Volume Right	0	46	36			
cSH	1555	1700	935			
Volume to Capacity	0.01	0.04	0.20			
Queue Length 95th (m)	0.2	0.0	5.5			
Control Delay (s)	2.5	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	2.5	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			6.7			
Intersection Capacity Utilization		24.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Ida Street & Glenelg Street

2030 Future Total - PM
09-17-2020










						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	31	30	26	28	33
Future Volume (Veh/h)	18	31	30	26	28	33
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	21	36	34	30	32	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	151	49			64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151	49			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	96			98	
cM capacity (veh/h)	828	1025			1551	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	57	64	70			
Volume Left	21	0	32			
Volume Right	36	30	0			
cSH	943	1700	1551			
Volume to Capacity	0.06	0.04	0.02			
Queue Length 95th (m)	1.5	0.0	0.5			
Control Delay (s)	9.1	0.0	3.5			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	3.5			
Approach LOS	A					
Intersection Summary						
Average Delay		4.0				
Intersection Capacity Utilization		20.0%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2: Dundalk Street & Glenelg Street/Grey Street N

2030 Future Total - PM

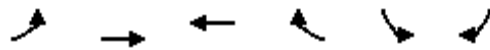
09-17-2020




						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	40	75	4	47	129	5
Future Volume (Veh/h)	40	75	4	47	129	5
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)	49	91	5	57	157	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			140		162	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			140		162	94
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		81	99
cM capacity (veh/h)			1456		831	968
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	140	62	163			
Volume Left	0	5	157			
Volume Right	91	0	6			
cSH	1700	1456	836			
Volume to Capacity	0.08	0.00	0.20			
Queue Length 95th (m)	0.0	0.1	5.5			
Control Delay (s)	0.0	0.6	10.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization			20.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Main Street W & Dundalk Street

2030 Future Total - PM
09-17-2020



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	275	269	121	77	18
Future Volume (Veh/h)	14	275	269	121	77	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	306	299	134	86	20
Pedestrians		3			9	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	442				713	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442				713	378
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	97
cM capacity (veh/h)	1120				393	666
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	322	433	106			
Volume Left	16	0	86			
Volume Right	0	134	20			
cSH	1120	1700	426			
Volume to Capacity	0.01	0.25	0.25			
Queue Length 95th (m)	0.3	0.0	7.4			
Control Delay (s)	0.5	0.0	16.2			
Lane LOS	A		C			
Approach Delay (s)	0.5	0.0	16.2			
Approach LOS			C			
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		38.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
4: Ida Street & Grey Road 9/Main Street W

2030 Future Total - PM




09-17-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	156	17	18	171	27	27	25	35	19	26	17
Future Volume (Veh/h)	30	156	17	18	171	27	27	25	35	19	26	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	177	19	20	194	31	31	28	40	22	30	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	225			196			538	520	186	558	514	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	225			196			538	520	186	558	514	210
tC, single (s)	4.1			4.3			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			92	94	95	94	93	98
cM capacity (veh/h)	1356			1276			411	445	861	390	448	836
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	230	245	99	71								
Volume Left	34	20	31	22								
Volume Right	19	31	40	19								
cSH	1356	1276	536	486								
Volume to Capacity	0.03	0.02	0.18	0.15								
Queue Length 95th (m)	0.6	0.4	5.1	3.9								
Control Delay (s)	1.3	0.8	13.2	13.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.3	0.8	13.2	13.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			30.6%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 10: Glenelg Street & Site Access

2030 Future Total - PM
09-17-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	17	30	146	86	22
Future Volume (Veh/h)	37	17	30	146	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	18	33	159	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	192				210	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192				210	112
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				88	97
cM capacity (veh/h)	1394				760	946
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	58	192	117			
Volume Left	40	0	93			
Volume Right	0	159	24			
cSH	1394	1700	792			
Volume to Capacity	0.03	0.11	0.15			
Queue Length 95th (m)	0.7	0.0	3.9			
Control Delay (s)	5.4	0.0	10.3			
Lane LOS	A		B			
Approach Delay (s)	5.4	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			30.0%	ICU Level of Service		A
Analysis Period (min)			15			

APPENDIX F

Industrial Access TIS Excerpts

4.0 BACKGROUND TRAFFIC

Background traffic is traffic growth generated from sources other than the developments being studied. This will allow an analysis of the effect that the developments will have on the existing road network.

For the purpose of this study, it was assumed that the road construction of the industrial Access Road would be completed in 2019. This study will analyze the traffic volumes at the Grey Road 9 and Ida Street intersection in 2019 (after the road is completed), in 2024 (full and 50% build-out of industrial lands), and a 5 year horizon (2029). A conservative growth rate of 2% was applied to existing traffic volumes to establish background volumes for 2019, 2024, and 2029.

Flato Dundalk Meadows Inc. (residential development site) is located immediately south of Dundalk and is expected to be constructed and fully occupied by 2030. C.F. Crozier & Associates Inc. completed a traffic impact study (Addendum – June 2016) for the development with the trips generated distributed on the existing local roads. C.F. Crozier had assumed that 30% of the trips generated would travel to and from the west (including downtown Dundalk). To incorporate the additional traffic from this residential development, it is assumed that only 10% of the trips generated would travel to and from Grey Road 9 past Ida Street (with the remaining 20% dispersing in downtown Dundalk). This additional traffic is shown on Figure 2 and was added to the background traffic.

Once the Industrial Access Road is constructed, some traffic will re-route based on more direct connections. It was assumed for the purpose of this study that 30% of the traffic on Grey Road 9 through Dundalk would use the Access Road as a bypass route around the community. This is considered to be a conservative estimate. It was also assumed that all truck traffic currently going through Dundalk would use the Access Road to bypass the village or access the industrial lands.

The following list summarizes the movements that are affected by these assumptions:

- 30% of SB-left cars will be added to SB-thru;
- 30% of EB-thru cars will be added to EB-right;
- 30% of WB-thru cars will be added to NB-left;
- 30% of WB-right cars will be added to NB-thru;
- SB-left trucks will be added to SB-thru;
- EB-thru trucks will be added to EB-right;
- WB-left trucks will be removed;
- WB-thru trucks will be added to NB-left;
- WB-right trucks will be added to NB-thru; and,
- NB-right trucks will be removed.

The effects of this redistribution of traffic and the Flato Dundalk Meadows development are shown on Figures 3, 4, and 5 for 2019, 2024, and 2029 background traffic, respectively. Table 2, Table 3, and Table 4 show the 2019, 2024, and 2029 background traffic levels of service for the Grey Road 9 and Ida Street Intersection after this redistribution.

Table 2: 2019 Background Traffic Levels of Service

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.00	0.00
	WB Overall	A	A	0.01	0.02
	NB Overall	A	B	0.07	0.16
	SB Overall	B	B	0.06	0.05

Table 3: 2024 Background Traffic Levels of Service

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.01	0.02
	NB Overall	B	B	0.08	0.19
	SB Overall	B	B	0.07	0.06

Table 4: 2029 Background Traffic Levels of Service

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.02	0.02
	NB Overall	B	B	0.09	0.22
	SB Overall	B	B	0.08	0.07

The intersection of Grey Road 9 and Ida Street will remain operating at a very good and good level of service in both the AM and PM peak hours after the Access Road is constructed in 2019. The intersection will also continue to operate at a very good and good level of service in 2024 and 2029 if there are no industrial developments constructed on the Access Road. The volume to capacity ratios have increased but are still at very acceptable levels. The intersection can also fully accommodate the additional traffic produced from the Flato Dundalk Meadows development.

5.0 SITE GENERATED TRAFFIC

5.1 Trip Generation

Trip generation is a forecast of the additional traffic created by future developments from studies of similar developments to assess the impact of the additional traffic on the surrounding road network. The *Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition* (ITE Code 130 – Industrial Park) was used in this analysis.

The types of developments surrounding the Access Road are not known at this time. The ITE Code 130 – Industrial Park will provide a conservative trip generation. To account for a level of uncertainty, and that a full build-out of the industrial lands is expected to take longer than 5 years, a scenario of 50% build-out was also analyzed to assess when improvements to the Grey Road 9 and Ida Street intersection will be required.

Based on the legal plan provided, an approximate area of 259.75 acres was used to forecast the trips generated by a full build-out of the industrial lands surrounding the proposed Access Road. The 50% build-out area used was 129.875 acres. For this study, it is assumed that all trips generated by the developments are primary trips, thus providing a conservative approach.

The total number of trips generated by the developments for the Weekday AM and PM peak hours are summarized in Table 5 for both 50% build-out and full build-out. The equations used to calculate the number of trips, can be found in Appendix C. It is noted that the 50% development scenario still generates a conservative estimate of 802 and 769 additional trips in the AM and PM peak hours respectively.

Table 5: Trip Generation Summary

Land Use	Weekday AM			Weekday PM		
	Trips Entering	Trips Exiting	Total Trips	Trips Entering	Trips Exiting	Total Trips
Industrial Lands – 50% build-out	666	136	802	161	608	769
Industrial Lands – full build-out	1142	234	1376	266	1000	1266

5.2 Trip Distribution

The trips generated by the developments were distributed and assigned to the road network based on local traffic patterns, as well as expected origin and destination. It was assumed that 70% of the trips generated would head towards/come from Highway 10 on the Access Road. For a conservative approach, it was assumed that all of the site

generated traffic that heads towards/comes from Ida Street would go to/come from the north. The site generated distributions are shown on Figure 6 for a 50% build-out and Figure 7 for a full build-out of industrial lands.

6.0 TOTAL SITE TRAFFIC

The site generated traffic was added to the 2024 and 2029 background traffic volumes at the Grey Road 9 and Ida Street intersection to determine the total site peak hour volumes, as illustrated in Figure 8 through 11.

6.1 Industrial Development at 50% Build-Out

A level of service analysis was performed to determine the impact of the trips generated by a 50% build-out of the development on the unsignalized intersection of Grey Road 9 and Ida Street during the AM and PM peak hours. These levels of service are summarized in Table 6 and Table 7, for the 2024 and 2029 years respectively.

Table 6: 2024 Total Traffic Levels of Service – 50% Build-Out

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.05	0.03
	NB Overall	B	C	0.21	0.57
	SB Overall	B	B	0.24	0.10

Table 7: 2029 Total Traffic Levels of Service – 50% Build-Out

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.06	0.03
	NB Overall	B	C	0.23	0.63
	SB Overall	C	B	0.26	0.11

The Grey Road 9 and Ida Street intersection will continue to operate at a very good to average level of service in the AM peak hours with a 50% industrial build-out. This drop in level of service of some movements is acceptable as the volume to capacity ratios are still at acceptable levels for the individual movements.

6.2 Industrial Development at Full Build-Out

A level of service analysis was also performed to determine the impact of the trips generated by a full build-out of the industrial development on the unsignalized intersection of Grey Road 9 and Ida Street during the AM and PM peak hours. These

levels of service are summarized in Table 8 and Table 9, for the 2024 and 2029 years respectively.

Table 8: 2024 Total Traffic Levels of Service - Full Build-Out

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.09	0.04
	NB Overall	C	E	0.38	0.85
	SB Overall	C	B	0.42	0.12

Table 9: 2029 Total Levels of Service - Full Build-Out

Intersection	Movement	Level of Service		v/c Ratio	
		AM	PM	AM	PM
Grey Road 9 and Ida Street (Unsignalized)	EB Overall	A	A	0.01	0.01
	WB Overall	A	A	0.09	0.04
	NB Overall	C	E	0.40	0.91
	SB Overall	C	B	0.45	0.14

The Grey Road 9 and Ida Street intersection will continue to operate at a very good to average level of service in the AM and PM peak hours with a full industrial build-out. The northbound movement will drop to a poor level of service during the PM peak hours; however, this drop is still acceptable as the movement hasn't reached capacity.

7.0 INTERSECTION ANALYSIS AND RECOMMENDATIONS

The Grey Road 9 and Ida Street intersection will maintain a very good to good level of service once the Access Road is constructed. The intersection will be able to fully accommodate the re-directed traffic and the additional traffic from the Flato Dundalk Meadows Inc. residential development.

The intersection will maintain a very good to average level of service through 2029 at full build-out of industrial lands surrounding the Access Road except for the northbound PM movement. The northbound movement will experience very long traffic delays during the PM peak hour once the industrial lands surrounding the Access Road are fully developed. These very long traffic delays are considered acceptable as the northbound movement will not have reached its capacity. At 50% developed, the northbound movement will only experience average traffic delays. Therefore, the existing intersection configuration will be able to accommodate the fully developed traffic volumes expected in 2029. Should the industrial lands develop at a rate close to

full build-out, operations at the intersection should be monitored to determine if delays become excessive. In this case, traffic signals may be required.

Due to the heavy right turn volumes expected after development begins, a 60m right turn taper may be required on Grey Road 9 to prevent gravel spoilage on the shoulder of the road. A 30m recovery taper should be constructed with the right turn taper on the same side of Grey Road 9.

The intersection was analyzed for traffic signals. Due to the uncertainty in the development, Justification 7 – Project Volumes was elected as the most appropriate warrant from *Ontario Traffic Manual, Book 12, March 2012*. Justification 7 adjusts the peak hour volumes (PHV) to an average hourly volume (AHV) to compare against the volume and delay justifications (1 and 2). The thresholds of Justifications 1 and 2 must be met 120% to account for the uncertainty of estimating volumes from the PHV. Table 10 shows the results of the warrant analysis for a 2029 full build-out scenario.

