TRAFFIC IMPACT STUDY

WARREN D. SINCLAIR CONSTRUCTION LTD

MEAFORD HAVEN DEVELOPMENT
206080 HIGHWAY 26

MUNICIPALITY OF MAYFORD
COUNTY OF GREY

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
1 FIRST STREET
COLLINGWOOD, ONTARIO
L9Y 4R3

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CROZIER
CONSULTING ENGINEERS

Identification	Date	Description of Work
Rev. 0	February 2011	TIS Submission
Rev. 1	December 2021	Updated TIS for the MTO and Municipality

1 EXECUTIVE SUMMARY

C.F. Crozier & Associates Inc. (Crozier) was retained by Warren D. Sinclair Construction Ltd. ("the Developer") to update the Traffic Impact Study (TIS) in support of the Redline Draft Application for the Meaford Haven Development (the site) in the Municipality of Meaford, County of Grey.

The development is proposed to consist of 110 apartments, 206 attached family homes and approximately 8,000 square feet of commercial space (743 metres squared). Access to the site is proposed through a connection to Highway 26, as well as connections to Ridge Road through extensions of the existing Ridge Creek Drive and Fairway Avenue roadways.

The analysis was completed using the Development Concept Plan prepared by IBI Group (March 2021) which shows build-out of all development area indicated within the Official Plan. It is acknowledged that the limits of development and associated Concept Plan are subject to change based on the findings of the Environmental Impact Study. These changes will be addressed as required during the subsequent Site Plan Applications for the specifics Blocks.

For the purpose of the analysis, it was assumed that the development would be built-out by 2023. Accordingly, the horizon years of 2023, 2028 and 2033 have been assessed representing full build-out, as well as five and ten years beyond full build-out.

Analysis of the study intersections indicated the following:

- Under the existing conditions the intersections of Highway 26 and 7th Line and Highway 26 and Ridge Road are operating at a level of service (LOS) "C" or better.

- Under 2033 future background traffic volume conditions, the intersection of Highway 26 and 7th Line is anticipated to operate at a LOS of "E" or better; and the intersection of Highway 26 and Ridge Road is expected to operate at LOS of "C" or better.

- The development is proposed to generate 236 and 216 two-way primary trips in the weekday a.m. and p.m. peak hours, respectively, and 53 and 29 two-way pass-by trips in the a.m. and p.m. peak hours, respectively.

- Under the 2033 future total traffic volume conditions, the proposed site access does not warrant signalization. Signal warrants were completed based on the average hour volumes and the methodology described in the Ontario Traffic Manual (OTM) Book 12, Justification 7 – Projected Volumes.

- The requirement for left-turn lanes was reviewed for the 2033 horizon years. The left-turn warrants resulted in the following key findings: the eastbound traffic volumes warrant a left-turn lane with a storage length of 15 meters; and the westbound traffic volumes warrant a left-turn lane with a storage length of 25 meters.

- Under future total traffic conditions, the intersection of Highway 26 and 7th Line is expected to continue to operate at a LOS of "E" or better; Highway 26 and Ridge Road is expected to operate at a LOS of "D" or better and Highway 26 and the Site Access is expected to operate at a LOS of "E" or better. This analysis assumed the construction of the left-hand turn lanes at the site access.

    - The addition of the site generated traffic at the intersections of Highway 26 and 7th Line and Highway 26 and Ridge Road is expected to result in a maximum increase in

the control delay of 6.9 seconds and a maximum increase in volume-to-capacity ratio of 0.04, associated with the southbound approach, when compared to the future background traffic operations.

- The intersection of Highway 26 and the Site Access is expected to have a maximum increase in the control delay of 16.1 seconds and an increase in the volume to capacity ratio of 0.13 associated with the southbound movement from the Loon Call site.

- The proposed development will result in the addition of traffic volumes to local roads east and south of the site. During the critical weekday p.m. peak hour, the addition of traffic volumes on Ridge Road in both directions is forecasted to be 57 vehicles, which equates to approximately one vehicle per minute; or one vehicle every 60 seconds. This additional traffic will not materially alter the urban local nature of the roadways.

The available sight distance at the Highway 26 site access exceeds the minimum sight distance requirements. Accordingly, the proposed development can be supported from a sight distance perspective.

The analysis contained within this report was prepared using the most recent Development Concept Plan (IBI Group, March 2021). Any minor revisions to the development concept are not expected to affect the conclusions contained with this report. It is acknowledged that the limits of development and associated Concept Plan are subject to change based on the findings of the Environmental Impact Study. These changes will be addressed as required during the subsequent Site Plan Applications for the specifics Blocks.

In conclusion, the Meaford Haven development applications can be supported for a traffic operations and safety perspective.

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2 INTRODUCTION

2.1 Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Warren D. Sinclair Construction Ltd. ("the Developer") to update the Traffic Impact Study (TIS) in support of the Redline Draft Plan Application for the Meaford Haven Development (the site) in the Municipality of Meaford, County of Grey.

Crozier completed a TIS in February 2011 to support the original Draft Plan Application. This TIS Update will be completed based on the scope of the original TIS, the MTO TIS Guidelines and the agreed upon Terms of Reference with MTO staff (**Appendix A**). Other key references for this TIS include:

- Loon Call Development Traffic Impact Study
- Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition
- Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR)
- Ontario Traffic Manual Book 12 – Traffic Signals

The analysis contained within this report was prepared using the most recent Development Concept Plan (IBI Group, March 2021). Any minor revisions to the development concept are not expected to affect the conclusions contained with this report. It is acknowledged that the limits of development and associated Concept Plan are subject to change based on the findings of the Environmental Impact Study. These changes will be addressed as required during the subsequent Site Plan Applications for the specifics Blocks.

2.2 Purpose

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

The study reviews the following aspects of the proposed 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
- Required road improvements including auxiliary turn-lane requirements and signal warrants

2.3 Development Proposal

The Development Concept Plan (IBI Group, March 2021) proposes the development of 206 townhouse units, three apartment buildings with 110 units and a commercial block with a gross floor area (GFA) of approximately 8,000 square feet (743 metres squared).

Access to the site is proposed through a connection to Highway 26, as well as connections to Ridge Road through extensions of the existing Ridge Creek Drive and Fairway Avenue roadways. Pedestrian connections will be provided throughout the site.

Figure 1a contains the Redline Draft Plan (Crozier, December 2021) and **Figure 1b** contains the Development Concept Plan (IBI Group, March 2021).

3 EXISTING CONDITIONS

3.1 Development Lands

The property is approximately 15.8 hectares (39 acres) and is bounded by Highway 26 to the north, a residential area known as Ridge Creek to the east, the Meaford Golf Course to the south, and agricultural lands to the west. The site is largely undeveloped and was formerly used as a garden centre with the remnants of existing buildings remaining onsite adjacent to Highway 26. The site's location is illustrated in **Figure 2**.

3.2 Key Intersections

The study analyzes the operations of the following intersections:

- Highway 26 and Ridge Road;
- Highway 26 and 7th Line; and
- Highway 26 and the proposed Site Access

The Highway 26 and Ridge Road intersection is a T-intersection with stop control on the south approach of Ridge Road. Similarly, the intersection of Highway 26 and 7th Line is a four-legged intersection with stop control on the north and south approaches. **Figure 3** illustrates the existing traffic controls and lane configurations at each intersection.

3.3 Boundary Road Network

The boundary road network is described in **Table 1**. The information included below was obtained from the Municipality of Meaford Official Plan "Schedule C1 – Transportation", included as **Appendix B**, and the Grey County GIS Mapping.

Table 1: Boundary Road Network

Roadway	Highway 26	7th Line	Ridge Road
Direction	East-West	North-South	North-South
Jurisdiction	Ministry of Transportation	Municipality of Meaford	Municipality of Meaford
Classification	2B Arterial Highway	Local	Local ("Proposed Collector Road" in Draft TMP Update)
Speed Limit	80 km/h at 7th Line 70 km/h at Site Frontage 50 km/h at Ridge Road	80 km/h[1]	50 km/h
Number of Lanes	2	2	2

Note[1]: Grey County GIS Mapping labels 7th Line as a speed of 80 km/hr.

No pedestrian facilities or cycling facilities are present on the study roadways or at the study intersections.

3.4 Traffic Data

Due to the COVID-19 pandemic and the ongoing lockdown at the time that this study was commenced, historical traffic data was utilized to establish the 2021 traffic volumes at the study intersections.

Traffic volumes were obtained from MTO staff for the intersection of Highway 26 and 7th Line, and for Ridge Road, south of Highway 26. Additionally, turning movement counts at Highway 26 and Ridge Road collected by Ontario Traffic Inc. (OTI) in October 2014 were previously commissioned by Crozier staff and available for reference.

Turning movement counts at the intersection of Highway 26 and 7th Line were undertaken from 7:00 a.m. to 10:00 a.m., 11:00 a.m., to 2:00p.m., and 3:00 p.m. to 6:00 p.m. on Wednesday August 16th, 2017. The Ridge Road sideroad counts were completed by the MTO the week of July 12, 2014 to July 18, 2014. Turning movement counts at the intersection of Highway 26 and Ridge Road were undertaken from 7:00 a.m. to 11:00 a.m. and 3:00 p.m. to 7:00 p.m. on Friday, October 17, 2014. The volumes on Highway 26 were compared to the 2019 traffic volumes adjacent to the subject lands collected by JD Engineering as part of the Loon Call TIS, and the MTO side-road volumes on Ridge Road were compared to the October 2014 traffic data previously commissioned by Crozier.

In aggregate, the 2017 traffic volumes on Highway 26, as obtained from the MTO, were higher than those undertaken in 2019 by JD Engineering. The Highway 26 and Ridge Road traffic volumes collected by OTI were higher than those provided by the MTO. Accordingly, the traffic volumes at Highway 26 and 7th Line were used as the base data for the intersection and were used to establish the through volumes at the site access and at Highway 26 and Ridge Road. The October 2014 turning movement counts completed by OTI were used as a base for the turning volumes to and from Ridge Road. A growth rate of 0.5 percent was used to forecast the 2021 existing traffic volumes. Discussions

As noted, negative growth was observed from 2017 to 2019. Similarly, an overall negative trend in growth was observed based on MTO Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) volumes for the segment of Highway 26 to the west of the Meaford limits from 2012 to 2016. Based on the negative trend in growth historically on Highway 26, a growth rate of 0.5 percent, compounded per annum, was used to establish 2021 base traffic volumes.

Traffic data has been attached as **Appendix C**, and relevant excerpts from the Loon Call TIS report have been included as **Appendix D**.

3.5 Intersection Operations

The operations of the study intersections were analyzed based on the traffic volumes illustrated in **Figure 4**. A peak hour factor of 0.88 was used for the study intersections, as directed by MTO staff. Level of service (LOS) definitions have been included in **Appendix E**, with detailed capacity analysis worksheets included in **Appendix F. Table 2** outlines the existing traffic operations at the study intersections.

Table 2: 2021 Existing Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	B	14.0 s (SB)	0.18 (SB)
		P.M.	C	24.4 s (SB)	0.52 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	11.8 s	0.07 (NB)
		P.M.	C	16.1 s	0.10 (NB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 intersections operate at a LOS "C" or better under existing traffic volume conditions. The maximum control delay was found to be 24.4 seconds and the maximum volume-to-capacity ratio was found to be 0.52, both of these metrics are associated with the southbound movements on 7th Line. These metrics indicate that the study intersections have reserve capacity for future increase in traffic volumes.

4 FUTURE BACKGROUND CONDITIONS

4.1 Study Horizon Years

The development is anticipated to be built-out by 2023, accordingly, the horizon years of full build-out (2023) as well as five (2028) and ten (2033) years beyond full build-out were assessed.

4.2 Growth Rate

Historical MTO Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) traffic data from 2012 to 2016 reflected negligible growth on the section of Highway 26 to the west of the Municipality of Meaford boundary. It is not considered appropriate to apply a negative or zero growth rate, accordingly, a one percent growth rate was applied to forecast the 2023, 2028 and 2033 future background traffic volumes on the boundary road network. This is also consistent with the assumptions used in the Loon Call TIS.

4.3 Background Development Trip Generation (Loon Call)

The Loon Call Development is located directly north of the site and includes a proposed site access directly across from Meaford Haven proposed site access on Highway 26. An addendum has been proposed that would change the units to 31 single family homes and 218 attached homes, however the trips generated by the addendum generate less trips than the original proposal of 113 detached and 112 attached homes. To be conservative, the unit count from the original report has been referenced in this report. It has been assumed that the lands will be fully built out and occupied by the 2023 horizon year. Excerpts from the Loon Call TIS have been included as **Appendix D.**

As noted in the Loon Call TIS, the trip generation of the proposed development was established using the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition. The Loon Call trip generation is summarized in **Table 3**, as extracted from the original TIS**.**

Table 3: Background Development Trip Generation

Development	Unit Type	Number of Units	Roadway Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Loon Call Development	LUC 210: Single Family Detached Housing	113	Weekday A.M.	22	64	86
			Weekday P.M.	72	43	115
	LUC 220: Multifamily Housing (Low-Rise)	112	Weekday A.M.	12	42	54
			Weekday P.M.	42	24	66
Total			**Weekday A.M.**	**34**	**106**	**140**
			Weekday P.M.	**114**	**67**	**181**

The trips generated by the Loon Call Development were assigned to the boundary road network based on the trip distribution described in the Loon Call TIS report. The trips generated by the Loon Call Development are included in **Figure 5**.