Table 10: Traffic Signal Warrants

Grey Road 9 and Ida Street	Justification 1		Justification 2	
	1A	1B	2A	2B
Required Volume (per hour)	480	120	480	50
2029 Future PHV AM(PM)	769 (880)	281 (486)	488 (394)	213 (370)
Adjusted 2029 Future AHV	412	192	221	146
Percent Fulfilled	86%	160%	46%	292%

For traffic signals to be warranted, Justification 1 or 2 must be met 120%. The results of the analysis show that Justification 1A and 2A do not meet the required 120% volumes; therefore, traffic signals are not warranted.

APPENDIX G

Glenelg Phase 1 TIS Excerpts

TRAFFIC IMPACT STUDY

**2358737 ONTARIO INC.
TOWNSHIP OF SOUTHGATE**

GLENELG RESIDENTIAL DEVELOPMENT

PREPARED BY:

**C.F. CROZIER & ASSOCIATES INC.
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SEPTEMBER 2018

CFCA FILE NO. 1060-4171

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“B” or better under 2028 future background conditions, with minimal delays and reserve capacity for increases in traffic volumes.

5 SITE GENERATED TRAFFIC

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements at the boundary road intersections.

5.1 Trip Generation

The trip generation of the single detached residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 210 “Single Family Detached Dwelling”.

The trip generation of the townhouse residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 220 “Multifamily Housing (Low-Rise)”.

The trip generation of Glenelg is summarized in **Table 8**. Relevant excerpts from the ITE Trip Generation Manual, 10th Edition are included in **Appendix I**.

Table 8: Glenelg Trip Generation

Use	Trip Type	Peak Hour	Number of Trips		
			Inbound	Outbound	Total
L.U. 210: Single Family Detached Housing (Glenelg: 127 Units)	Primary	Weekday A.M.	23	71	94
	Primary	Weekday P.M.	81	47	128
L.U. 220: Multifamily Housing (Low-Rise) (Glenelg: 26 Units)	Primary	Weekday A.M.	3	10	13
	Primary	Weekday P.M.	11	7	18
Total	Primary	Weekday A.M.	26	81	107
	Primary	Weekday P.M.	92	54	146

5.2 Trip Distribution and Assignment

The trip distribution utilized in the Flato North and East development was used as a basis for the Glenelg development. This distribution was compared with recent Transportation Tomorrow Survey (TTS) data for the Township of Melancthon. The TTS is a comprehensive survey of transportation characteristics in the Golden Horseshoe, Simcoe County and Grey County areas. In order to obtain survey data most applicable to the Subject Property, TTS data was filtered for the Township of Melancthon. TTS data is not available for the Community of Dundalk, accordingly, the Township of Melancthon (abutting the Dundalk to the south and east) was selected as it is considered most representative of the subject area.

The TTS data was found to be consistent with the distribution utilized in the Flato East and Flato North TIS, and thus was used for this analysis. TTS Data has been included in **Appendix J**. The trip distribution is as follows:

- 10 % to/from the north on Ida Street
- 10% to/from the west on Ida Street
- 10% to/from the east on Grey Road 9
- 50% to/from the south on Highway 10
- 20% to/from Dundalk (downtown)

Of the 20 percent remaining in Dundalk, five percent were assumed to travel south on Dundalk Street and then turn right to travel west on Main Street West. The remaining 15 percent were assumed to travel east on Grey Street South and use Proton Street North to access the main downtown commercial corridor.

The development was analyzed under a consolidated access configuration to obtain a conservative analysis. The future operations of the site accesses to Glenelg Street are expected to be better than listed herein as traffic volumes will be diffused across both accesses.

The trips generated by the proposed development were assigned to the boundary road network per the distributions illustrated in **Figure 9**. The corresponding trip assignment is illustrated in **Figure 10**.

6 TOTAL FUTURE CONDITIONS

6.1 Basis of Assessment

The traffic impacts arising from the proposed development were assessed on the basis of the site generated traffic, illustrated in **Figure 10** being superimposed on the future background traffic volumes in **Figures 7 and 8**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 11 and 12** for the 2023 through 2028 horizon years.

6.2 Auxiliary Lane Assessment

Traffic volumes at the intersections of Ida Street and Glenelg Street, Glenelg Street and the Site Access, and Dundalk Street and Main Street West do not meet the threshold to warrant auxiliary left-turn lanes. Accordingly, the future total traffic volumes were analyzed under existing lane configurations. The intersection of Glenelg Street and the Site Access was analyzed with shared through/turn lanes on all approaches.

The left-turn lane warrant charts for 60 km/h design speed roads have been included in **Appendix K** for reference.

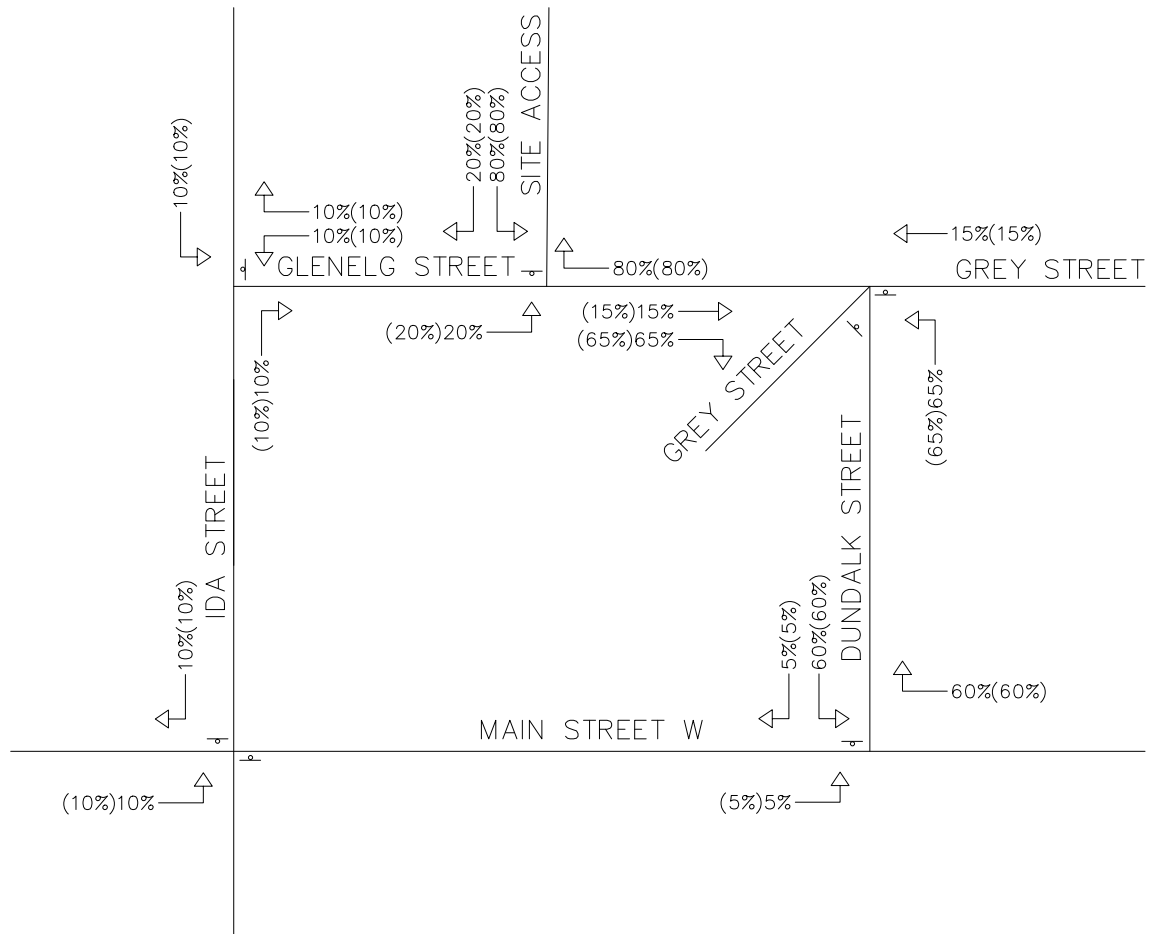
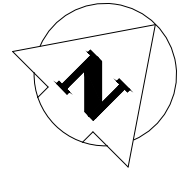
The requirement for a westbound right-turn lane at the site entrance was also analyzed. According to the TAC GDGCR, a right-turn lane is required when the volume of vehicles compared with the through traffic volume causes undue hazard. In the 2028 horizon year, 20 and 74 vehicles are forecasted to make a westbound right-turn at the site entrance. This can be compared with the westbound through volumes of 12 and 29 in the a.m. and p.m. peak hours, respectively. Considering these volumes in combination with the traffic modelling results, it is demonstrated that a right-turn lane is not required to facilitate right turns at the site entrance. The intersection is anticipated to operate at an excellent level of service, and the through movements are not expected to be impeded.

6.3 Intersection Operations

The 2023 through 2028 future total traffic operations of the boundary road network are summarized in **Table 9 and Table 10**. The detailed capacity analysis is included in **Appendix F**, and LOS definitions are included in **Appendix E**.

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

STOP CONTROL
XX%(YY%) WEEKDAY AM(PM)

Project

**GLENELG
TOWNSHIP OF SOUTHGATE**

Title

TRIP DISTRIBUTION



**CROZIER
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Check	T.W.	Check	M.F.	Scale	N.T.S.
				Dwg.	FIG. 7

APPENDIX H

Edgewood Greens TIS Excerpts

TRAFFIC IMPACT STUDY

**EDGEWOOD GREENS
TOWNSHIP OF SOUTHGATE**

**PREPARED FOR:
FLATO DEVELOPMENTS INC.**

**PREPARED BY:
CROZIER CONSULTING ENGINEERS
40 HURON STREET, SUITE 301
COLLINGWOOD, ONTARIO
L9T 6P4**

**ORIGINAL – DECEMBER 2015
UPDATE – FEBRUARY 2016
UPDATE – JUNE 2016
UPDATE – JANUARY 2020**

CFCA FILE NO. 1060-5384

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Table 7: 2035 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	10.6 s	0.42 (EBT)	None
		P.M.	B	12.6 s	0.50 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	B	10.1 s	0.07 (NB)	None
		P.M.	B	10.8 s	0.06 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.3 s	0.06 (NB)	None
		P.M.	C	15.2 s	0.07 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	11.8 s	0.04 (SB)	None
		P.M.	B	14.2 s	0.06 (SB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.2 s	0.07 (NB)	None
		P.M.	A	9.2 s	0.04 (NB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

The metrics summarized above indicate that the study intersections are expected to continue operating with a LOS "B" or better, with the exception of Main Street and Alice Street/Mill Street, which is expected to operate with a LOS "C" in the weekday p.m. peak hour. The maximum volume-to-capacity ratio of 0.50 (Highway 10 and Main Street, EBT, p.m.) indicates that the intersections have reserve capacity for increases in traffic volumes. The 95th percentile queues through all horizon years and peak hours can be contained within their available storage lengths.

5.0 Future Total Conditions

5.1 Site Generated Traffic

The proposed mixed-use development will result in additional vehicles on the boundary road network that would otherwise not exist. The proposed development will also result in additional turning movements at the study intersections.

As noted, the remainder of the development is proposed to consist of the following:

- 477 Single-detached Units
- 219 Semi-detached Units
- Commercial Building with a GFA of 1,635 m² (17,599 ft²)

The trip generation of the proposed residential dwelling and commercial units was forecasted using published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th 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.

The applicable average rates and fitted curve equations for Land Use Category (LUC) 210 "Single Family Detached Housing" and LUC 220 "Multifamily Housing (Low-Rise)" were applied to the proposed residential dwelling units, and the average rates for LUC 820 "Shopping Centre" were applied to the proposed commercial GFA.

As defined by the ITE Trip Generation Handbook, 3rd Edition, primary trips are made for the specific purpose of visiting the generator. Pass-by trips are made as intermediate stops on the way from an origin to a primary destination without a route diversion. Accordingly, these vehicles do not increase the volume of vehicles on the roadway.

The pass-by trip percentage of the commercial retail pass-by trips was forecasted using the rates provided by the ITE Trip Generation Handbook. LUC 820 was used to establish a pass-by percentage of 34 percent for the p.m. peak period. A pass-by percentage was not applied to the a.m. peak period as this trip generation generally captures employees of the commercial uses.

Relevant excerpts from the ITE Trip Generation Manual, 10th Edition and ITE Trip Generation Handbook, 3rd Edition have been included in **Appendix I**. The forecasted trip generation of the mixed-use development is summarized in **Table 8**.

Table 8: Trip Generation

Land Use	Units/GFA	Peak Hour	Trip Type	Trips Generated		
				Inbound	Outbound	Total
LUC 210: Single Family Detached Housing	477 Units	A.M.	Primary	85	258	343
		P.M.		287	168	455
LUC 220: Multifamily Housing (Low-Rise)	219 Units	A.M.	Primary	23	77	100
		P.M.		75	44	119
LUC 820: Shopping Centre	17,599 ft²	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	118	342	460
			Pass-by	0	0	0
		P.M.	Primary	383	235	618
			Pass-by	11	12	23

5.2 Trip Distribution and Assignment

5.2.1 Residential Trips

The trips generated by the proposed residential portion of the development were distributed to the boundary road network using the distribution described in the June 2016 TIS Update, which was completed using Transportation Tomorrow Survey (TTS) data. Excerpts from the June 2016 TIS as well as the TTS data have been included in **Appendix G**.