4.4 Roadway Improvements

Based on a review of Ontario's Highway Program and the Municipality of Meaford's Transportation Master Plan (May 2021), no road improvements have been identified in the study area that would impact intersection and road capacity.

4.5 Intersection Operations

The 2023, 2028, and 2033 future background traffic operations are summarized in **Table 4**, **Table 5**, and Table 6, respectively. The operations were based on the future background traffic volumes illustrated in **Figure 6, Figure 7, and Figure 8** for 2023, 2028, and 2033 horizon years, respectively. The LOS definitions and capacity analysis worksheets have been included in **Appendix E** and **Appendix F**, respectively.

Table 4: 2023 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	B	15.0 s (SB)	0.20 (SB)
		P.M.	D	28.8 s (SB)	0.58 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	13.4 s	0.09 (NB)
		P.M.	C	19.4 s	0.13 (NB)
Highway 26 and Loon Call Site	Stop	A.M.	C	15.7 s	0.26 (SB)
		P.M.	D	25.1 s	0.30 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 5: 2028 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	C	15.6 s (SB)	0.22 (SB)
		P.M.	D	33.9 s (SB)	0.65 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	13.9 s	0.10 (NB)
		P.M.	C	20.7 s	0.15 (NB)
Highway 26 and Loon Call Site	Stop	A.M.	C	16.3 s (SB)	0.28 (SB)
		P.M.	D	27.1 s (SB)	0.32 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 6: 2033 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	C	16.4 s (SB)	0.24 (SB)
		P.M.	E	42.2 s (SB)	0.73 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	14.2 s	0.11 (NB)
		P.M.	C	22.1 s	0.17 (NB)
Highway 26 and Loon Call Site	Stop	A.M.	C	17.0 s (SB)	0.29 (SB)
		P.M.	D	29.6 s (SB)	0.34 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 intersection of Highway 26 and 7th Line is expected to operate with a LOS "E" or better under 2033 future background traffic volume conditions. The maximum control delay of 42.2 seconds and maximum volume-to-capacity ratio of 0.73 (SB) indicates that the intersection has reserve capacity for increases in traffic volumes.

The intersection of Highway 26 and Ridge Road is expected to operate with a LOS "C" or better under 2033 future background traffic volume conditions. The maximum control delay of 22.1 seconds and maximum volume-to-capacity ratio of 0.17 (NB) indicates that the intersection is expected to operate well with reserve capacity for increases in traffic volumes.

The intersection of Highway 26 and the Loon Call Site is expected to operate with a LOS "D" or better under 2033 future background traffic volume conditions. The maximum control delay of 29.6 seconds and maximum volume-to-capacity ratio of 0.34 (SB) indicates that the intersection is expected to operate with reserve capacity for increases in traffic volumes.

5 SITE GENERATED TRAFFIC

5.1 Trip Generation

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The trip generation of the proposed development was forecasted using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition for the following land uses:

- LUC 220: Multifamily Housing (Low-Rise)
- LUC 221: Multifamily Housing (Mid -Rise)
- LUC 820: Shopping Centre

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. Land Use Category 820 "Shopping Centre" was used to forecast a pass-by trip percentage of 34 percent for the p.m. peak period. A pass-by percentage was not available for the a.m. peak hour; accordingly, the p.m. pass-by percentage of 34 percent was applied.

The intent of the commercial space is to service those living within the development. It is expected that 70 percent of the primary trips will come from within the proposed development. The remaining 30 percent of primary trips generated were applied and analysed as primary trips on the external road network.

Relevant excerpts from the ITE Trip Generation Manual, 10th Edition and ITE Trip Generation Handbook, 3rd Edition have been included in **Appendix G**. The forecasted trip generation for the proposed development is summarized in **Table 7.**

Table 7: Trip Generation

Land Use Category	No. Units	Peak Hour	Number of Trips		
			Inbound	Outbound	Total
LUC 220: Multifamily Housing (Low-Rise)	206	A.M.	22	73	95
		P.M.	70	42	112
LUC 221: Multifamily Housing (Mid-Rise)	110	A.M.	10	28	38
		P.M.	30	19	49
LUC 820: Shopping Centre (Primary)	8,000 sq.ft.	A.M.	64	39	103
		P.M.	26	25	55
LUC 820: Shopping Centre (Pass-By)		A.M.	33	20	53
		P.M.	14	15	29

5.2 Trip Distribution and Assignment

The residential trips generated by the proposed development were distributed to the boundary road network based on the location of employment, retail, and service destinations. The downtown core of Meaford is the nearest and most convenient location for the aforementioned destinations. Accordingly, 80 percent of trips were distributed to Meaford and areas east, with the balance distributed to the west towards the City of Owen Sound and the Land Force Centra Areal Training Centre Meaford.

The distribution between the site accesses was selected to reflect the layout and density of residential areas within the site. The residential trip distribution and corresponding assignment are illustrated in **Figures 9 and 12**, respectively.

The trips generated by the commercial building were distributed to the boundary road network based on the location of residential areas. As noted, previously, 70 percent of trips were expected to be contained within the site. Of the remaining 30 percent, 80 percent of trips were assigned to the east towards the urban area of Meaford, with the remaining 20 percent assigned to the west to

capture residential areas between Owen Sound and Meaford. The primary commercial trip distribution is illustrated in **Figure 10**.

The pass-by trips generated by the proposed commercial development were distributed to the boundary road network based on the existing volume of traffic passing the proposed development on Highway 26. An overall pass-by distribution was applied proportional to the existing traffic volumes on Highway 26. Accordingly, 50 percent of the pass-by trips were assigned to the east on Highway 26 and 50 percent were applied to the west. **Figure 11** illustrates the pass-by trip distribution. **Figure 13** illustrates the commercial primary and pass-by trip assignment.

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 12 and 13** being superimposed on the future background traffic volumes in **Figures 6, 7, and 8**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 14, 15, and 16** for the 2023, 2028, and 2033 horizon years, respectively.

6.2 Signal Justification

A signal warrant analysis was undertaken for the proposed site access based on the 2033 future total traffic volumes. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justification 7 – Projected Volumes was selected as the most appropriate warrant with which to assess the intersection. Average hour volumes were established based on the 2033 future total peak hour traffic volumes illustrated in **Figure 16**. For future intersections and planned developments, the minimum volume threshold volumes must be increased by 50 percent. The below section percentages are based on 150 percent of the minimum threshold.

The results of the signal warrant analysis are summarized in **Table 8** and the warrant sheets have been included in **Appendix H**. It can be seen that signals are not warranted based on Justifications 7.

Table 8: Signal Warrant Analysis Results
2033 Traffic Volume Conditions

Justification		Section Percent	Signal Justified
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches	69%	No
	B. Vehicle Volume, Along Minor Streets	45%	
2. Delay to Cross Traffic	A. Vehicle Volume, Along Major Streets	58%	No
	B. Combined Vehicle and Pedestrian Volume	65%	

Note: Section Percent is based on 150% of the base threshold volumes as the warrant is for a proposed intersection.

6.3 Auxiliary Lane Assessment

An auxiliary left-turn lane warrant was completed at the Highway 26 site access based on the methodology described in the MTO Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR). The warrants were undertaken based on the 2033 future total weekday a.m. and p.m. traffic volumes. Highway 26 has

a posted speed limit of 70 km/h adjacent to the site access. Accordingly, a design speed of 90 km/h was used.

Auxiliary left-turn lane warrant charts have been included as **Appendix I**. **Table 9** summarizes the results of the left-turn lane warrants.

Table 9: Auxiliary Turn Lane Warrant at the Site Access

Intersection	Peak Hour	V_A	% Left Turns in V_A	V_O	Warranted	Minimum Storage	Reference
Eastbound							
Highway 26 & Site Access	A.M.	287	2%	325	No	N/A	9A-19
	P.M.	483	5%	550	Yes	15 m	9A-19
Westbound							
Highway 26 & Site Access	A.M.	325	14%	287	Yes	15 m	9A-23
	P.M.	685	9%	483	Yes	25 m	9A-24

As summarized, auxiliary left turn lanes are warranted in the 2033 horizon year. Exact details relating to the proposed taper, storage and deceleration lengths will be determined through detailed design. **Table 10** outlines the requirements for storage, deceleration, and taper lengths per the left-turn lane warrants and the MTO Design Supplement for TAC (April 2020). The requirements for taper and parallel lengths for left-turn lanes are described in 9-R. Relevant excerpts from the MTO Design Supplement to TAC have been included as **Appendix I**.

Table 10: Site Access Auxiliary Left-turn Lane Requirements

Approach	Design Speed	Storage Length	Deceleration Length	Taper Length	MTO Design Supplement Reference
Eastbound	90 km/h	25 m	60 m	145 m	Exhibit 9-R
Westbound	90 km/h	30 m			

The requirement for left-turn lanes is consistent with the recommendations of the Loon Call TIS. It is noted that the parallel and taper lengths differ slightly due to the change in total traffic volumes and the changes to the deceleration and taper length requirements contained in the April 2020 version of the MTO Design Supplement for TAC (previously December 2017). As noted in the Loon Call TIS, the construction cost for the proposed left-turn lanes should be split between the LC Development Group Inc. and Warren D. Sinclair Construction Ltd.

6.4 Intersection Operations

The 2023, 2028, and 2033 future total traffic operations are summarized in **Table 11, Table 12,** and **Table 13,** respectively. The operations were based on the future background traffic volumes illustrated in **Figures 14, 15, and 16**. This analysis assumed the construction of the warranted left-hand turning lanes. The LOS definitions are included in **Appendix E**, and the detailed capacity analysis worksheets are included in **Appendix F**.

Table 11: 2023 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	C	15.6 s (SB)	0.21 (SB)
		P.M.	D	32.0 s (SB)	0.62 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	14.2 s	0.13 (NB)
		P.M.	C	21.1 s	0.17 (NB)
Highway 26 and Site Access	Stop	A.M.	C	20.8 s (SB)	0.35 (SB)
		P.M.	E	36.7 s (SB)	0.41 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 12: 2028 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	C	16.4 s (SB)	0.23 (SB)
		P.M.	E	38.6 s (SB)	0.69 (SB)
Highway 26 and Ridge Road	Stop	A.M.	B	14.8 s	0.14 (NB)
		P.M.	C	22.6 s	0.19 (NB)
Highway 26 and Site Access	Stop	A.M.	C	22.0 s (SB)	0.36 (SB)
		P.M.	E	40.6 s (SB)	0.44 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 13: 2033 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service[1]	Control Delay	Maximum v/c ratio[2]
Highway 26 and 7th Line	Stop	A.M.	C	17.2 s (SB)	0.25 (SB)
		P.M.	E	49.1 s (SB)	0.77 (SB)
Highway 26 and Ridge Road	Stop	A.M.	C	15.1 s	0.14 (NB)
		P.M.	C	24.2 s	0.21 (NB)
Highway 26 and Site Access	Stop	A.M.	C	23.2 s (SB)	0.38 (SB)
		P.M.	E	45.7 s (SB)	0.47 (SB)

Note[1]: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note[2]: 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 of Highway 26 and 7th Line and Highway 26 and Ridge Road are expected to operate at a LOS "E" or better in the weekday a.m. and p.m. peak hours. The addition of the site generated traffic is expected to result in a maximum increase in control delay of 6.9 seconds, and a maximum increase in maximum volume-to-capacity ratio of 0.04 when compared to the future background traffic operations, this maximum change is associated with the southbound approach at 7th Line.

The site access is expected to operate with a LOS "E" under 2033 future total traffic volume conditions. The addition of the fourth leg and the development traffic results in an increase in maximum control delay of 16.1 seconds and an increase in volume-to-capacity ratio of 0.13, this change is associated with the southbound approach out of the Loon Call site.

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

6.5 Sight Distance Analysis

A sight distance analysis was completed to demonstrate that the proposed access provides sufficient stopping and intersection sight distance at the proposed Highway 26 site access. The minimum sight distance requirements were obtained from the TAC GDGCR. As noted previously, the section of Highway 26 fronting the site has an assumed design speed of 90 km/h, representing an industry standard increase of 20 km/h for higher speed roads.

Section 2.5 of the TAC GDGCR provides the minimum stopping sight distances for various design speeds on level roadways. For a design speed of 90 km/h, a minimum stopping sight distance of 160 metres is required.

Section 9.9 of the TAC GDGCR provides intersection sight distance for different intersection control types. For this access, the applicable cases Case B1 – "Left turns from the minor road" has the greatest sight distance requirement of 190 metres for 90 km/h design speed roads.

Relevant excerpts from TAC GDGCR have been included as **Attachment J**. The minimum and available sight distances are summarized in **Table 14**.

Table 14: Sight Distance

Access	Oncoming Traffic	Design Speed	Stopping Sight Distance		Intersection Sight Distance	
			Minimum Standard	Available Distance	Minimum Standard	Available Distance
Highway 26	Westbound	90 km/h	160 m	>200 m	190 m	>200 m
	Eastbound		160 m	>200 m	190 m	>200 m

As summarized above, the available sight distance exceeds the minimum sight distance requirements. Accordingly, the proposed development can be supported from a sight distance perspective.