The following residential trip distribution was established:

- 50% to and from the south on Highway 10 via the Highway 10 Access
- 5% to and from the north on Highway 10 via the Highway 10 Access

- 5% to and from the east on Main Street via the Highway 10 Access
- 15% travelling to and from the west on Main Street via Elm Street and Osprey Street
- 15% to and from the west on Main Street via Russell Street
- 5% to and from the east on Main Street via Russell Street
- 5% to and from the north on Highway 10 via Russell Street

Figure 10 outlines the residential trip distribution for the development. The associated primary trip assignment is illustrated in **Figure 13**.

5.2.2. Commercial Primary Trips

The primary trips generated by the commercial component of the proposed development were distributed to the boundary road network based on the expected catchment areas in the community. The main catchment area is expected to be comprised of the surrounding residential dwellings in the urban area of the Community of Dundalk.

Given the scale of the Edgewood Greens development, it is assumed that the commercial development will primarily service residents from within the development. As such, half the primary commercial trips were assumed to remain within Edgewood Greens. The remaining trips were distributed to the west on Main Street and Victoria Street via Russell Street and Elm Street, respectively.

Figure 11 outlines the residential trip distribution for the development. The associated primary trip assignment is illustrated in **Figure 14**.

5.2.3. Commercial Pass-By Trips

The pass-by trips generated by the proposed development are expected to utilize the proposed site access to Highway 10. Existing turning movement counts were used to establish the pass-by trip distribution. Pass-by trips are only considered in the p.m. peak hour, accordingly, only this timeframe was analyzed. In the weekday p.m. peak hour, 35 percent of trips were observed travelling south on Highway 10, with the remaining 65 percent travelling north on Highway 10.

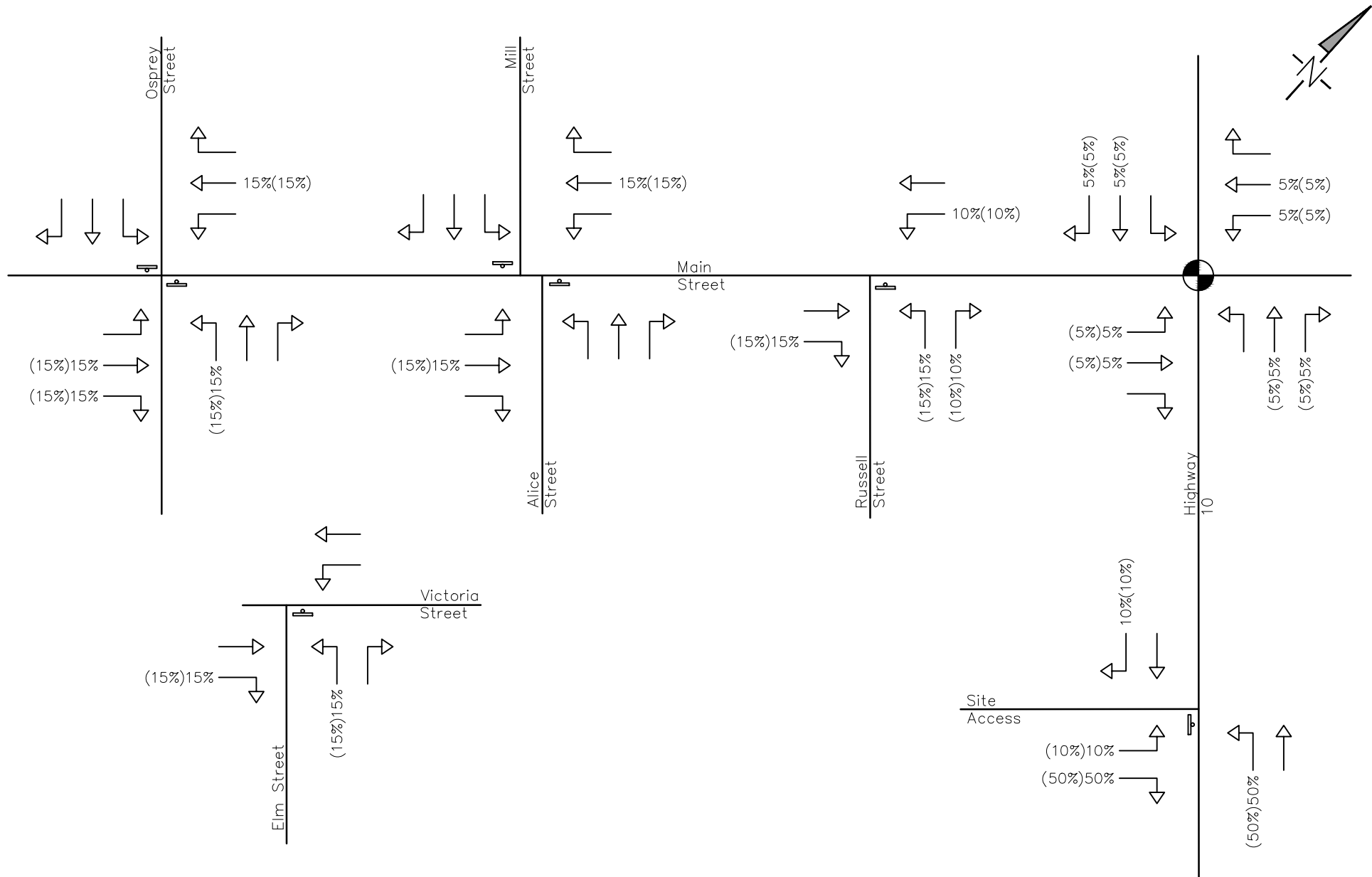
Figure 12 outlines the pass-by trip distribution for the site, and **Figure 15** outlines the corresponding pass-by trip assignment.

5.3 Auxiliary Turn-Lane Assessment

Auxiliary left-turn lane warrants were undertaken for a northbound left-turn lane on Highway 10 at the proposed site access. The warrants were completed using the MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads. Highway 10 has a posted speed limit of 80 km/h fronting the site access. Accordingly, a design speed of 100 km/h was selected, reflecting the engineering convention of a 20 km/h increase on higher speed roadways. **Table 9** summarizes the results of the northbound left-turn lane analyses.

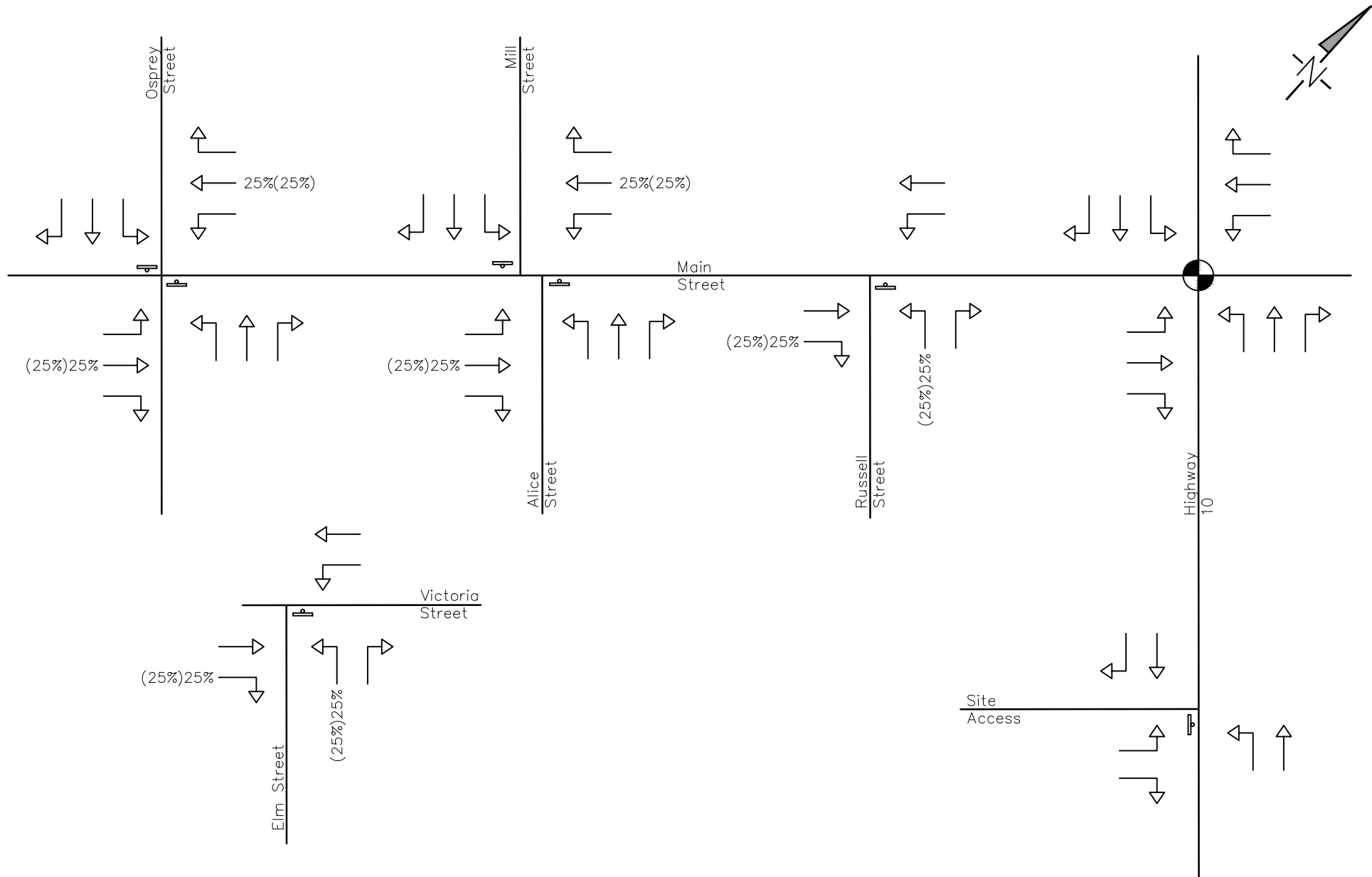
Table 9: 2035 Future Total Auxiliary Lane Analysis

Intersection	Peak Hour	V _A	% Left Turns in V _A	V _O	Warranted	Minimum Storage	MTO GDSOH Figure
Highway 10 and Site Access	A.M.	272	20%	277	Yes	15 m	Ex 9A-23
	P.M.	687	27%	316	Yes	40 m	Ex 9A-24






NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend SIGNAL CONTROL STOP CONTROL xx(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate		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	
	Drawing Residential Trip Distribution		Drawn By S.K. Design By S.K. Project 1060-5384	Scale N.T.S. Date JAN. 20, 2020 Check By M.F. Drawing FIG. 10



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

<div>Legend</div> <div><div></div><div>SIGNAL CONTROL</div></div> <div><div></div><div>STOP CONTROL</div></div> <div><div><div>xx(yy)</div><div>A.M. (P.M.)</div><div>PEAK HOUR TRAFFIC VOLUMES</div></div></div>	<div>Project</div> <div>Edgewood Greens</div> <div>Dundalk, Township of Southgate</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>THE HARBOUREDGE BUILDING,</div><div>40 HURON STREET, SUITE 301,</div><div>COLLINGWOOD, ON L9Y 4R3</div><div>705 446-3510 T</div><div>705 446-3520 F</div><div>WWW.CFCROZIER.CA</div><div>INFO@CFCROZIER.CA</div></div></div>
	<div>Drawing</div> <div>Commercial Primary Trip Distribution</div>	
	<div><div>Drawn By</div><div>S.K.</div><div>Design By</div><div>S.K.</div><div>Project</div><div>1060-5384</div></div> <div><div>Scale</div><div>N.T.S.</div><div>Date</div><div>JAN. 20, 2020</div><div>Check By</div><div>M.F.</div><div>Drawing</div><div>FIG. 11</div></div>	

APPENDIX I

ITE Trip Generation Manual, 10th Edition Excerpts



Trip Generation Manual

10th Edition • Volume 2: Data
Residential (Land Uses 200–299)

SEPTEMBER 2017

Land Use: 210

Single-Family Detached Housing

Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and 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, 903, 925, 936