6.6 Local Road Impacts

The proposed development will result in the addition of traffic volumes to local roads east and south of the site. During the critical weekday p.m. peak hour, the addition of traffic volumes on Ridge Road is forecasted to be 57 vehicles, which equates to approximately one vehicle per minute; or

one vehicle every 60 seconds. This additional traffic will not materially alter the urban local nature of the roadways.

7 Recommendations

The key recommendations contained within this report include:

- Eastbound left-turn lane with a 25-metre storage length, 60-metre deceleration length and 145-metre taper length.
- Westbound left-turn lane with a 30-metre storage length, 60-metre deceleration length and 145-metre taper length.
- The construction cost for the proposed left-turn lanes should be split between LC Development Group Inc. and Warren D. Sinclair Construction Ltd.

8 CONCLUSIONS

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

- Under the existing conditions the intersections of Highway 26 and 7th Line and Highway 26 and Ridge Road are operating at a level of service (LOS) "C" or better, with excess capacity for growth.
- Under 2033 future background traffic volume conditions, the intersection of Highway 26 and 7th Line is anticipated to operate at a LOS of "E" or better; and the intersection of Highway 26 and Ridge Road is expected to operate at LOS of "C" or better.
- The development is proposed to generate 236 and 216 two-way primary trips in the weekday a.m. and p.m. peak hours, respectively, and 53 and 29 two-way pass-by trips in the a.m. and p.m. peak hours, respectively.
- Under the 2033 future total traffic volume conditions, the proposed site access does not warrant signalization. Signal warrants were completed based on the average hour volumes and the methodology described in the Ontario Traffic Manual (OTM) Book 12, Justification 7 – Projected Volumes.
- Auxiliary left-turn lanes are warranted at the site access under 2033 future total conditions with storage lengths of 15 meters and 25 meters for the eastbound and westbound directions, respectively.
- Under future total traffic conditions, the intersection of Highway 26 and 7th Line is expected to continue to operate at a LOS of "E" or better; Highway 26 and Ridge Road is expected to operate at a LOS of "D" or better and Highway 26 and the Site Access is expected to operate at a LOS of "E" or better. This analysis assumed the construction of the left-hand turn lanes at the site access.
    - The addition of the site generated traffic at the intersections of Highway 26 and 7th Line and Highway 26 and Ridge Road is expected to result in a maximum increase in the control delay of 6.9 seconds and a maximum increase in volume-to-capacity ratio of 0.04, associated with the southbound approach, when compared to the future background traffic operations.

  - The intersection of Highway 26 and the Site Access is expected to have a maximum increase in the control delay of 16.1 seconds and an increase in the volume to capacity ratio of 0.13 associated with the southbound movement from the Loon Call site.

- The proposed development will result in the addition of traffic volumes to local roads east and south of the site. During the critical weekday p.m. peak hour, the addition of traffic volumes on Ridge Road is forecasted to be 57 vehicles, which equates to approximately one vehicle per minute; or one vehicle every 60 seconds. This additional traffic will not materially alter the urban local nature of the roadways.

- The available sight distance at the Highway 26 site access exceeds the minimum sight distance requirements.

It is concluded that the traffic generated by the Meaford Haven Development can be supported by the boundary road network.

The analysis contained within this report was prepared using the most recent Development Concept Plan (IBI Group, March 2021). Any minor revisions to the development concept are not expected to affect the conclusions contained with this report. It is acknowledged that the limits of development and associated Concept Plan are subject to change based on the findings of the Environmental Impact Study. These changes will be addressed as required during the subsequent Site Plan Applications for the specifics Blocks.

The Meaford Haven Development can be supported from a traffic operations and safety perspective.

Prepared by,

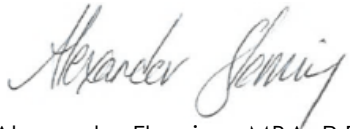
C.F. CROZIER & ASSOCIATES INC.

Madeleine Ferguson, P.Eng.
Manager of Transportation

C.F. CROZIER & ASSOCIATES INC.

Emma Howlett, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.



Alexander Fleming, MBA, P.Eng.
Associate, Manager of Transportation

MF/eh/la

J:\1900\1930-Warren D. Sinclair Construction\5664_Haven Development\Reports\Traffic\5664_TIS (December 2021).docx

APPENDIX A

Terms of Reference Correspondence

Emma Howlett

From: Madeleine Ferguson
Sent: July 9, 2021 3:35 PM
To: Emma Howlett
Subject: FW: Meaford Haven - TIS Update TOR

Madeleine Ferguson, P.Eng. | Manager of Transportation
DID: 705.434.3418

From: Leyten, Martin (MTO) <Martin.Leyten@ontario.ca>
Sent: Thursday, June 24, 2021 11:51 AM
To: Madeleine Ferguson <mferguson@cfcrozier.ca>
Cc: Kerianne Hagan <khagan@cfcrozier.ca>; Hodgins, Allan (MTO) <Allan.Hodgins@ontario.ca>
Subject: RE: Meaford Haven - TIS Update TOR

Hi Madeleine,

Please see MTO comments below in red. It is also recommended by our Traffic Office that we arrange a meeting prior to the commencement of the TIS to clarify the data that it's going to be used for this TIS and the study horizon assumptions.

I will be off from June 28 to August 9th during this time Allan Hodgins from our office will be looking after some of my files. Please reach out to him to arrange the meeting.

Allan Hodgins | Corridor Management Planner
MTO – Operation Branch West | Corridor Management Section, West
Ph: (226) 973-8580 | Email: allan.hodgins@ontario.ca

If you have any questions please feel free to contact me directly

Thanks

Martin

From: Madeleine Ferguson <mferguson@cfcrozier.ca>
Sent: May 20, 2021 11:38 AM
To: Leyten, Martin (MTO) <Martin.Leyten@ontario.ca>
Cc: Kerianne Hagan <khagan@cfcrozier.ca>
Subject: Meaford Haven - TIS Update TOR

Hi Martin,

I hope you're doing well. We have been retained to prepare an updated Transportation Impact Study (TIS) for the Meaford Haven development located at Lot 1697 in the Municipality of Meaford. The elements envisioned for this subdivision include approximately 110 apartment units, 206 townhouse units and 4 commercial units.

We have prepared the following TOR for the TIS Update and are seeking confirmation from the MTO that the proposed scope is acceptable. We have also contacted the Municipality to get their comments on the TOR. We prepared an original TIS in February 2011, and are proposing a scope of work in-line with our previous analysis.

The TIS will review the following intersections:

- Highway 26 and Ridge Road;
- Highway 26 and 7th Line; and
- Highway 26 and the Site Access

Colleen provided historical data from the MTO. We will compare this data to the original 2011 TIS and the nearby 2020 Loon Call TIS to establish 2021 volumes. A negative growth rate was established based on historical MTO AADT and SADT data along the roadway. Accordingly, a 1% growth rate will be applied to existing volumes, as is consistent with the assumptions contained within the Loon Call TIS.

The data to be used in the study has to be approved by the ministry.

Analysis Periods and Scenarios

Analysis of weekday A.M. and P.M. peak hours will be used to capture the peak hours associated with the proposed use. Analysis of a three-phase buildout with the first phase completed in 2023, the second in 2026 and the third in 2030 as well as the 5-year (2035) and 10-year (2040) horizons will be completed.

Analyse full build out only assuming an opening date of 2023. Opening date can vary but it cannot be too far into the future otherwise the traffic projections are meaningless.

Background Developments

The Loon Call residential development located on the north side of Highway 26 directly opposite the Meaford Haven site will be considered as a background development in the report.

Trip Generation

ITE Trip Generation 10th Edition will be used to calculate the expected trip generation for the development. Assignment of site generated traffic on the boundary road network will be based on existing travel patterns and expected catchment areas.

Use equations to estimate the trip generation.

Road Characteristics

A number of elements will be reviewed including auxiliary turn-lane and signalization requirements at the proposed site access on Highway 26, as well as sight distance requirements at the proposed access. The TIS will also included a summary of the number of trips expected to utilize Ridge Road, Ridge Creek Drive and Fairway Avenue and qualitatively assess the impacts of the development on the local road network.

Other:

- Submit 2 copies of the report in PDF format: one locked and sealed ;and the other unlocked and without the seal.
- When evaluating impacts at intersections please refer to the TAC's Geometric Design Guide for Canadian Roads, MTO Design Supplement for TAC's Geometric Design Guide for Canadian Roads (http://www.mto.gov.on.ca/phmpmbp/Reference%20Materials/HwyDes-MTO_DS_TAC_GDG-April2020-Final.pdf) and the OTM Books (https://www.library.mto.gov.on.ca/SydneyPLUS/Sydney/Portal/default.aspx?lang=en-US).
- Submit digital Sychro files in version 10.
- For the Synchro files please use an Ideal Saturation Flow Rate of 1900 and a PHF of 0.88 for MTO facilities. For all scenarios and peak periods.

I hope the above is acceptable. Should you have any questions or concerns, please feel free to contact me.

Regards,
Madeleine

Madeleine Ferguson, P.Eng. | Project Engineer
40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
T: 705.446.3510

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CONSULTING ENGINEERS

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APPENDIX B

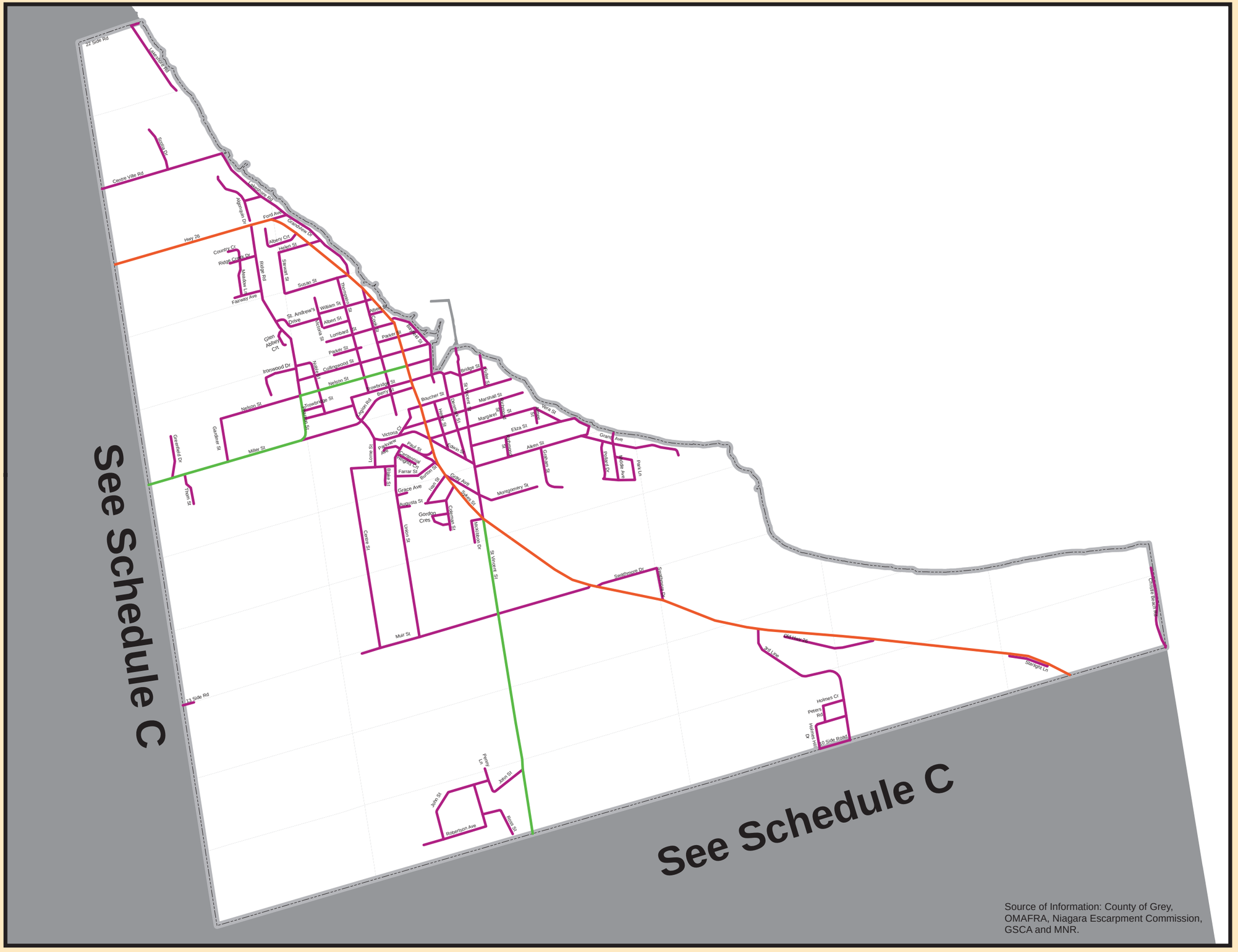
Municipality of Meaford Official Plan Excerpts

Municipality of Meaford

Official Plan Schedule C-1 Transportation

Legend

- Provincial Highways
- County Roads
- Local Roads (Open and Maintained Year-Round)



Source of Information: County of Grey, OMAFRA, Niagara Escarpment Commission, GSCA and MNR.

0 1 2 km

Updated: April 2013

Municipality of Meaford

Official Plan Schedule C Transportation

Legend

- Provincial Highway
- County Roads
- Local Roads (Open and Maintained Year-Round)
- Federal Lands

0 2 4 8 km

Source of Information: County of Grey, OMAFRA, Niagara Escarpment Commission, GSCA and MNR.

Updated: April 2013

APPENDIX C

Traffic Data

Ontario Traffic Inc

Morning Peak Diagram

Specified Period	One Hour Peak
From: 7:00:00	**From:** 8:00:00
To: 11:00:00	**To:** 9:00:00

Municipality: Meaford
Site #: 1423500005
Intersection: Hwy 26 & Ridge Rd
TFR File #: 8
Count date: 17-Oct-14

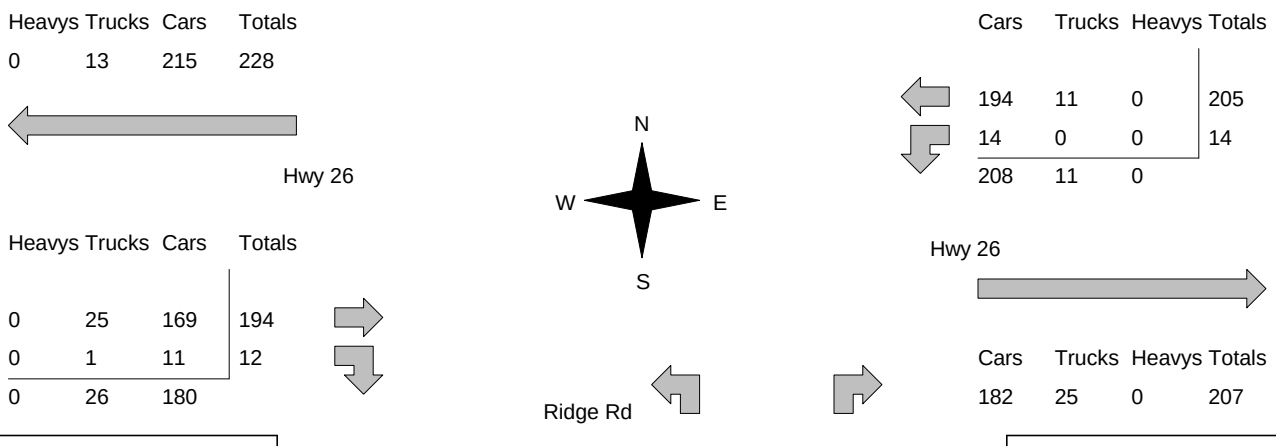
Weather conditions:

Person(s) who counted:

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

Major Road: Hwy 26 runs W/E

East Leg Total: 426
East Entering: 219
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 206
West Leg Total: 434

Cars 25
Trucks 1
Heavys 0
Totals 26

Cars 21 13 34
Trucks 2 0 2
Heavys 0 0 0
Totals 23 13

Peds Cross: ⋈
South Peds: 0
South Entering: 36
South Leg Total: 62

Comments

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: HWY 26 @ MEAFORD 7TH LINE
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 26
Start Date: 16-Aug-2017 (Wed) | **I/C Side:** | **LHRS:** 25690
End Date: 16-Aug-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 10.600
Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																				Minor Road Approaches																
	West HWY 26										East HWY 26										North MEAFORD 7TH LINE										South MEAFORD 7TH LINE									
Start Time	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Total Veh.
	←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		
Period 3																																								
15:00	4	47	2	1	0	0	0	1	1	0	1	59	11	0	0	0	0	1	0	0	19	4	9	1	0	0	0	0	0	0	1	3	2	0	0	0	0	0	0	0	**167**
15:15	6	58	1	1	1	0	0	0	1	0	2	53	13	0	1	0	0	1	0	0	10	3	10	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	**164**
15:30	3	48	1	0	1	0	0	3	0	0	4	49	11	0	0	0	0	1	0	0	19	4	7	0	0	0	0	0	0	0	4	1	5	0	0	0	0	0	0	0	**161**
15:45	5	56	4	0	0	1	0	0	0	0	1	54	17	1	2	0	0	4	0	0	16	0	15	0	1	0	0	0	0	0	3	4	5	0	0	0	0	0	0	0	**189**
16:00	7	66	1	0	1	0	1	3	2	0	5	50	20	0	0	1	0	5	0	0	27	9	27	0	0	1	0	0	0	0	2	2	1	0	0	0	0	0	0	0	**231**
16:15	6	67	7	0	0	0	0	0	1	0	6	65	20	0	1	0	0	0	1	0	27	9	16	0	0	1	0	0	0	0	1	3	0	0	0	0	0	0	0	0	**231**
16:30	7	67	1	0	0	0	0	2	2	0	1	64	16	0	1	0	0	1	2	0	21	3	14	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	**204**
16:45	9	71	4	0	3	0	0	3	2	0	3	57	18	0	0	0	0	2	0	0	28	2	9	0	0	0	0	0	0	0	3	5	2	0	0	0	0	0	0	0	**221**
17:00	6	66	4	0	1	0	0	1	1	0	7	73	23	0	2	0	0	0	0	0	21	5	15	0	0	1	0	0	0	0	1	4	1	0	1	0	0	0	0	0	**233**
17:15	9	67	0	0	1	0	2	2	1	0	4	67	18	0	1	1	0	0	0	0	21	3	1	0	0	0	0	0	1	0	3	5	3	0	0	0	0	0	0	0	**210**
17:30	9	64	1	0	1	0	0	0	1	0	5	62	16	0	4	0	0	1	0	0	17	1	6	0	0	0	0	0	0	0	1	3	3	0	0	0	0	0	0	0	**195**
17:45	6	33	4	0	0	0	0	0	2	0	6	63	13	0	2	0	0	0	0	0	23	3	9	0	0	0	0	0	0	0	2	6	2	0	0	0	0	0	0	0	**174**

Ontario Traffic Inc

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 19:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: Meaford
Site #: 1423500005
Intersection: Hwy 26 & Ridge Rd
TFR File #: 8
Count date: 17-Oct-14

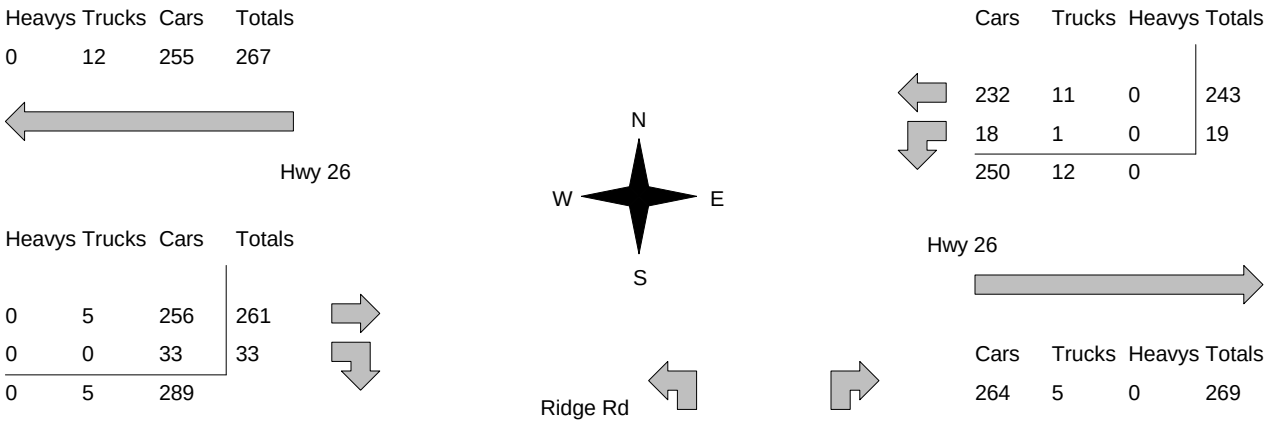
Weather conditions:

Person(s) who counted:

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

Major Road: Hwy 26 runs W/E

East Leg Total: 531
East Entering: 262
East Peds: 0
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 294
West Leg Total: 561

Cars 51
Trucks 1
Heavys 0
Totals 52

Cars 23 8 31
Trucks 1 0 1
Heavys 0 0 0
Totals 24 8

Peds Cross:
South Peds: 0
South Entering: 32
South Leg Total: 84

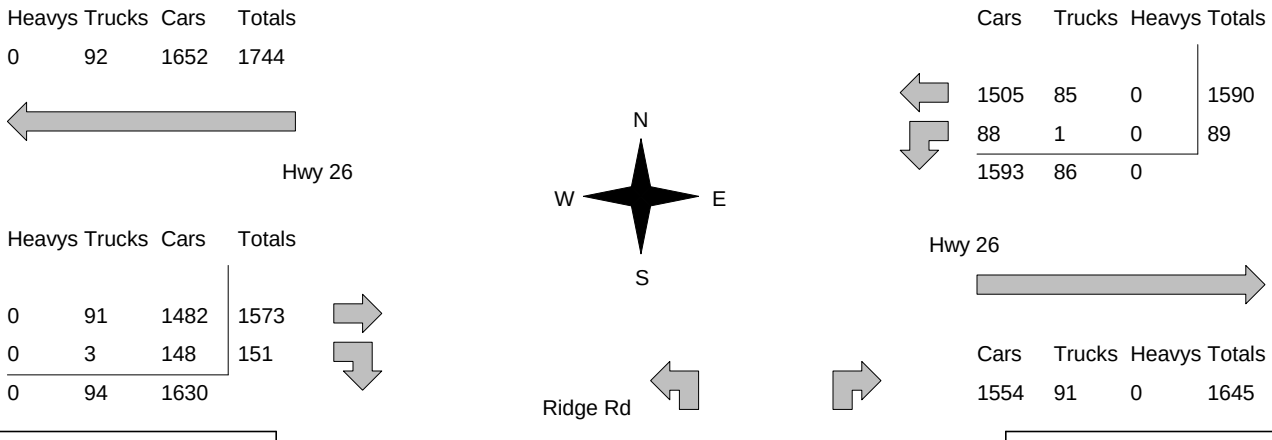
Comments

Ontario Traffic Inc

Total Count Diagram

Municipality: Meaford	**Weather conditions:**
Site #: 1423500005	
Intersection: Hwy 26 & Ridge Rd	**Person(s) who counted:**
TFR File #: 8	
Count date: 17-Oct-14	
**** Non-Signalized Intersection ****	**Major Road:** Hwy 26 runs W/E

East Leg Total: 3324
East Entering: 1679
East Peds: 0
Peds Cross:



Peds Cross:		Cars	236	Cars	147	72	219	Peds Cross:	
West Peds:	0	Trucks	4	Trucks	7	0	7	South Peds:	0
West Entering:	1724	Heavys	0	Heavys	0	0	0	South Entering:	226
West Leg Total:	3468	Totals	240	Totals	154	72		South Leg Total:	466

Comments

Ontario Traffic Inc
Traffic Count Summary

Intersection: Hwy 26 & Ridge Rd | **Count Date:** 17-Oct-14 | **Municipality:** Meaford

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	2
8:00:00	0	0	0	0	0	27
9:00:00	0	0	0	0	0	36
10:00:00	0	0	0	0	0	31
11:00:00	0	0	0	0	0	28
15:00:00	0	0	0	0	0	4
16:00:00	0	0	0	0	0	32
17:00:00	0	0	0	0	0	29
18:00:00	0	0	0	0	0	23
19:00:00	0	0	0	0	0	14
Totals:	0	0	0	0	0	226

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	2	0	0	2	0
8:00:00	23	0	4	27	0
9:00:00	23	0	13	36	0
10:00:00	18	0	13	31	0
11:00:00	19	0	9	28	0
15:00:00	2	0	2	4	0
16:00:00	24	0	8	32	0
17:00:00	22	0	7	29	0
18:00:00	13	0	10	23	0
19:00:00	8	0	6	14	0
Totals:	154	0	72	226	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	3	0	3	0	5
8:00:00	5	172	0	177	0	341
9:00:00	14	205	0	219	0	425
10:00:00	11	139	0	150	0	324
11:00:00	8	215	0	223	0	415
15:00:00	1	9	0	10	0	16
16:00:00	9	205	0	214	0	469
17:00:00	20	231	0	251	0	556
18:00:00	13	240	0	253	0	515
19:00:00	8	171	0	179	0	337
Totals:	89	1590	0	1679	0	3403

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	2	0	2	0
8:00:00	0	146	18	164	0
9:00:00	0	194	12	206	0
10:00:00	0	157	17	174	0
11:00:00	0	180	12	192	0
15:00:00	0	5	1	6	0
16:00:00	0	240	15	255	0
17:00:00	0	265	40	305	0
18:00:00	0	241	21	262	0
19:00:00	0	143	15	158	0
Totals:	0	1573	151	1724	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	10:00	11:00	16:00	17:00	18:00	19:00
Crossing Values:	23	23	18	19	24	22	13	8

Ontario Traffic Inc

Count Date: 17-Oct-14 Site #: 1423500005

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:15:04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ontario Traffic Inc