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: 173

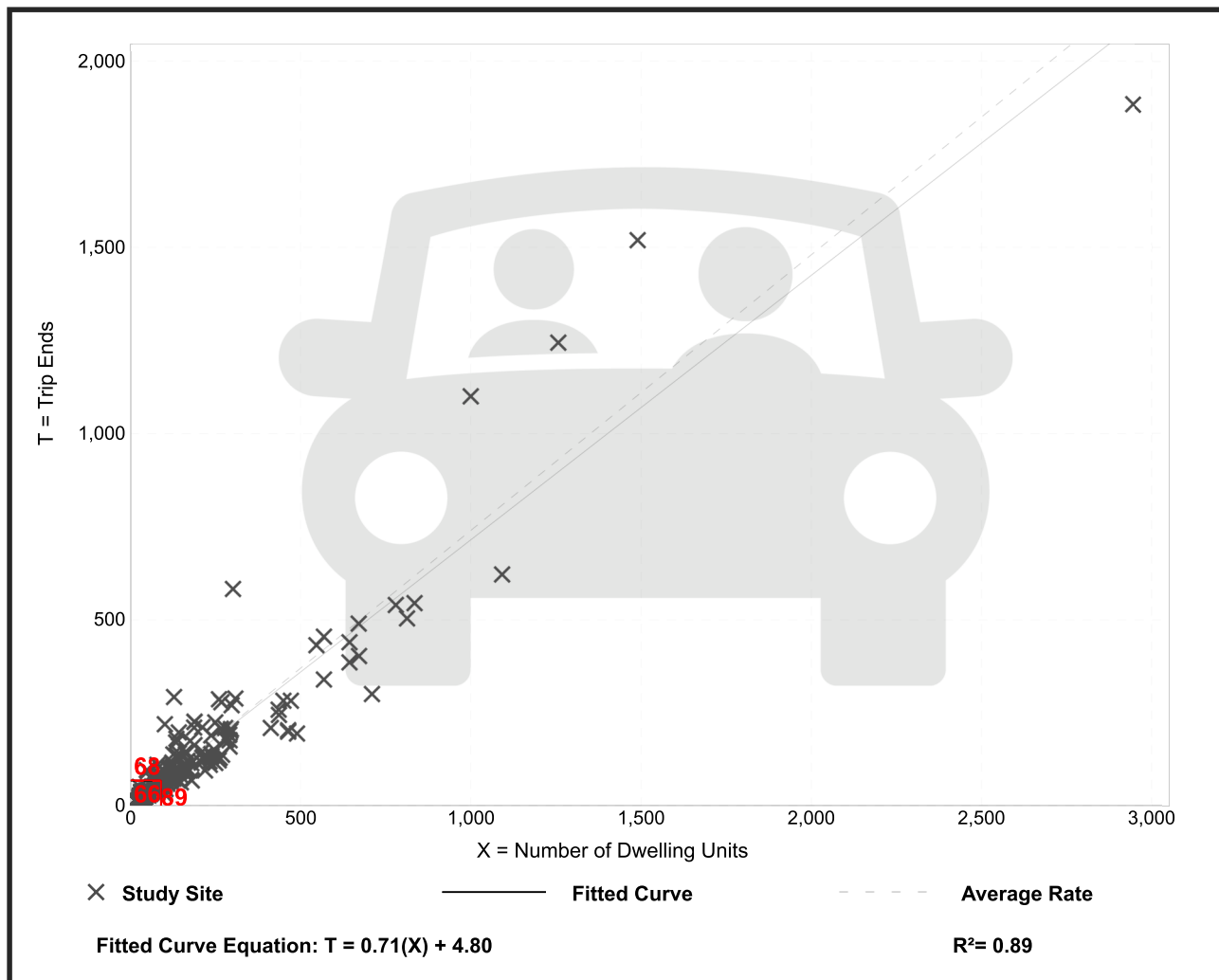
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

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: 190

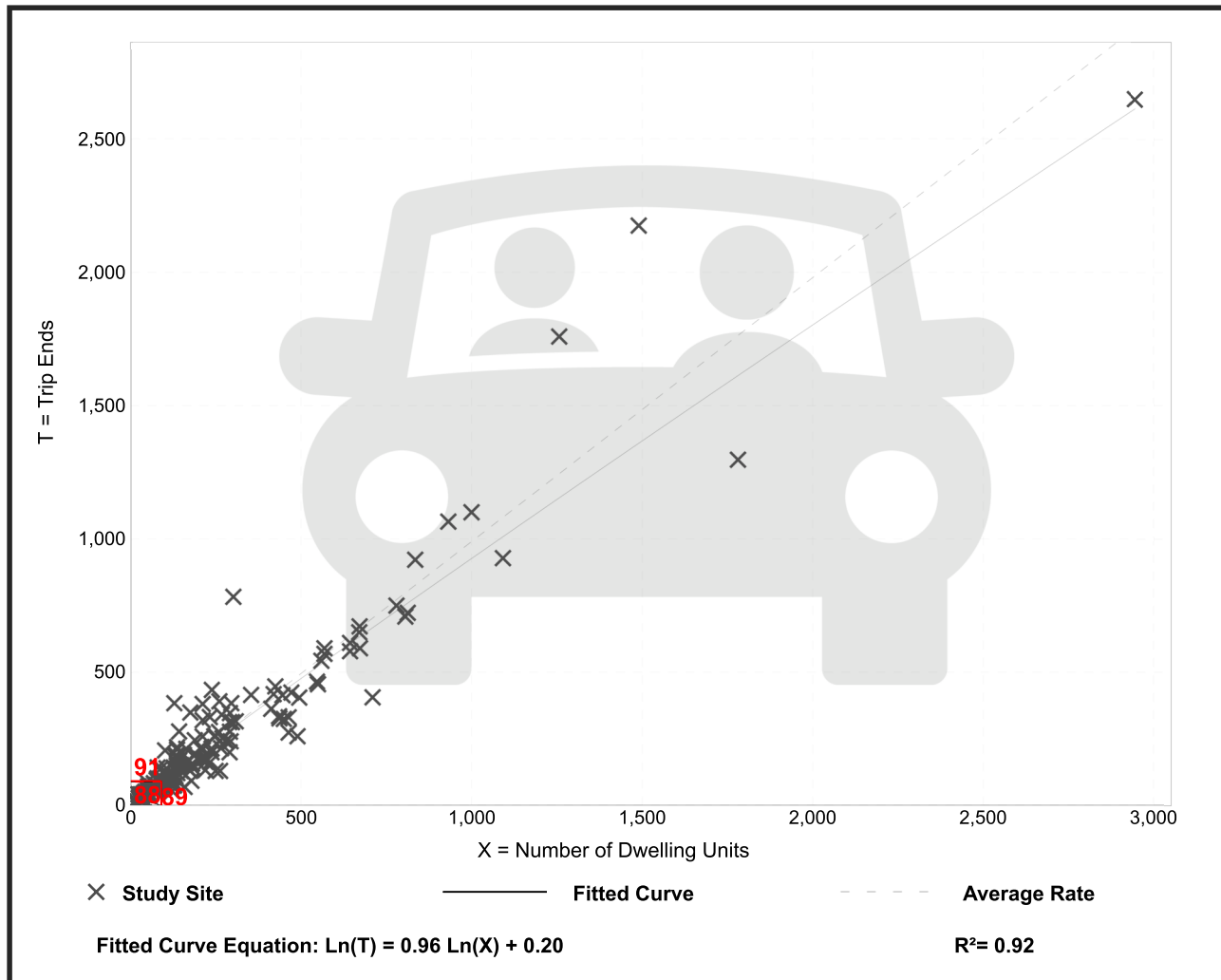
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Land Use: 220

Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and off-campus student apartment (Land Use 225) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:45 and 5:45 p.m., respectively. For the one site with Saturday data, the overall highest vehicle volume was counted between 9:45 and 10:45 a.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 11:45 a.m. and 12:45 p.m.

For the one dense multi-use urban site with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 6:15 and 7:15 p.m., respectively.

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

The average numbers of person trips per vehicle trip at the five general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.13 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.21 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, District of Columbia, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, and Washington.

It is expected that the number of bedrooms and number of residents are likely correlated to the number of trips generated by a residential site. Many of the studies included in this land use did not indicate the total number of bedrooms. To assist in the future analysis of this land use, it is important that this information be collected and included in trip generation data submissions.

Source Numbers

168, 187, 188, 204, 211, 300, 305, 306, 319, 320, 321, 357, 390, 412, 418, 525, 530, 571, 579, 583, 864, 868, 869, 870, 896, 903, 918, 946, 947, 948, 951

Multifamily Housing (Low-Rise) (220)

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: 42

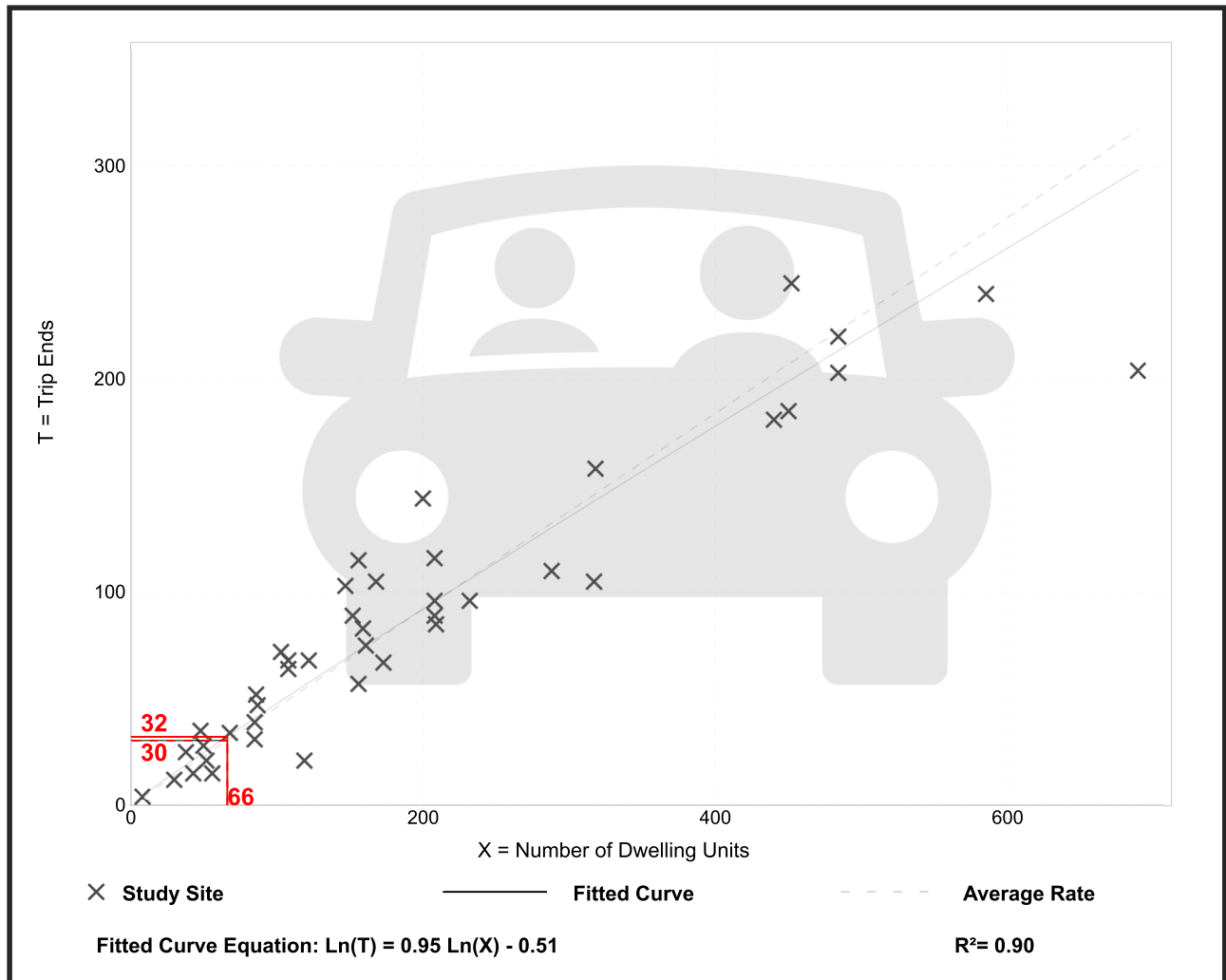
Avg. Num. of Dwelling Units: 199

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) (220)

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: 50

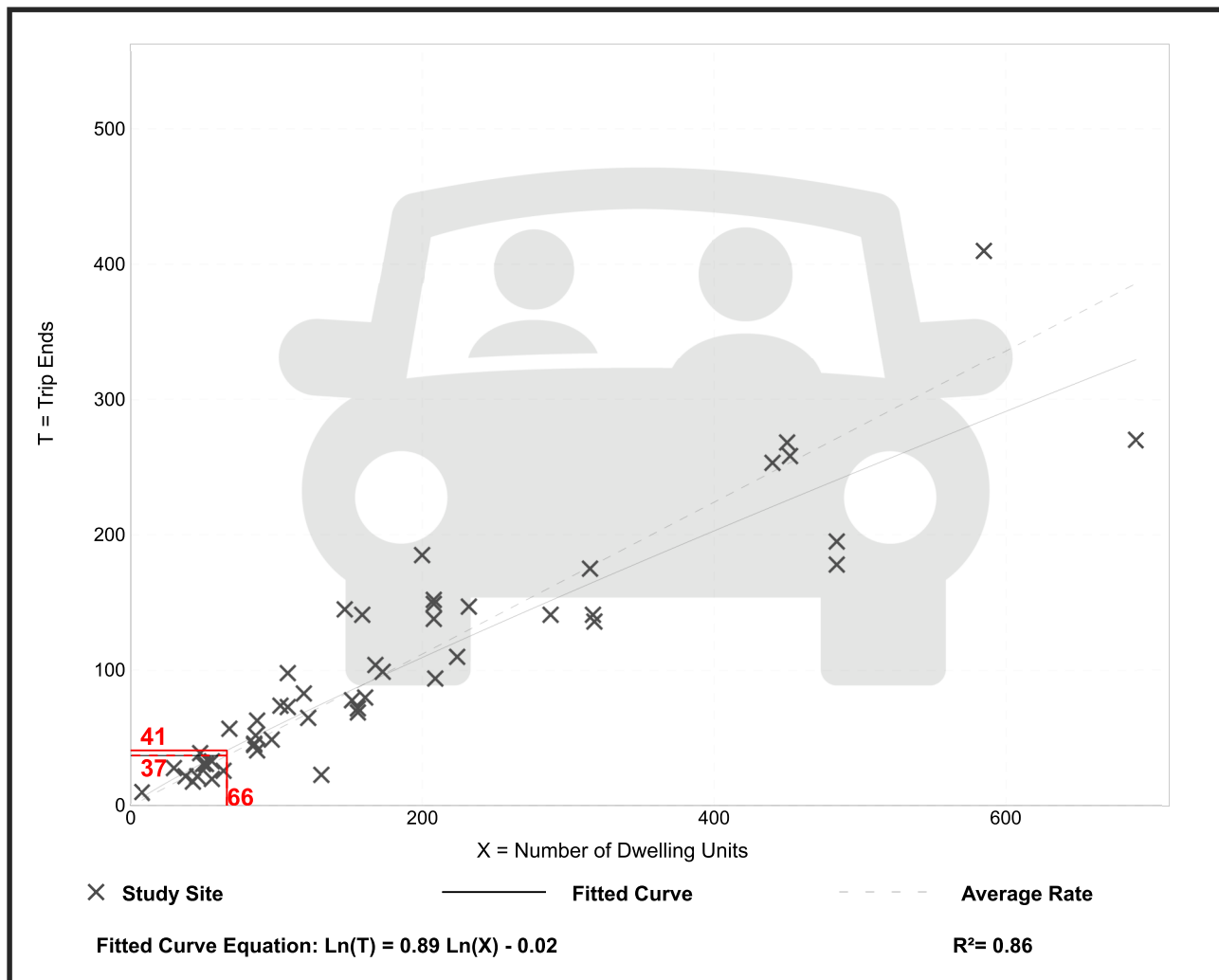
Avg. Num. of Dwelling Units: 187

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16

Data Plot and Equation



APPENDIX J

TTS Data

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: Planning district of origin - pd_orig