Count Date: 17-Oct-14 Site #: 1423500005

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	39	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	1	1	86	47	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
7:45:00	3	2	125	39	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0
8:00:00	5	2	171	46	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0
8:15:00	7	2	218	47	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0
8:30:00	11	4	274	56	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0
8:45:00	13	2	324	50	0	0	0	0	11	3	0	0	0	0	0	0	0	0	0	0
9:00:00	19	6	365	41	0	0	0	0	15	4	0	0	0	0	0	0	0	0	0	0
9:15:00	22	3	400	35	0	0	0	0	19	4	0	0	0	0	0	0	0	0	0	0
9:30:00	26	4	422	22	0	0	0	0	21	2	0	0	0	0	0	0	0	0	0	0
9:45:00	27	1	444	22	0	0	0	0	23	2	0	0	0	0	0	0	0	0	0	0
10:00:00	30	3	491	47	0	0	0	0	28	5	0	0	0	0	0	0	0	0	0	0
10:15:00	31	1	538	47	0	0	0	0	35	7	0	0	0	0	0	0	0	0	0	0
10:30:00	32	1	597	59	0	0	0	0	37	2	0	0	0	0	0	0	0	0	0	0
10:45:00	36	4	646	49	0	0	0	0	43	6	0	0	0	0	0	0	0	0	0	0
11:00:00	38	2	689	43	0	0	0	0	45	2	0	0	0	0	0	0	0	0	0	0
11:00:13	38	0	690	1	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0
15:00:00	39	1	697	7	0	0	0	0	46	1	0	0	0	0	0	0	0	0	0	0
15:15:00	42	3	761	64	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0
15:30:00	45	3	812	51	0	0	0	0	54	4	0	0	0	0	0	0	0	0	0	0
15:45:00	46	1	867	55	0	0	0	0	59	5	0	0	0	0	0	0	0	0	0	0
16:00:00	48	2	889	22	0	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0
16:15:00	53	5	940	51	0	0	0	0	61	2	0	0	0	0	0	0	0	0	0	0
16:30:00	59	6	991	51	0	0	1	1	64	3	0	0	0	0	0	0	0	0	0	0
16:45:00	64	5	1043	52	0	0	1	0	67	3	0	0	0	0	0	0	0	0	0	0
17:00:00	67	3	1110	67	0	0	1	0	69	2	0	0	0	0	0	0	0	0	0	0
17:15:00	71	4	1172	62	0	0	1	0	72	3	0	0	0	0	0	0	0	0	0	0
17:30:00	75	4	1228	56	0	0	1	0	77	5	0	0	0	0	0	0	0	0	0	0
17:45:00	77	2	1284	56	0	0	1	0	78	1	0	0	0	0	0	0	0	0	0	0
18:00:00	80	3	1340	56	0	0	1	0	79	1	0	0	0	0	0	0	0	0	0	0
18:15:00	81	1	1381	41	0	0	1	0	82	3	0	0	0	0	0	0	0	0	0	0
18:30:00	84	3	1436	55	0	0	1	0	84	2	0	0	0	0	0	0	0	0	0	0
18:45:00	85	1	1474	38	0	0	1	0	84	0	0	0	0	0	0	0	0	0	0	0
19:00:00	88	3	1505	31	0	0	1	0	85	1	0	0	0	0	0	0	0	0	0	0
19:15:00	88	0	1505	0	0	0	1	0	85	0	0	0	0	0	0	0	0	0	0	0
19:15:04	88	0	1505	0	0	0	1	0	85	0	0	0	0	0	0	0	0	0	0	0

Ontario Traffic Inc

Count Date: 17-Oct-14 Site #: 1423500005

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	8	6	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	17	9	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	22	5	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	25	3	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	30	5	0	0	8	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	39	9	0	0	9	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	40	1	0	0	10	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	46	6	0	0	17	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	51	5	0	0	21	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30:00	58	7	0	0	26	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45:00	62	4	0	0	28	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00:00	64	2	0	0	30	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15:00	68	4	0	0	31	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30:00	70	2	0	0	31	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45:00	78	8	0	0	34	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
11:00:00	82	4	0	0	39	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:13	82	0	0	0	39	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00:00	84	2	0	0	41	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15:00	86	2	0	0	42	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0
15:30:00	90	4	0	0	46	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45:00	101	11	0	0	46	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0
16:00:00	106	5	0	0	49	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15:00	108	2	0	0	50	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30:00	115	7	0	0	50	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45:00	123	8	0	0	52	2	6	1	0	0	0	0	0	0	0	0	0	0	0	0
17:00:00	127	4	0	0	56	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15:00	131	4	0	0	58	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30:00	136	5	0	0	60	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45:00	139	3	0	0	64	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00:00	140	1	0	0	66	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15:00	144	4	0	0	69	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30:00	145	1	0	0	69	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0
18:45:00	147	2	0	0	72	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00:00	147	0	0	0	72	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
19:15:00	147	0	0	0	72	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
19:15:04	147	0	0	0	72	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0

Ontario Traffic Inc

Count Date: 17-Oct-14 Site #: 1423500005

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	20	18	2	2	0	0	4	4	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	50	30	5	3	0	0	8	4	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	92	42	8	3	0	0	19	11	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	127	35	18	10	0	0	21	2	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	165	38	20	2	0	0	26	5	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	213	48	23	3	0	0	37	11	1	1	0	0	0	0	0	0	0	0
8:45:00	0	0	246	33	28	5	0	0	43	6	1	0	0	0	0	0	0	0	0	0
9:00:00	0	0	296	50	29	1	0	0	46	3	1	0	0	0	0	0	0	0	0	0
9:15:00	0	0	342	46	31	2	0	0	50	4	1	0	0	0	0	0	0	0	0	0
9:30:00	0	0	369	27	37	6	0	0	53	3	2	1	0	0	0	0	0	0	0	0
9:45:00	0	0	402	33	43	6	0	0	55	2	2	0	0	0	0	0	0	0	0	0
10:00:00	0	0	442	40	45	2	0	0	57	2	2	0	0	0	0	0	0	0	0	0
10:15:00	0	0	487	45	47	2	0	0	62	5	2	0	0	0	0	0	0	0	0	0
10:30:00	0	0	532	45	49	2	0	0	66	4	2	0	0	0	0	0	0	0	0	0
10:45:00	0	0	574	42	54	5	0	0	68	2	2	0	0	0	0	0	0	0	0	0
11:00:00	0	0	609	35	57	3	0	0	70	2	2	0	0	0	0	0	0	0	0	0
11:00:13	0	0	611	2	57	0	0	0	70	0	2	0	0	0	0	0	0	0	0	0
15:00:00	0	0	614	3	58	1	0	0	70	0	2	0	0	0	0	0	0	0	0	0
15:15:00	0	0	675	61	62	4	0	0	74	4	2	0	0	0	0	0	0	0	0	0
15:30:00	0	0	751	76	66	4	0	0	76	2	2	0	0	0	0	0	0	0	0	0
15:45:00	0	0	814	63	73	7	0	0	80	4	2	0	0	0	0	0	0	0	0	0
16:00:00	0	0	843	29	73	0	0	0	81	1	2	0	0	0	0	0	0	0	0	0
16:15:00	0	0	911	68	88	15	0	0	82	1	3	1	0	0	0	0	0	0	0	0
16:30:00	0	0	971	60	94	6	0	0	84	2	3	0	0	0	0	0	0	0	0	0
16:45:00	0	0	1032	61	102	8	0	0	85	1	3	0	0	0	0	0	0	0	0	0
17:00:00	0	0	1102	70	112	10	0	0	87	2	3	0	0	0	0	0	0	0	0	0
17:15:00	0	0	1167	65	121	9	0	0	87	0	3	0	0	0	0	0	0	0	0	0
17:30:00	0	0	1223	56	125	4	0	0	89	2	3	0	0	0	0	0	0	0	0	0
17:45:00	0	0	1275	52	129	4	0	0	90	1	3	0	0	0	0	0	0	0	0	0
18:00:00	0	0	1339	64	133	4	0	0	91	1	3	0	0	0	0	0	0	0	0	0
18:15:00	0	0	1377	38	134	1	0	0	91	0	3	0	0	0	0	0	0	0	0	0
18:30:00	0	0	1410	33	143	9	0	0	91	0	3	0	0	0	0	0	0	0	0	0
18:45:00	0	0	1450	40	145	2	0	0	91	0	3	0	0	0	0	0	0	0	0	0
19:00:00	0	0	1482	32	148	3	0	0	91	0	3	0	0	0	0	0	0	0	0	0
19:15:00	0	0	1482	0	148	0	0	0	91	0	3	0	0	0	0	0	0	0	0	0
19:15:04	0	0	1482	0	148	0	0	0	91	0	3	0	0	0	0	0	0	0	0	0

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Peak Hour Report

Description: HWY 26 @ MEAFORD 7TH LINE

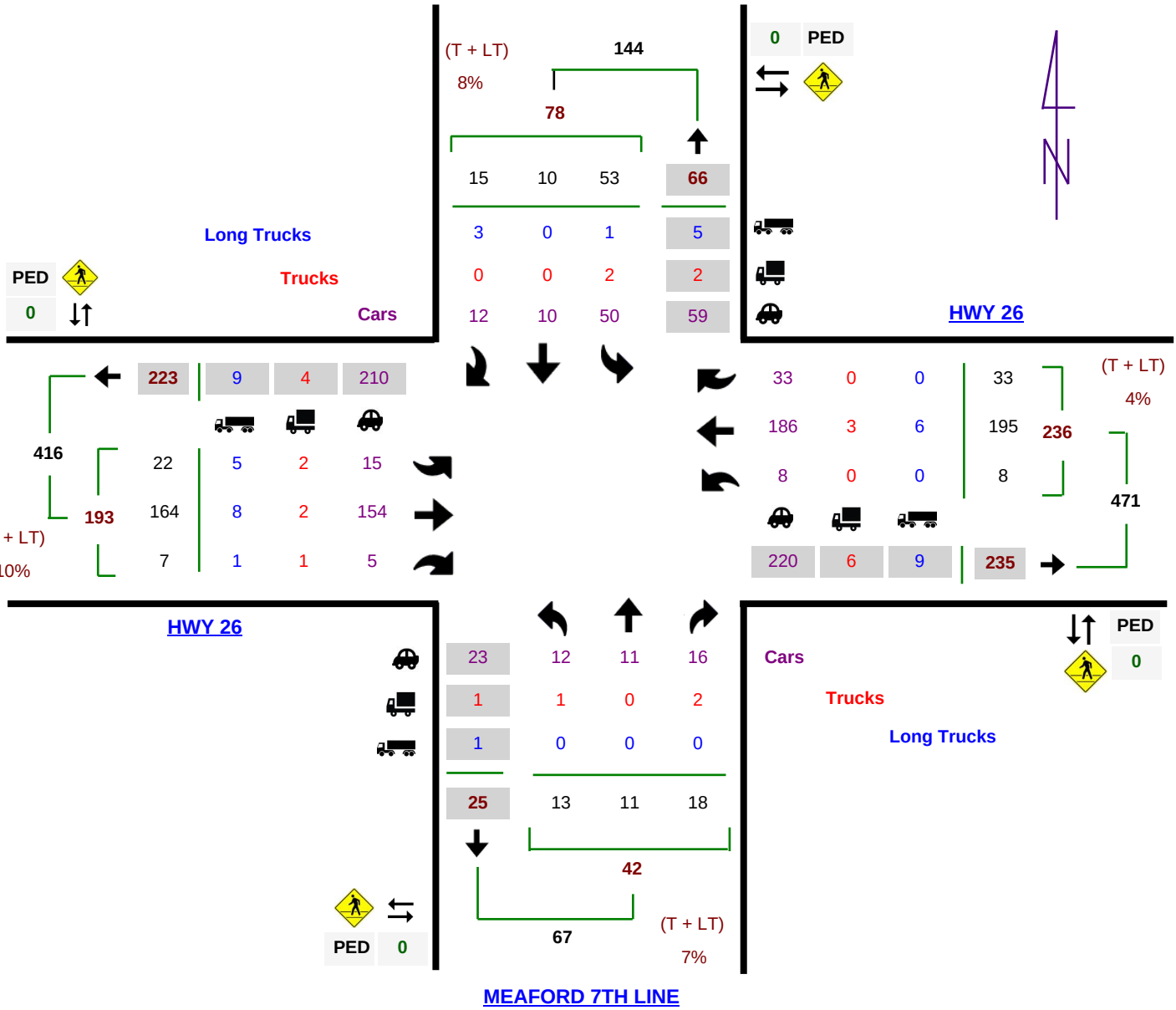
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 26