Filters:
Planning district of orig
and
Primary travel mode of
and
Start time of trip - start_time In 600-1000

Trip 2016
Table:

Melancthc Direction	
PD 1 of Toronto	25 Southeast
PD 9 of Toronto	7 Southeast
Brampton	48 Southeast
Mississauga	13 Southeast
Woolwich	6 West
City of Guelph	22 West
Erin	49 Southeast
Orangeville	65 Southeast
Barrie	213 East
New Tecumseth	22 Southeast
Adjala-Tosorontio	12 Southeast
Essa	6 Southeast
Grey	6 Northwest
Wasaga Beach	39 East
Mulmur	143 Southeast
Shelburne	189 Southeast
Amaranth	18 Southwest
Melancthon	81 Southeast

Row Labels	Sum of Melancthon	Percentage
East	252	26.14%
Northwest	6	0.62%
Southeast	660	68.46%
Southwest	18	1.87%
West	28	2.90%
Grand Total	964	100.00%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: Planning district of origin - pd_orig

Filters:
Planning distric
and
Primary travel r
and
Start time of trip - start_time In 1600-1900

Trip 2016
Table:

Melancthc Direction	
New Tecumseth	48 Southeast
Mulmur	7 Southeast
Shelburne	44 Southeast
Amaranth	34 Southeast
Melancthon	169 Southeast
Mono	24 Southeast
Grand Valley	10 Southwest

Row Labels	Sum of Melancthon	Percentage
Southeast	326	97.02%
Southwest	10	2.98%
Grand Total	336	100.00%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: Planning district of destination - pd_dest

Filters:
Planning distric
and
Primary travel r
and
Start time of trip - start_time In 600-1000

Trip 2016
Table:

	Melancthc Direction
Orangeville	15 Southeast
Barrie	76 East
Shelburne	104 Southeast
Amaranth	34 Southwest
Melancthon	81 Southeast
Mono	12 Southeast
Grand Valley	10 Southwest

Row Labels	Sum of Melancthon	Percentage
East	76	22.89%
Southeast	212	63.86%
Southwest	44	13.25%
Grand Total	332	100.00%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: Planning district of destination - pd_dest

Filters:
Planning distric
and
Primary travel r
and
Start time of trip - start_time In 1600-1900

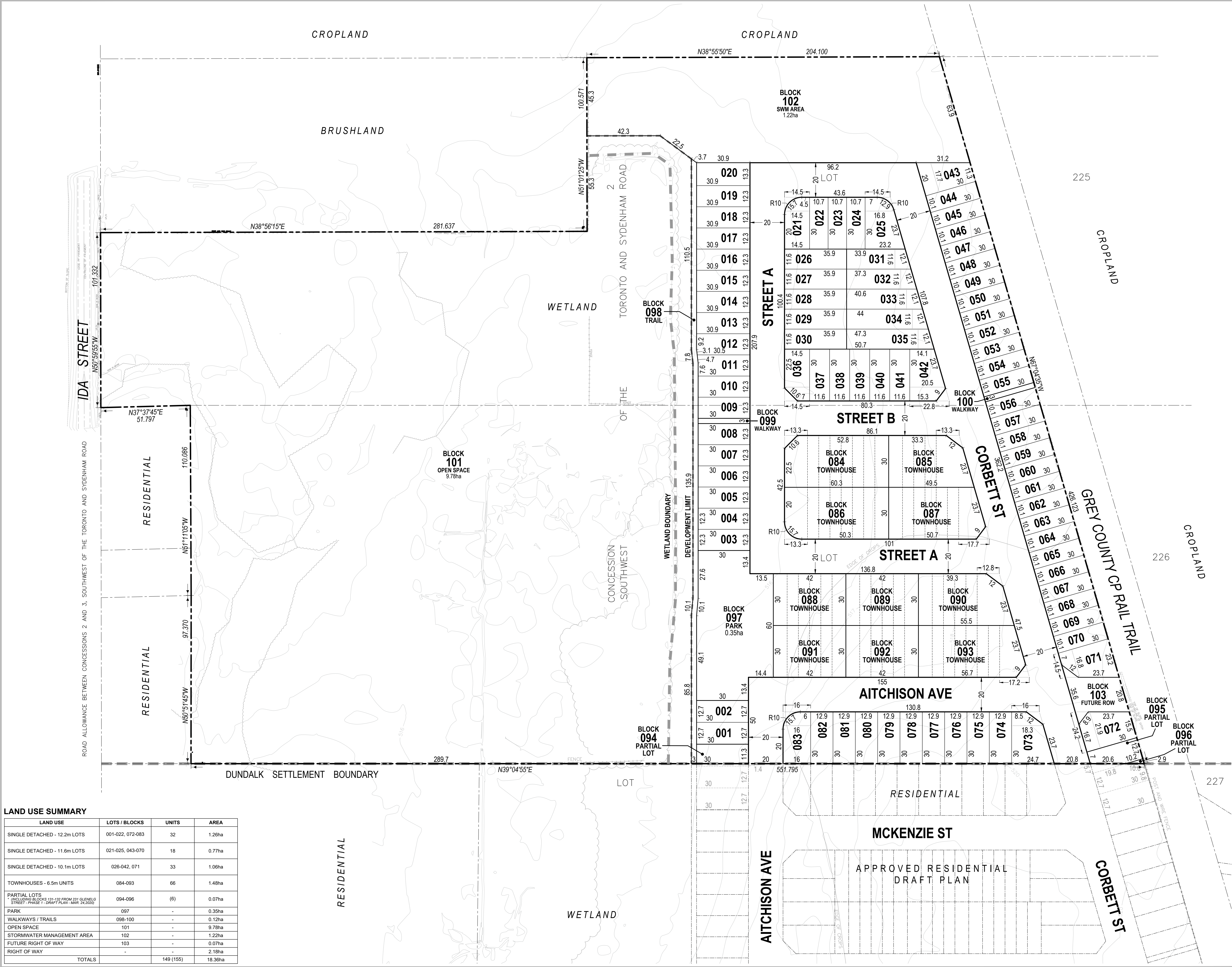
Trip 2016
Table:

	Melancthc Direction
PD 9 of Torontc	7 Southeast
Brampton	48 Southeast
Mississauga	35 Southeast
City of Guelph	22 West
Orangeville	205 Southeast
Essa	6 Southeast
Wasaga Beach	67 East
Mulmur	48 Southeast
Shelburne	44 Southeast
Melancthon	169 Southeast
Mono	48 Southeast

Row Labels	Sum of Melancthon	Percentage
East	67	9.59%
Southeast	610	87.27%
West	22	3.15%
Grand Total	699	100.00%

FIGURES

Figure 1:	Glenelg Phase 2 Draft Plan
Figure 2:	Site Location Plan
Figure 3:	Boundary Road Network
Figure 4:	2018 Existing Traffic Volumes
Figure 5:	Glenelg Phase 1 Background Traffic Volumes
Figure 6:	Edgewood Greens Background Traffic Volumes
Figure 7:	2025 Future Background Traffic Volumes
Figure 8:	2030 Future Background Traffic Volumes
Figure 9:	Trip Distribution
Figure 10:	Trip Assignment
Figure 11:	2025 Future Total Traffic Volumes
Figure 12:	2030 Future Total Traffic Volumes



LAND USE SUMMARY			
LAND USE	LOTS / BLOCKS	UNITS	AREA
SINGLE DETACHED - 12.2m LOTS	001-022, 072-083	32	1.26ha
SINGLE DETACHED - 11.6m LOTS	021-025, 043-070	18	0.77ha
SINGLE DETACHED - 10.1m LOTS	026-042, 071	33	1.06ha
TOWNHOUSES - 6.5m UNITS	084-093	66	1.48ha
PARTIAL LOTS (INCLUDING BLOCKS 131-132 FROM 231 GLENELG STREET - PHASE 1 - DRAFT PLAN - MAR. 24/2020)	094-096	(6)	0.07ha
PARK	097	-	0.35ha
WALKWAYS / TRAILS	098-100	-	0.12ha
OPEN SPACE	101	-	9.78ha
STORMWATER MANAGEMENT AREA	102	-	1.22ha
FUTURE RIGHT OF WAY	103	-	0.07ha
RIGHT OF WAY	-	-	2.18ha
TOTALS		149 (155)	18.36ha

LEGAL DESCRIPTION

PART OF LOTS 225 AND 226
CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
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
2358737 ONTARIO 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 - OLS
SCHAEFFER DZALDOV BENNETT LTD.
P: 416-987-0101

KEY PLAN

Subject Site

NORTH

SCALE
0 0.3 0.6 0.9 1.2km

LEGEND

RIGHT OF WAY LINE

BLOCK LINE

LOT LINE

PROJECT BOUNDARY LINE

PARCEL FABRIC

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	E. AS SHOWN	J. AS SHOWN	
B. AS SHOWN	F. AS SHOWN	K. ALL MUNICIPAL SERVICES AS REQUIRED	
C. AS SHOWN	G. AS SHOWN	L. AS SHOWN	
D. 83 SINGLE DETACHED LOTS & 64 TOWNHOUSE UNITS	H. MUNICIPAL WATER SUPPLY L. LOAM/SILT LOAM		

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
SEPT. 24, 2020

FILE No.
15184H

SCALE
1:1,000
(ARCH D)

DRAWN BY
M.M.

CHECKED BY
K.M.

OTHER

PROJECT

231 GLENELG STREET
PHASE 2
2358737 ONTARIO INC.
3621 HIGHWAY 7 EAST, SUITE 503
MARKHAM, ON L3R 0G6
P:(905) 479-9292 F:(905) 429-9165
WWW.FLATOGROUP.COM

FILE NAME

DRAFT
PLAN OF SUBDIVISION

DWG No.

1 of 1

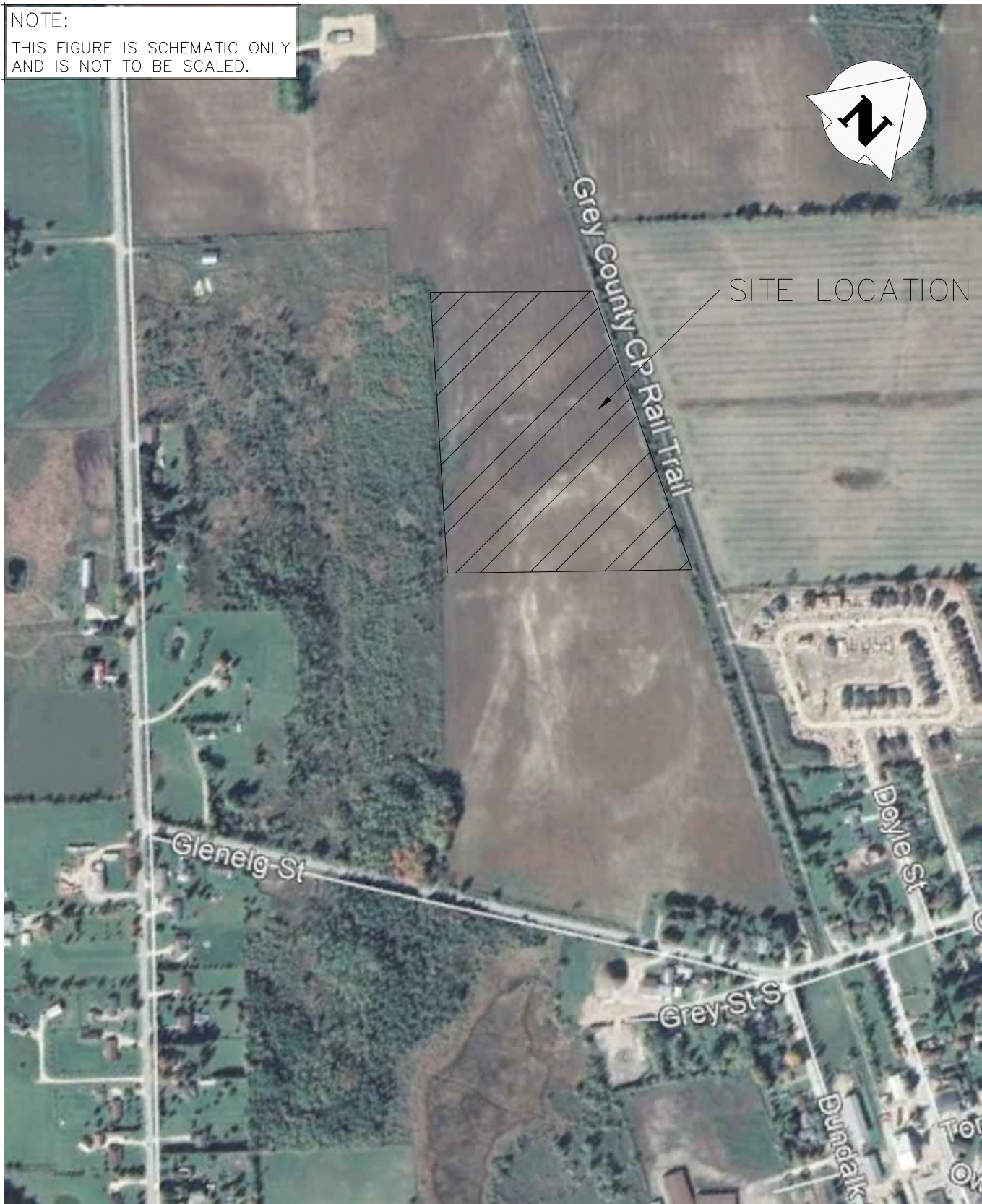
SCALE BAR

0 5 10 15 20 25 37.5 50 75 100m

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

N:\Southgate\231 Glenelg Street - 15184H\Drawings\Draft Plan - Phase 2\CAD\15184H - Draft Plan -
Phase 2 - 2020-09-24.dwg