Start Date: 16-Aug-2017 (Wed) | **I/C Side:** | **LHRS:** 25690

End Date: 16-Aug-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 10.600

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

AM Peak Hour Report - Start Time: 08:00



Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Peak Hour Report

Description: HWY 26 @ MEAFORD 7TH LINE

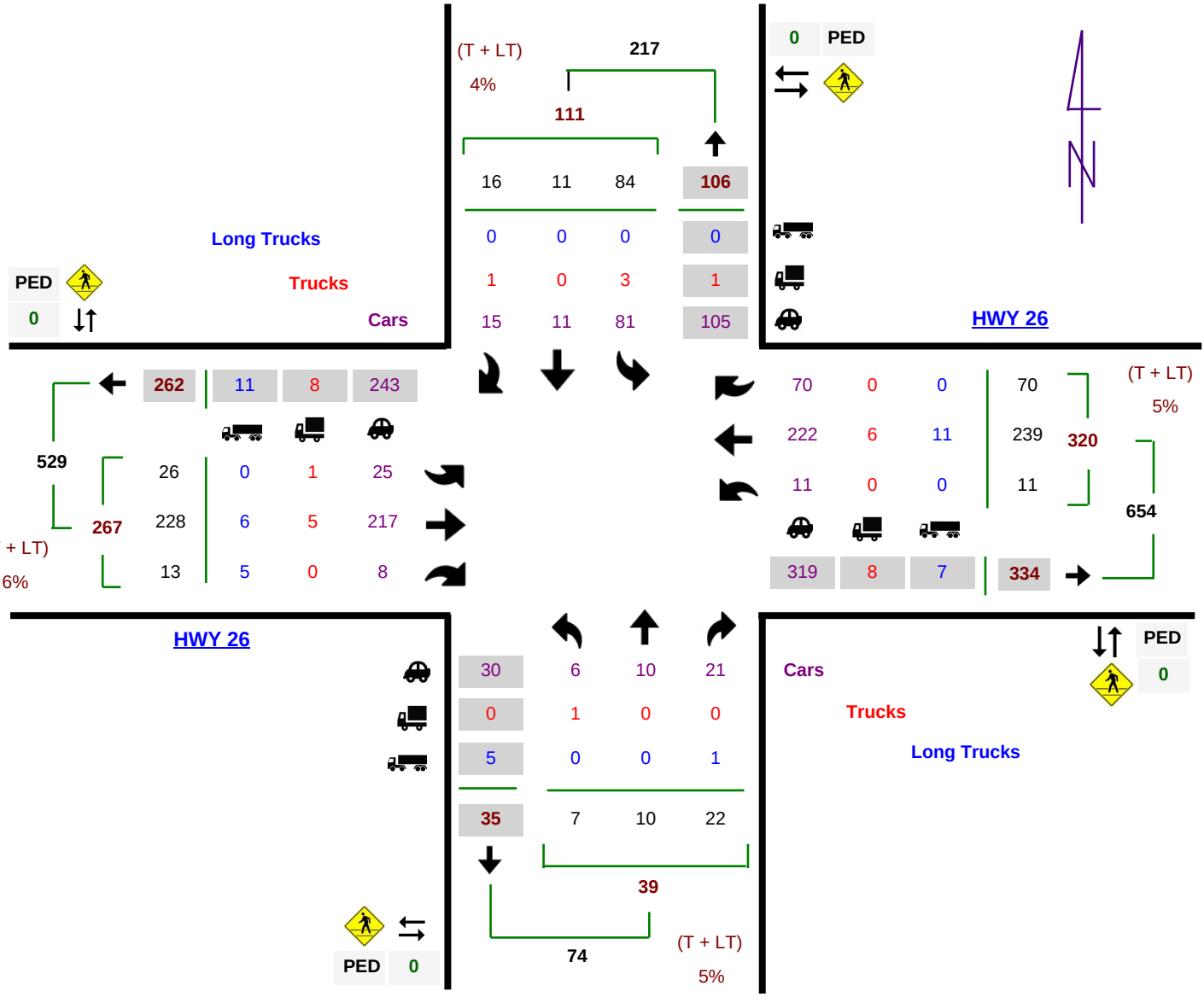
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 26

Start Date: 16-Aug-2017 (Wed) | **I/C Side:** | **LHRS:** 25690

End Date: 16-Aug-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 10.600

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

Midday Peak Hour Report - Start Time: 12:15



Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Peak Hour Report

Description: HWY 26 @ MEAFORD 7TH LINE

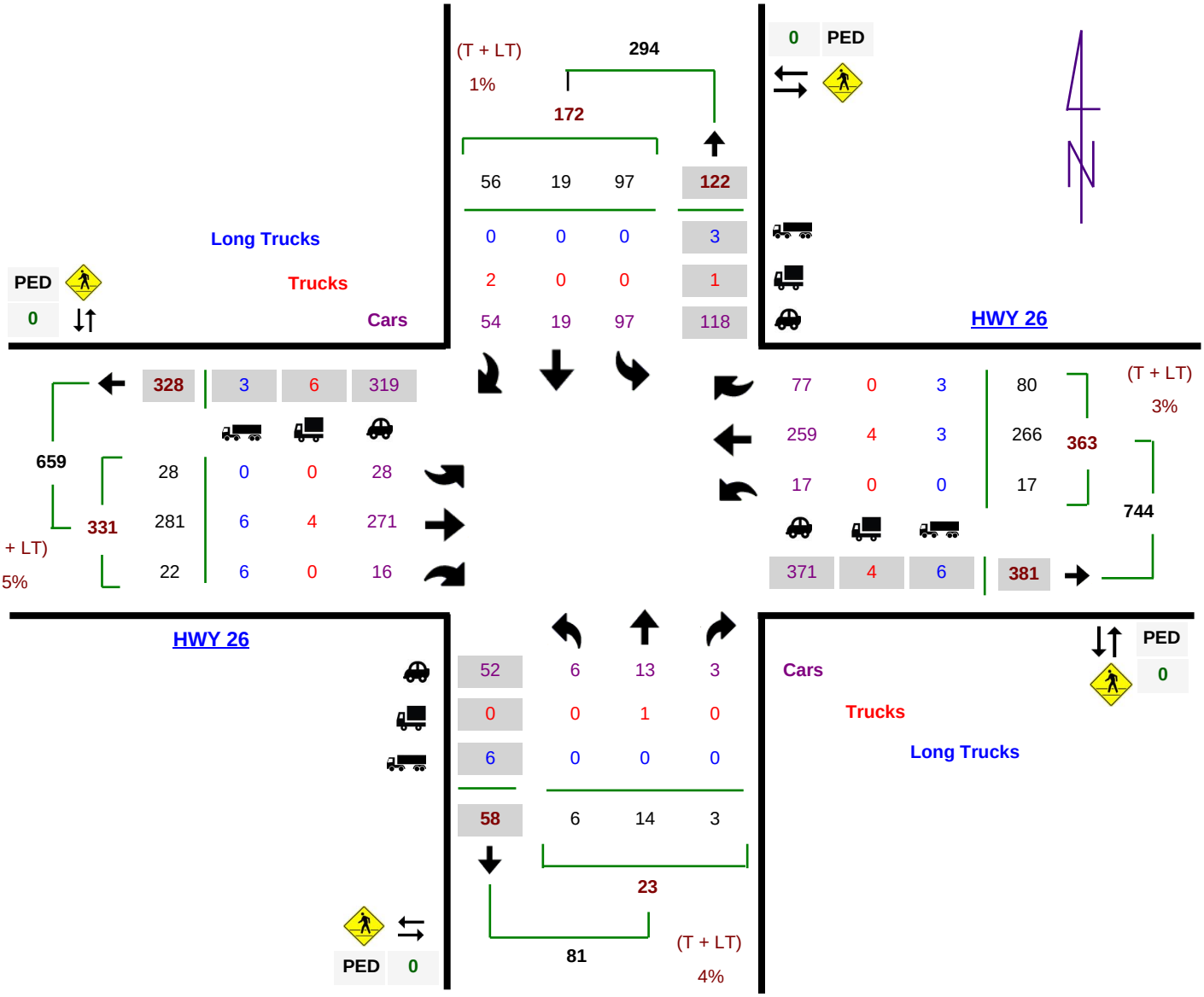
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 26

Start Date: 16-Aug-2017 (Wed) | **I/C Side:** | **LHRS:** 25690

End Date: 16-Aug-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 10.600

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

PM Peak Hour Report - Start Time: 16:15



Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: HWY 26 @ MEAFORD 7TH LINE
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 26
Start Date: 16-Aug-2017 (Wed) | **I/C Side:** | **LHRS:** 25690
End Date: 16-Aug-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 10.600
Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																				Minor Road Approaches																				
	West HWY 26										East HWY 26										North MEAFORD 7TH LINE										South MEAFORD 7TH LINE										
Start Time	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Total Veh.
	←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		
Period 1																																										
07:00	18	16	1	0	0	0	0	2	0	0	2	32	23	1	1	0	0	2	0	0	9	3	4	0	0	0	0	0	2	0	3	4	0	0	0	0	0	0	0	0	123
07:15	21	30	1	0	2	0	0	2	0	0	1	34	21	0	1	0	0	0	1	0	7	2	2	0	0	0	0	0	0	0	2	7	1	2	0	0	0	0	0	0	137
07:30	11	45	3	1	1	0	0	0	0	0	1	33	9	0	0	0	0	3	0	0	15	2	4	0	0	0	1	0	0	0	5	2	2	0	0	0	0	0	0	0	138
07:45	11	30	5	1	2	0	0	1	0	0	1	34	12	0	0	0	0	2	0	0	8	3	3	0	0	0	0	0	1	0	1	6	2	0	0	0	0	0	0	0	123
08:00	2	34	0	0	0	0	1	2	1	0	1	50	4	0	0	0	0	2	0	0	16	2	3	0	0	0	0	0	0	0	5	1	2	0	0	0	0	0	0	0	126
08:15	2	35	2	2	0	1	1	3	0	0	2	56	10	0	1	0	0	0	0	0	12	2	2	0	0	0	1	0	3	0	2	2	3	0	0	0	0	0	0	0	142
08:30	7	48	1	0	0	0	2	2	0	0	4	31	8	0	2	0	0	2	0	0	10	4	6	0	0	0	0	0	0	0	2	7	5	1	0	2	0	0	0	0	144
08:45	4	37	2	0	2	0	1	1	0	0	1	49	11	0	0	0	0	2	0	0	12	2	1	2	0	0	0	0	0	0	3	1	6	0	0	0	0	0	0	0	137
Period 2																																										
11:00	3	33	0	1	0	0	2	1	0	0	2	49	9	1	3	0	0	4	0	0	15	3	6	1	0	1	0	0	1	0	1	1	4	0	0	0	1	0	0	0	142
11:15	6	45	1	0	2	0	0	2	0	0	2	46	14	0	3	1	0	2	0	0	16	0	4	0	0	0	0	0	1	0	1	2	3	0	0	0	0	0	0	0	151
11:30	3	55	2	1	1	0	0	1	2	0	1	51	12	0	1	0	0	2	0	0	14	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	151
11:45	3	42	3	2	2	0	1	2	1	0	5	55	14	0	0	0	0	0	0	0	20	5	7	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	167
12:00	2	55	2	1	1	0	1	2	2	0	3	39	27	0	4	0	0	1	0	0	15	5	5	0	1	0	0	0	2	0	1	2	2	0	0	0	0	0	0	0	173
12:15	4	53	2	0	2	0	0	1	1	0	5	60	12	0	1	0	0	4	0	0	20	4	4	1	0	0	0	0	0	0	3	4	6	0	0	0	0	0	0	0	187
12:30	3	50	5	0	1	0	0	2	2	0	2	49	21	0	0	0	0	2	0	0	16	3	2	2	0	0	0	0	0	0	0	2	6	0	0	0	0	0	0	0	168
12:45	9	51	0	0	2	0	0	2	1	0	1	59	17	0	2	0	0	2	0	0	20	3	4	0	0	0	0	0	0	0	2	2	6	0	0	0	0	0	1	0	184
13:00	9	63	1	1	0	0	0	1	1	0	3	54	20	0	3	0	0	3	0	0	25	1	5	0	0	1	0	0	0	0	1	2	3	1	0	0	0	0	0	0	198
13:15	3	45	1	0	2	0	0	2	2	0	5	58	12	0	1	0	0	1	0	0	13	1	4	1	0	1	0	0	0	0	3	0	4	0	0	0	0	0	0	0	159
13:30	4	46	2	1	3	0	0	1	1	0	4	57	15	1	1	0	0	1	1	0	9	3	3	0	0	1	0	0	0	0	2	5	7	0	0	1	0	1	0	0	170
13:45	3	49	3	0	2	0	0	1	1	0	2	65	20	0	2	0	0	1	0	0	12	2	6	0	0	0	0	0	0	0	2	3	3	0	0	0	0	0	0	0	177

APPENDIX D

Loon Call TIS Excerpts

Loon Call Meaford

Municipality of Meaford
County of Grey

Traffic Impact Study for

LC Development Group Inc.

Type of Document:
Final Report

Project Number:
JDE – 19112

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John Northcote, P.Eng.
Professional License #: 100124071

ENGINEERING

JD Northcote Engineering Inc.
86 Cumberland Street
Barrie, ON
705.725.4035
www.JDEngineering.ca

Legal Notification

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Executive Summary

This report summarizes the traffic impact study for the proposed residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford [Municipality], County of Grey [County]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The final breakdown of units for the proposed development has not yet been finalized, however it is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units.

The proposed development will include one full-movement access driveways [Site Access] onto Highway 26 and an emergency access driveway onto Highway 26 [Emergency Access].

The scope of this analysis a review of the the Highway 26 / Site Access intersection:

Summary

1. The proposed development is expected to generate 140 AM and 181 PM new peak hour trips in the study area.
2. Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26 west of Ridge Road, completed on Thursday, December 5th, 2019.
3. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersection.
4. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended:

   Highway 26 / Site Access & Future Driveway

   Opening Day (2023) traffic volumes

   - Eastbound left-turn lane on Highway 26 with an 85 metre parallel length and a 105 metre taper length.
   - Westbound left turn lane on Highway 26 with a 95 metre parallel length and a 105 metre taper length.
   - It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.
5. The Site Access will operate efficiently as a full-movement access, with southbound stop control. A single lane for ingress and egress movements at the Site Access driveway will provide the necessary capacity to convey the traffic volume generated by the proposed development.
6. There are no issues with the sight distance available for the proposed Site Access.
7. Assuming there is no occupancy in the Meaford Heaven development prior to 2028; the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site.
8. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

LC Development Group Inc. [the Client] is proposing a residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford [Municipality], County of Grey [County]. The final breakdown of units for the proposed development has not yet been finalized, however it is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units.

The proposed development will include one full-movement access driveways [Site Access] onto Highway 26 and an emergency access driveway onto Highway 26 [Emergency Access]. The Site Access will be located across a future driveway for Meaford Haven noted in Section 2.4.

The Client has retained **JD Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

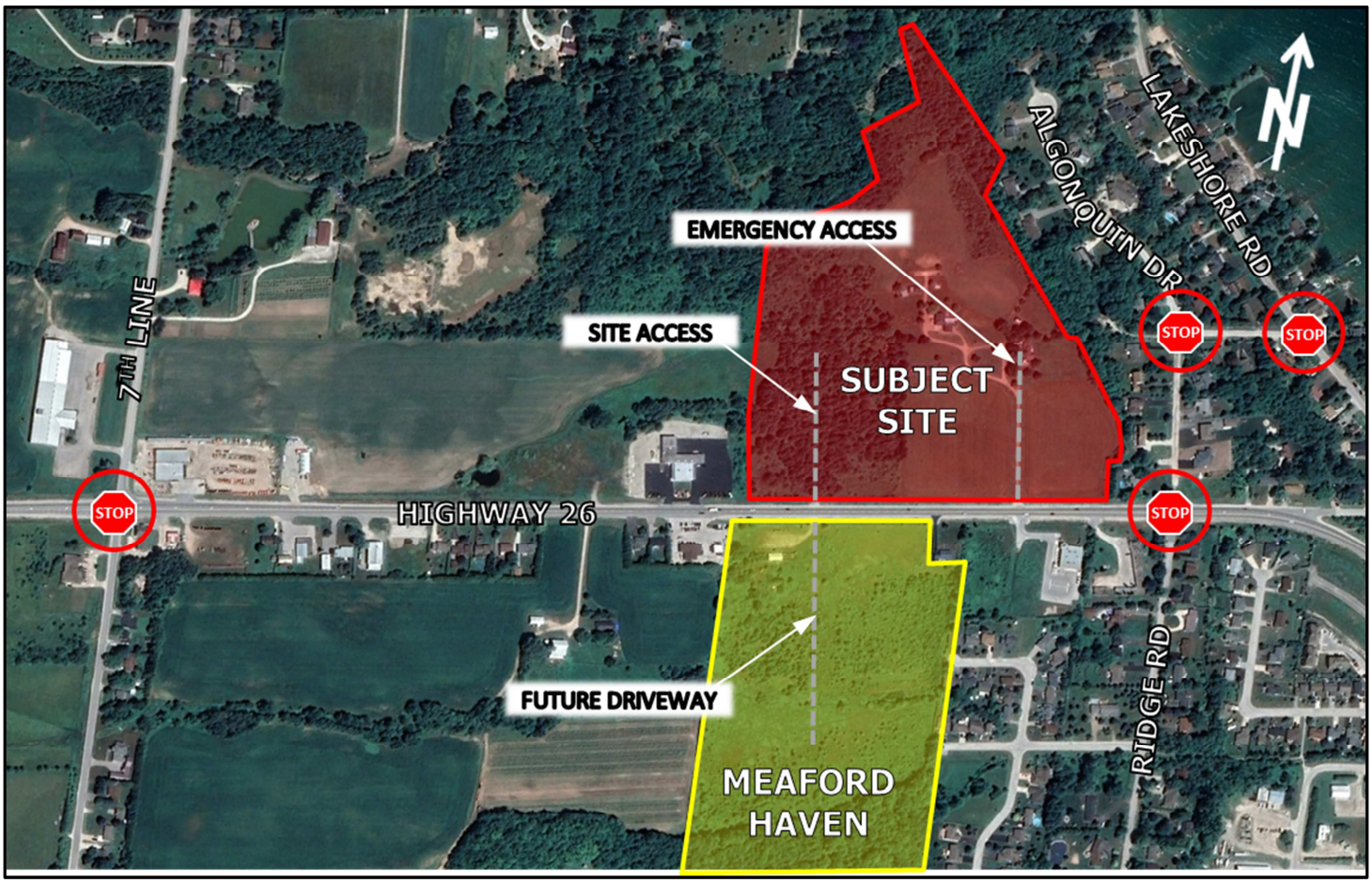
1.2 Study Area

Figure 1 illustrates the location of the subject site and study area intersections, in relation to the surrounding area. The site plan provided by the Pinestone Engineering Limited is included in **Appendix A.**

The subject site is bound by Highway 26 to the south, existing residential lands to the east, existing car dealership and agricultural lands to the west and environmental protection lands to the north.

Through consultation with the Ontario Ministry of Transportation [MTO] and the Municipality, the Highway 26 / Site Access intersection will be analysed as part of the study.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Review the proposed configuration of the site access driveways; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the build-out horizon year (2023), five-year post build-out horizon year (2028) and ten-year post build-out horizon year (2033) were selected for analysis of traffic operations in the

study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

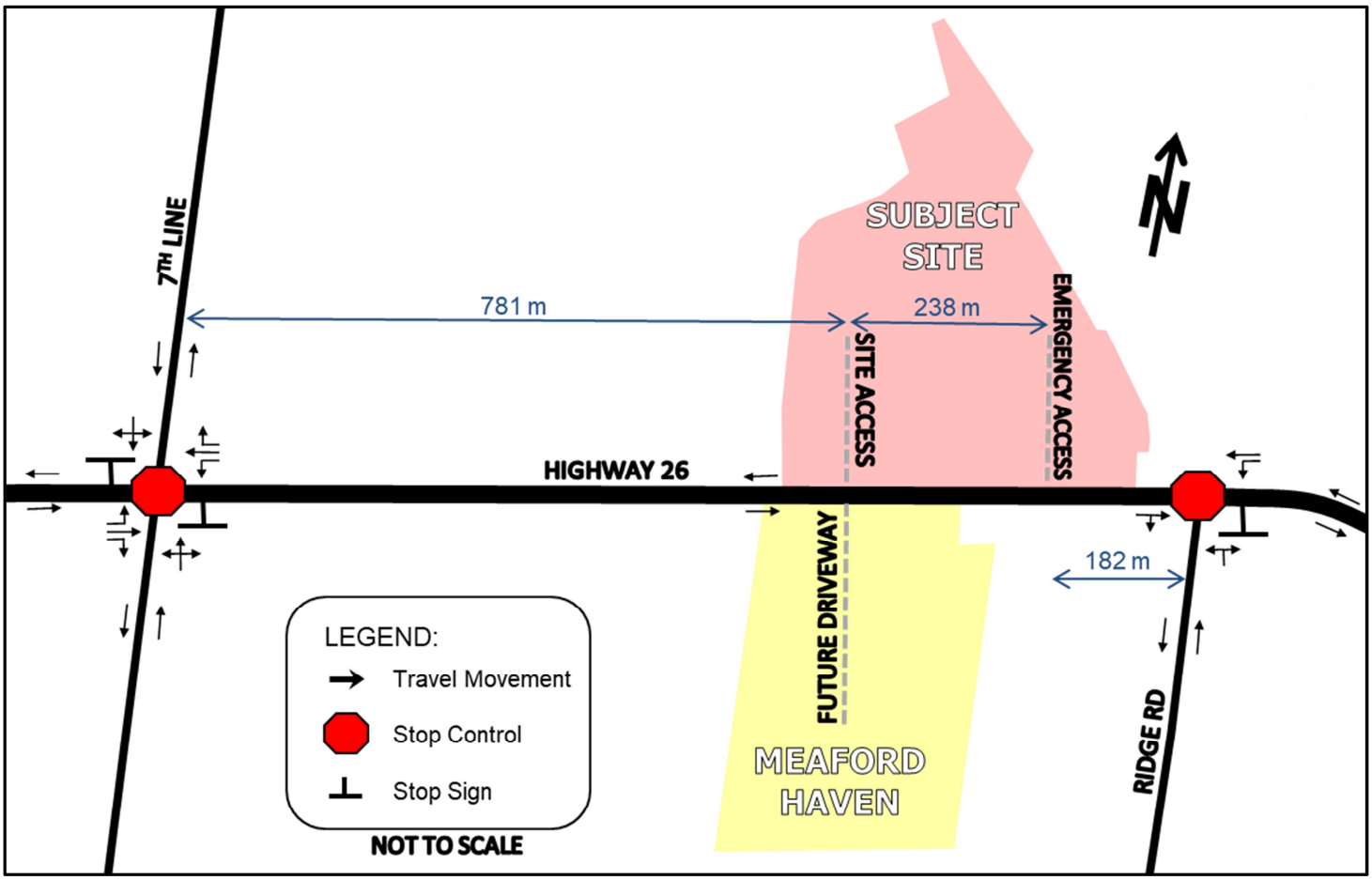
2 Information Gathering

2.1 Street and Intersection Characteristics

Highway 26 is a two-lane Class 2B arterial provincial highway with a rural cross-section and gravel shoulders and no sidewalk. Highway 26 is under jurisdiction of the MTO and has a posted speed limit of 70km/h in the study area.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2.**

Figure 2 - Existing Intersection Spacing and Lane Configuration within Study Area



2.2 Local Transportation Infrastructure Improvements

Based on a review of the MTO's active infrastructure plan (outlined on MTO's interactive infrastructure map) there are no planned infrastructure improvements in the local area that would have a notable impact on traffic circulation patterns in the study area.

The traffic impact study [TIS] completed for Meaford Haven by C.F. Croziers & Associates (dated February 2011) [Meaford Haven TIS] noted recommendations to widen Highway 26 at the Site Access, to add a westbound left-turn lane with a 50 metre storage length, 60 metre parallel length and 145 metre taper length (preliminary design from the Meaford Haven TIS are provided in **Appendix B**). As noted in Section 2.4 the Meaford Haven TIS will need to be updated; however, for the purposes of this study, we have assumed this road improvement will not be completed prior to occupancy of the subject site.

2.3 Transit Access

The study area is serviced by Meaford Moves+, a bus service that provides bus service for residents that have a disability and would be going to work, shopping and other recreation. Meaford Moves+ operates door-to-door within the Municipality between 08:00 – 16:00 and requires a pre-booking application.

2.4 Other Developments within Study Area

Based on discussions with the Municipality of Meaford and County of Grey, Meaford Haven is the only active development in the surrounding area that will have a notable impact on the local traffic volumes in the study area.

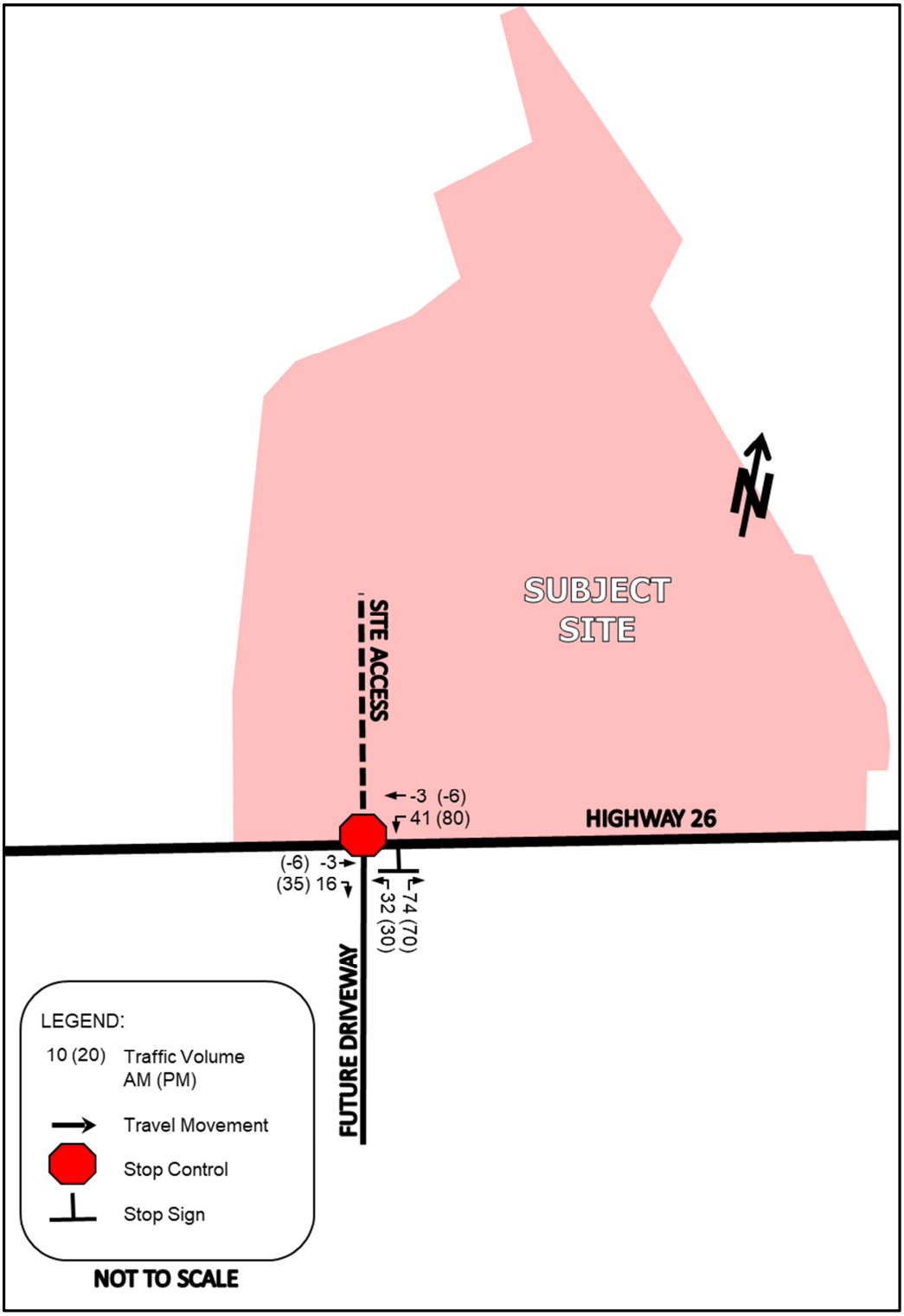
Meaford Haven is a mixed-use development, within a site municipally known as 848 Sykes Street North, located on the south side of Highway 26, directly across from the proposed development. Meaford Haven is expected to include 400 residential units and future non-residential blocks. A breakdown of the residential unit types and specifics for the non-residential blocks are not available at this time. The Meaford Haven TIS provided different statistics for Meaford Haven at the time the report was completed[1]. Meaford Haven will have an access onto Highway 26, directly across from the Site Access [Future Driveway]. A TIS update will be required prior to final approval of the development. Meaford Haven is draft plan approved; however, there is currently no timeline for construction of the Meaford Haven development. For the purpose of this report, we have assumed the development will be fully built-out and occupied by 2023, in order to be conservative.