NOTE:
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



Project
GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title
SITE LOCATION PLAN



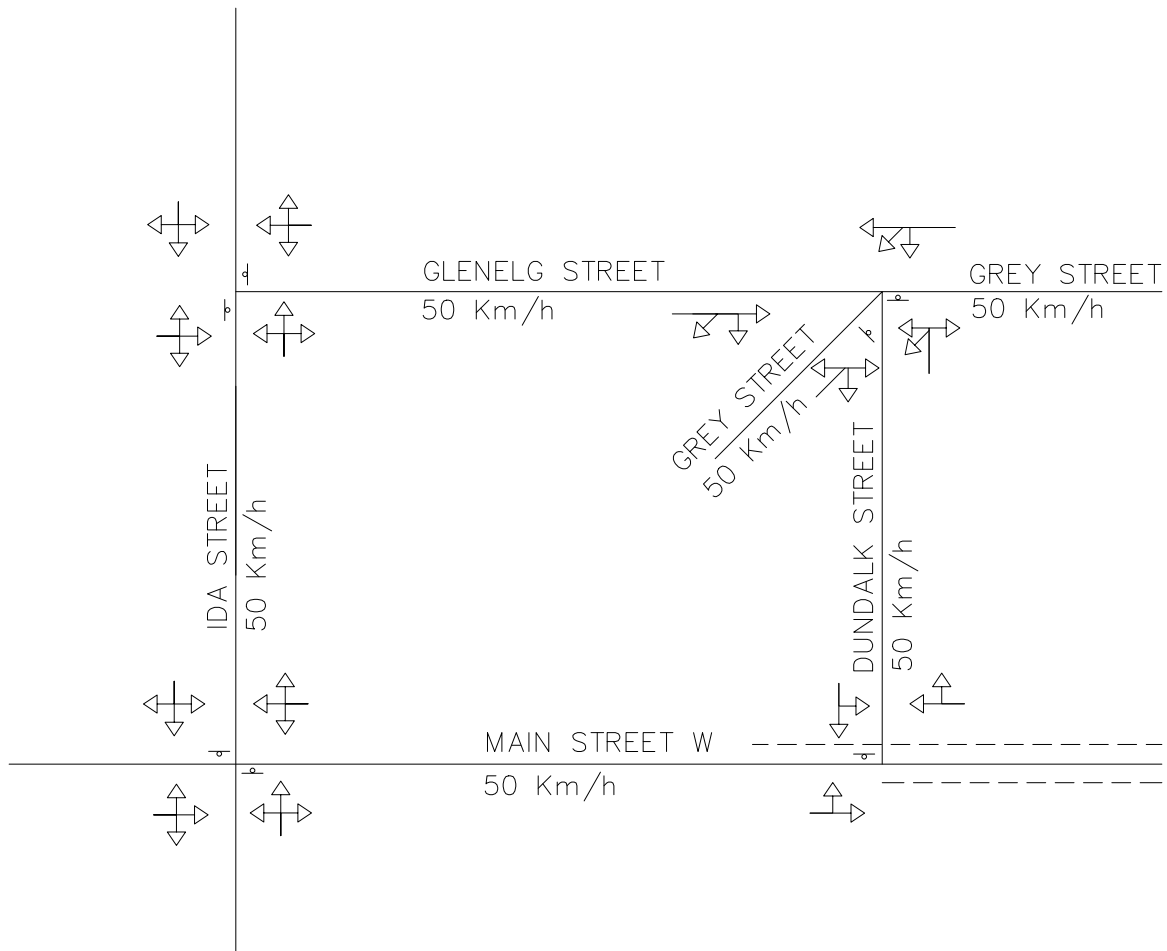
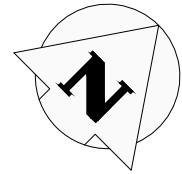
CROZIER
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705 446-3520 F
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 2

NOTE:

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LEGEND:

- ◻ STOP CONTROL
- AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION
- — — SIDEWALK

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

BOUNDARY ROAD NETWORK



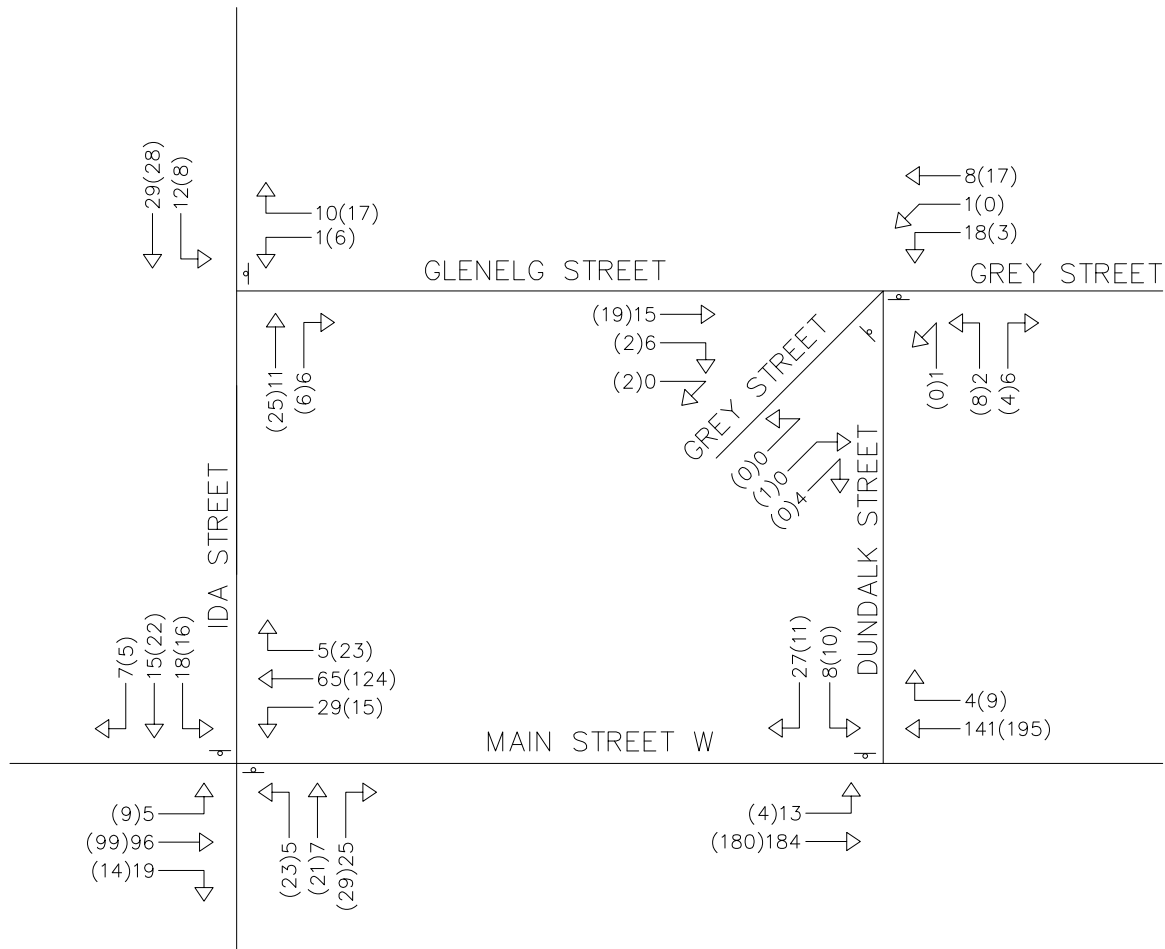
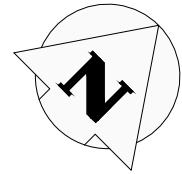
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			Dwg.	FIG. 3

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LEGEND:

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WEEKDAY AM(PM)
TRIP DISTRIBUTION

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

2018 EXISTING VOLUMES



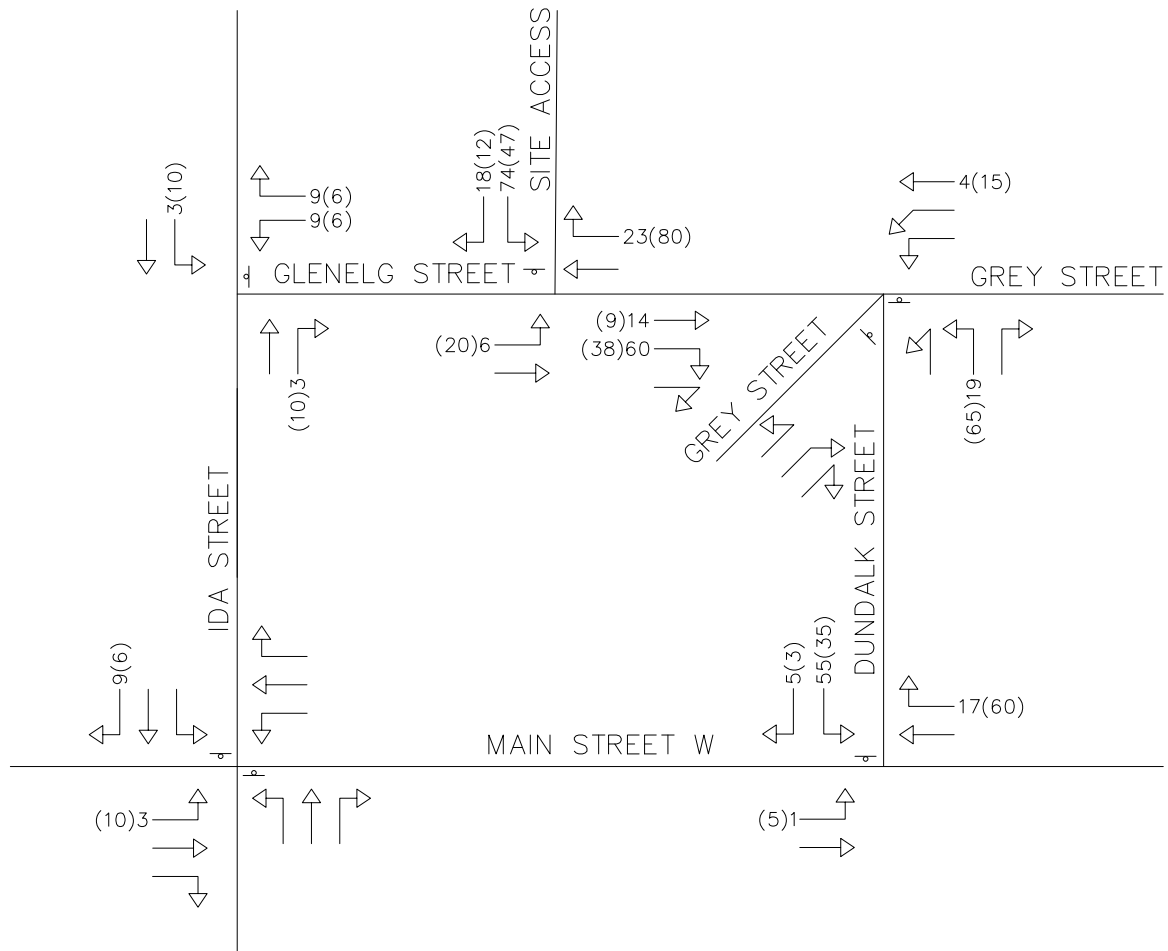
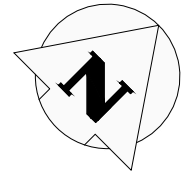
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Drawn	A.J.D.	Design	T.W.	Project No.	1060-5545
Check	T.W.	Check	M.F.	Scale	N.T.S.
				Dwg.	FIG. 4

NOTE:

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LEGEND:

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

GLENELG PHASE 1
BACKGROUND TRAFFIC VOLUMES



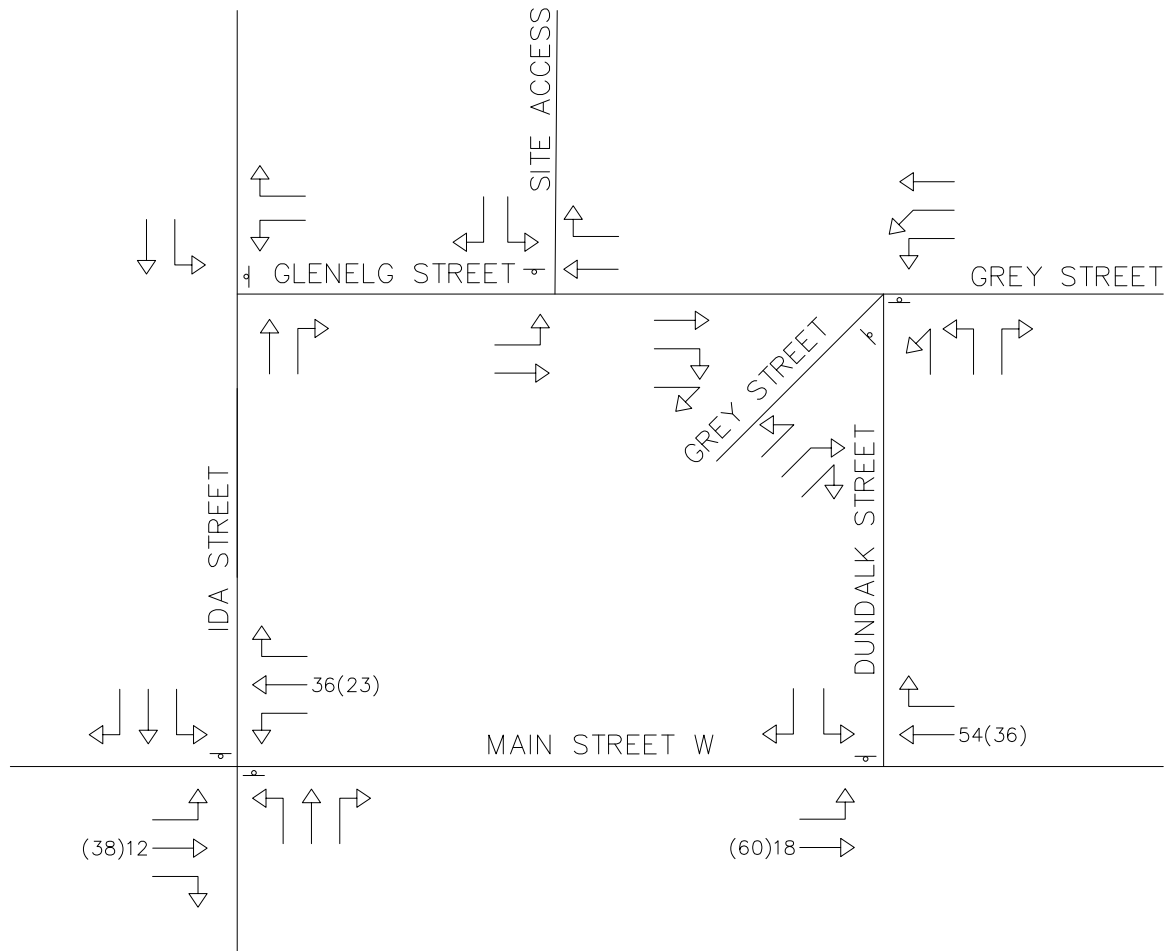
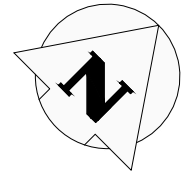
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 5

NOTE:

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LEGEND:

□ STOP CONTROL
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

EDGEWOOD GREENS
BACKGROUND TRAFFIC VOLUMES



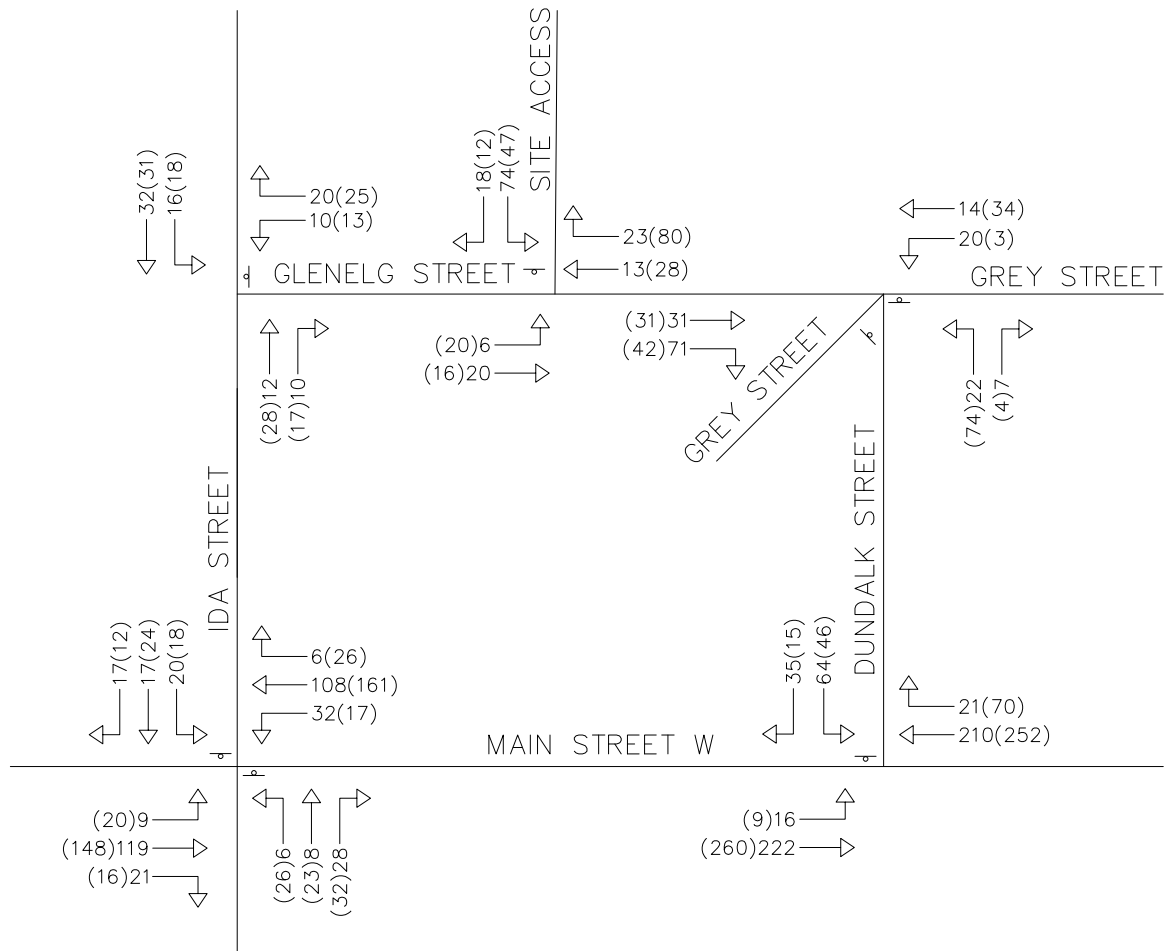
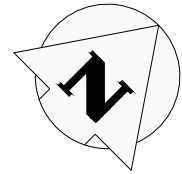
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 6


NOTE:

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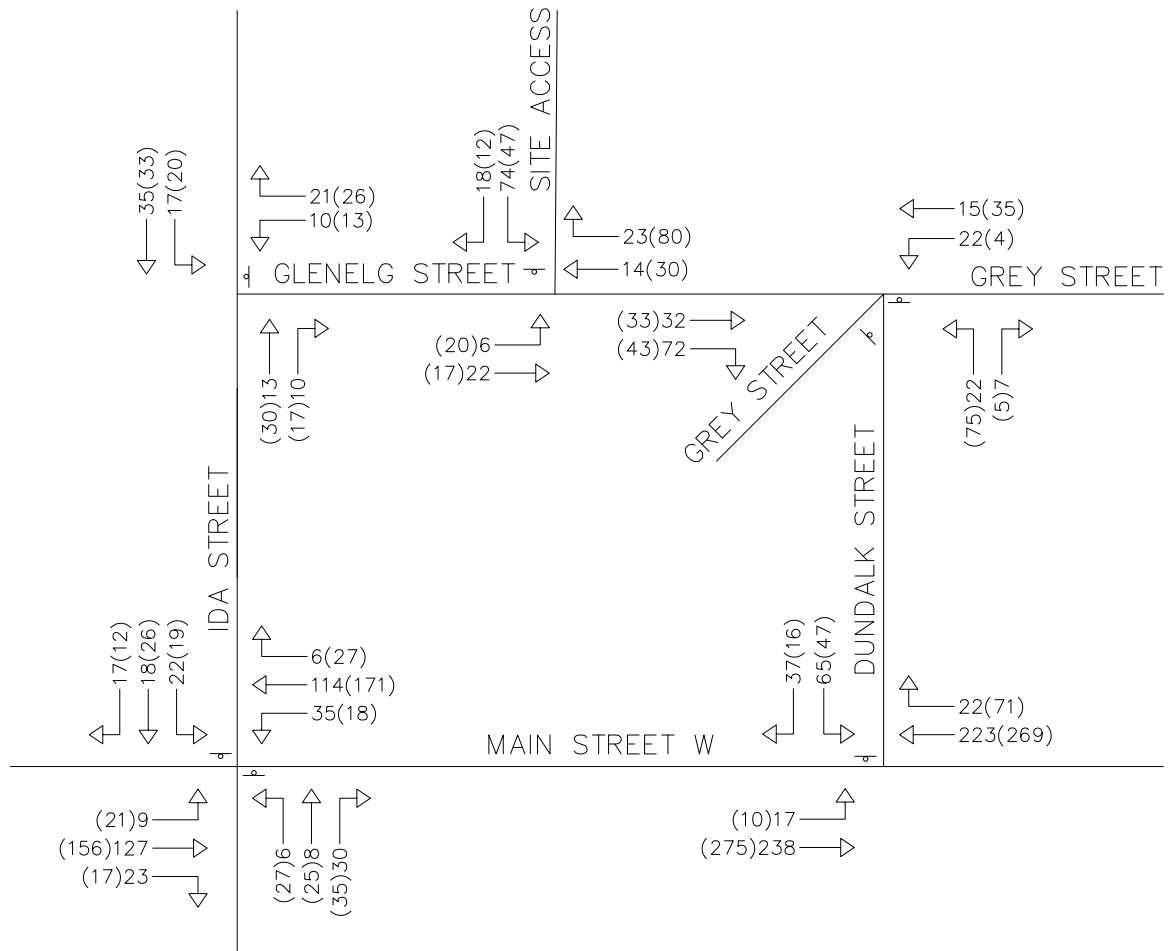
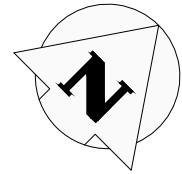
LEGEND:

STOP CONTROL
WEEKDAY AM(PM)
TRIP DISTRIBUTION

Project	GLENELG PHASE 2 TOWNSHIP OF SOUTHGATE		<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>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</div></div></div>			
Title	2025 FUTURE BACKGROUND TRAFFIC VOLUMES		Drawn S.K.	Design	Project No.	1060-5545
	Check M.F.	Check	Scale N.T.S.	Dwg.	FIG. 7	

NOTE:

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LEGEND:

d STOP CONTROL
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

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TOWNSHIP OF SOUTHGATE

Title

2030 FUTURE BACKGROUND
TRAFFIC VOLUMES



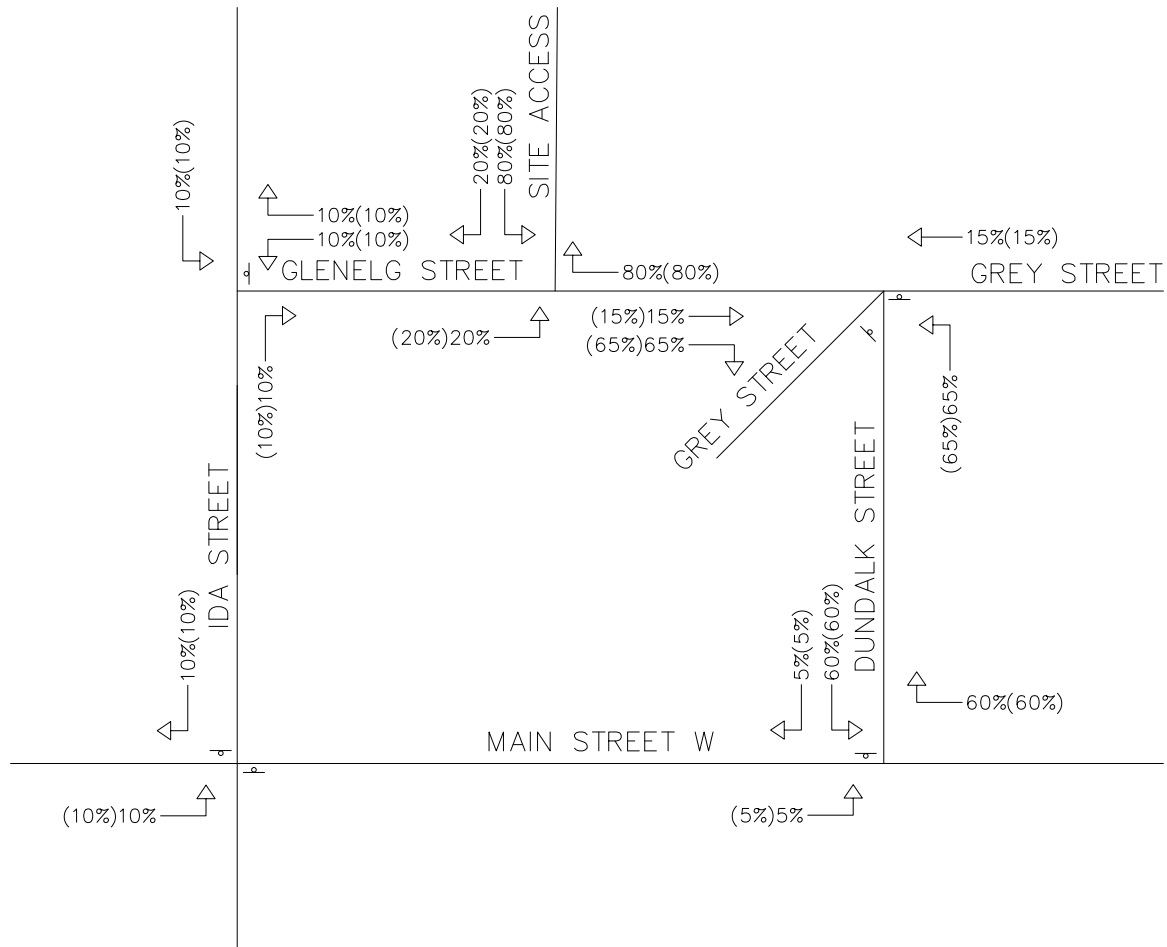
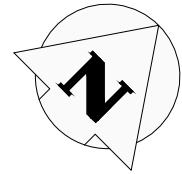
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 8

NOTE:

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LEGEND:

 STOP CONTROL
 AM(PM) WEEKDAY AM(PM)
 TRIP DISTRIBUTION

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

TRIP DISTRIBUTION



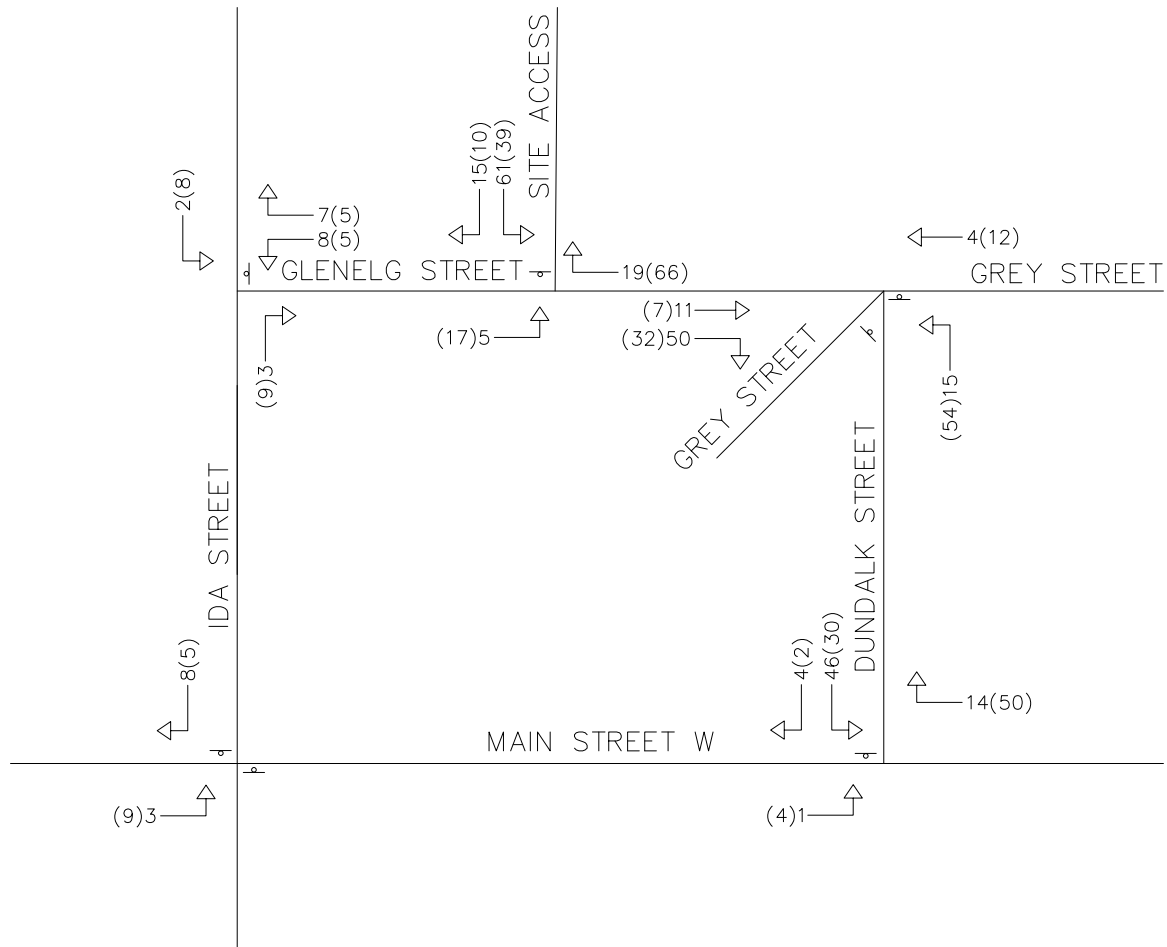
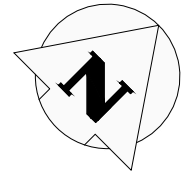
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 9

NOTE:

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AND IS NOT TO BE SCALED.



LEGEND:

⊥ STOP CONTROL
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

TRIP ASSIGNMENT



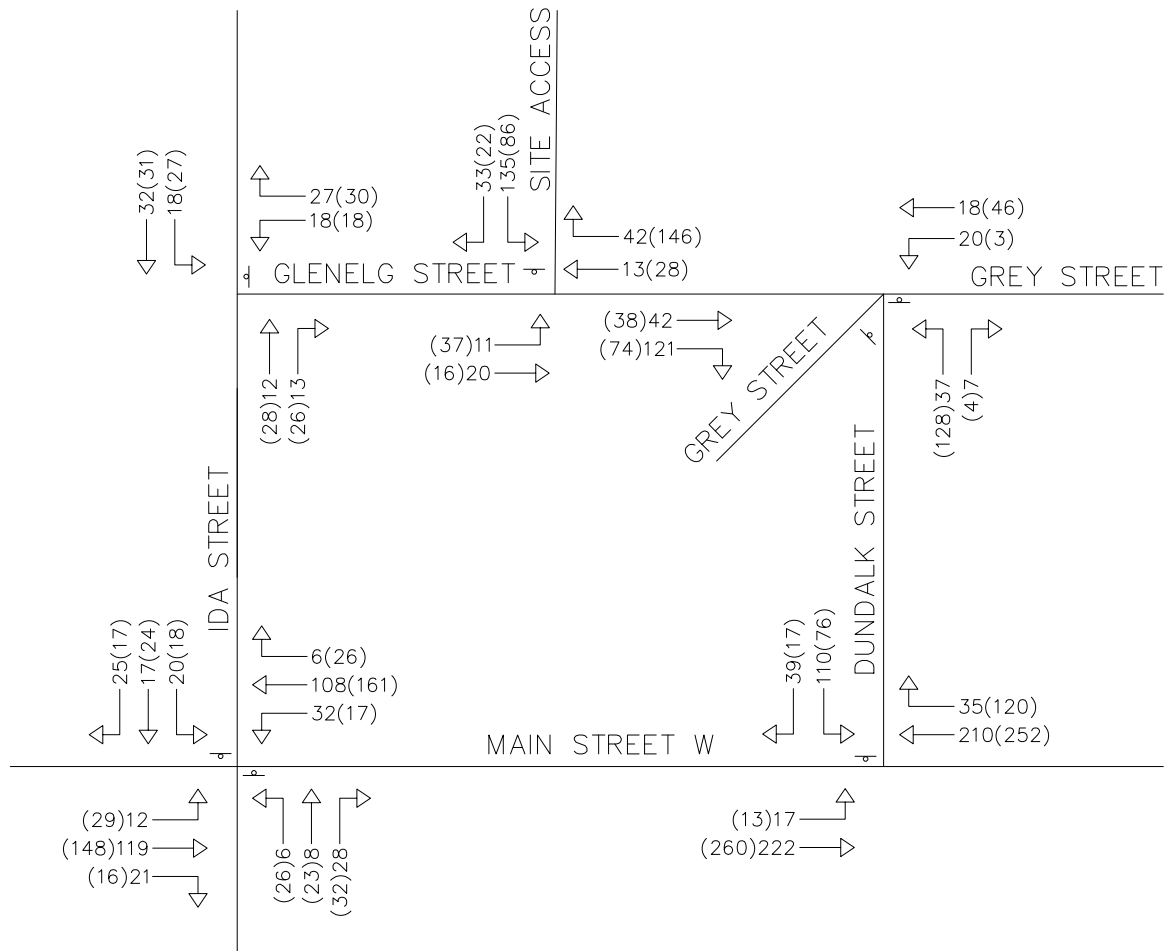
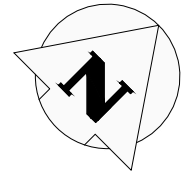
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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 10


NOTE:

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AND IS NOT TO BE SCALED.



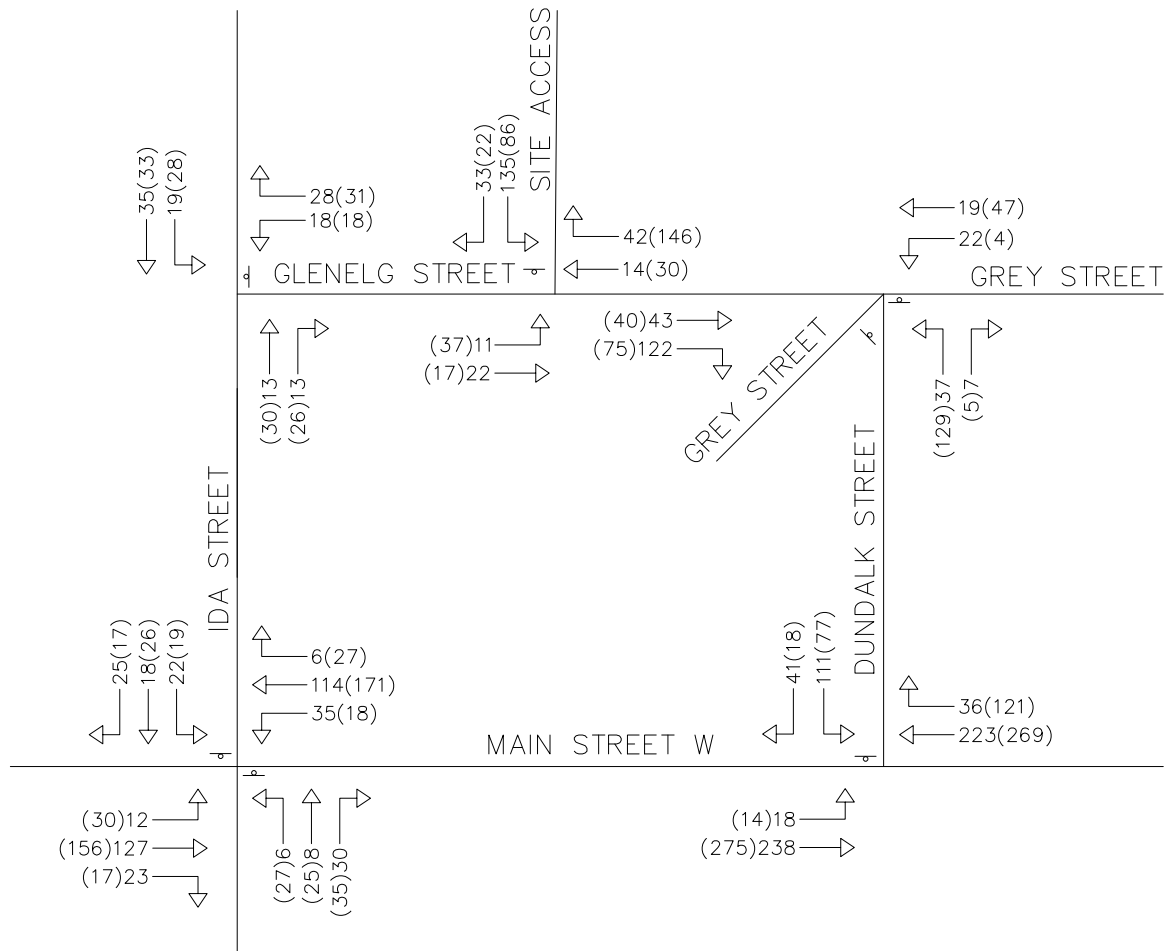
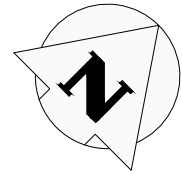
LEGEND:

STOP CONTROL
WEEKDAY AM(PM)
TRIP DISTRIBUTION

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Title	2025 FUTURE TOTAL TRAFFIC VOLUMES		Drawn S.K.	Design	Project No.	1060-5545
	Check M.F.	Check	Scale N.T.S.	Dwg.	FIG. 11	

NOTE:

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AND IS NOT TO BE SCALED.



LEGEND:

STOP CONTROL
WEEKDAY AM(PM)
TRIP DISTRIBUTION

Project

GLENELG PHASE 2
TOWNSHIP OF SOUTHGATE

Title

2030 FUTURE TOTAL
TRAFFIC VOLUMES



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Drawn	S.K.	Design	Project No.	1060-5545
Check	M.F.	Check	Scale	N.T.S.
			Dwg.	FIG. 12