The total number of units have been updated since the Meaford Haven TIS, however, the updated statistics do not provide a breakdown of the residential units and details of the non-residential blocks; consequently, we have assumed the traffic generation and traffic assignment from the Meaford Haven TIS for the purposes of this report (excerpts provided in **Appendix B**).

Figure 3 illustrates the traffic assignment during the AM and PM peak hour for Meaford Haven.

[1] The proposed statistics in the Meaford Haven TIS for Meaford Haven consisted of a total of 378 residential units (18 single-family detached units, 60 senior apartment units, 96 condo apartments and 204 townhouse units), medical offices (6,500 sq.ft.) and a pharmacy (5,500 sq.ft.).

Figure 3 – Meaford Haven Build-out Traffic Assignment (2023)



2.5 Background Traffic Growth

Based on the correspondence with the MTO, a background traffic growth rate of 1% was assumed along Highway 26.

2.6 Traffic Counts

Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26.

Table 1 summarizes the traffic count data collection information.

Table 1 - Traffic Count Data

Roadway	Count Date	AM Peak Hour	PM Peak Hour	Source
Highway 26 (west of Ridge Road)	Thursday, December 5th 2019	07:45 – 08:45	15:30 – 16:30	JD Eng.*

*Traffic counts were completed by Ontario Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. The peak hours of traffic generation for the study area intersections generally aligned with the anticipated peak hour of traffic generation by the proposed development.

Heavy vehicle percentages and pedestrian crossings from the traffic count data have also been included in the Synchro analysis.

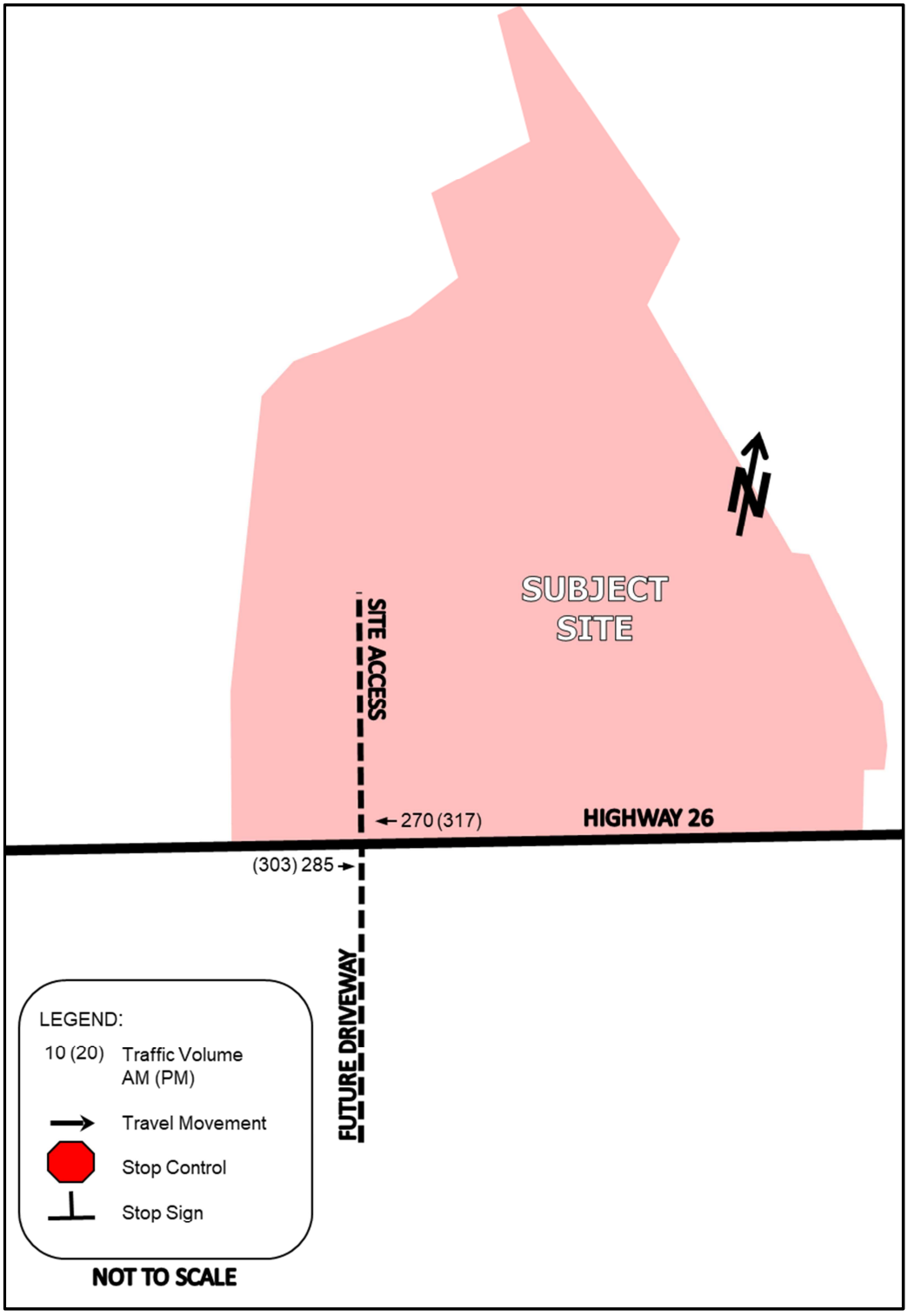
The traffic counts have been factored by the road specific background traffic growth rates noted in Section 2.4 to estimate the existing (2020) traffic volumes.

The traffic counts at both intersections have been adjusted to account for seasonal variation, specifically in the summer months were the Municipality experiences a large increase in traffic. A seasonal traffic factor of 14%[2] has been applied to the traffic count data to estimate summertime traffic conditions.

Figure 4 illustrates the existing AM and PM peak hour traffic volumes in the study area.

[2] Based on a comparison of average weekday daily traffic (AWD) completed in August (Summer) and October (Fall) of 2014.

Figure 4 – Existing Traffic Volumes



3 Proposed Development Traffic Generation and Assignment

3.1 Traffic Generation

The traffic generation for the subject site has been based on the ITE *Trip Generation* data. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 210 (Single-Family Detached Housing) – General Urban/Suburban Setting
- ITE land use 221 (Multifamily Housing (Low-Rise)) – General Urban/Suburban Setting

The estimated trip generation for the proposed development is illustrated below in **Table 2.** The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 2 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	113 units	22	64	86	72	43	115
Multifamily Housing (Low-Rise) ITE Land Use: 221	112 units	12	42	54	42	24	66
TOTAL TRIP GENERATION		**34**	**106**	**140**	**114**	**67**	**181**

3.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

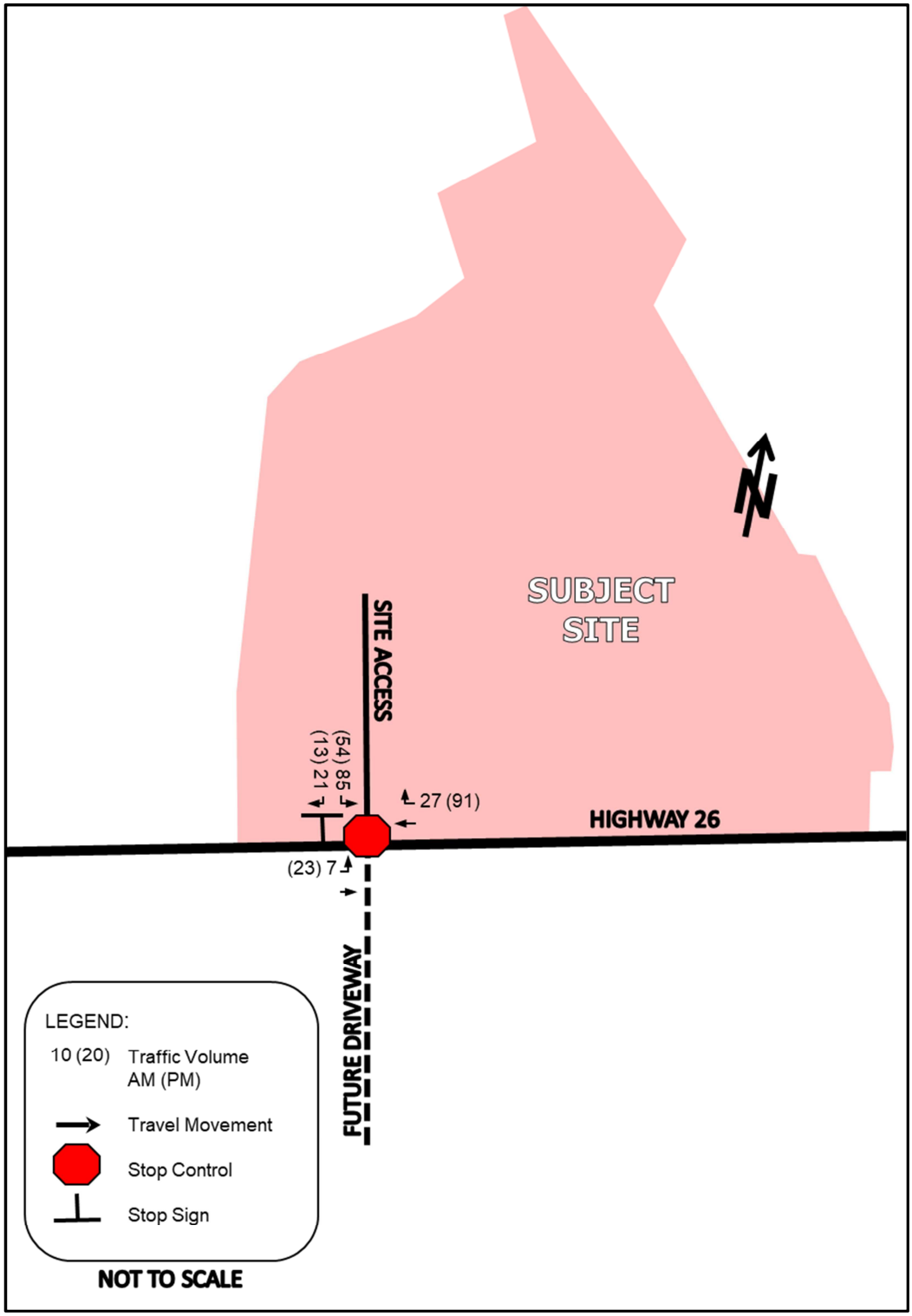
The distribution of site traffic is Meaford Haven TIS for the residential component of Meaford Haven (excerpts provided in **Appendix B**). **Table 3** illustrates the estimated distribution traffic for the proposed development, based on the above-noted assumptions.

Table 3 – Proposed Development Traffic Distribution Summary

Travel Direction (to/from)	Percentage of Total Traffic Generation
East via Highway 26	80%
West via Highway 26	20%
Total	**100%**

Using the traffic distribution patterns noted above, the proposed development traffic assignment was calculated for the AM and PM peak hour and is illustrated in **Figure 5.**

Figure 5 – Proposed Development Traffic Assignment



3.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2023, 2028 & 2033) horizon year traffic volumes, the proposed development traffic (outlined in Section 3.2), the adjacent development traffic volumes (outlined in Section 2.4) and the background traffic growth rate discussed in Section 2.5 has been applied to the existing traffic volumes to estimate the total (2023, 2028 & 2033) horizon year traffic volumes.

Figure 6 to **8** illustrate the background (2023, 2028 & 2033) for the AM and PM peak hour traffic volumes in the study area respectively.

Figure 6 – Total (2023) Traffic Volumes

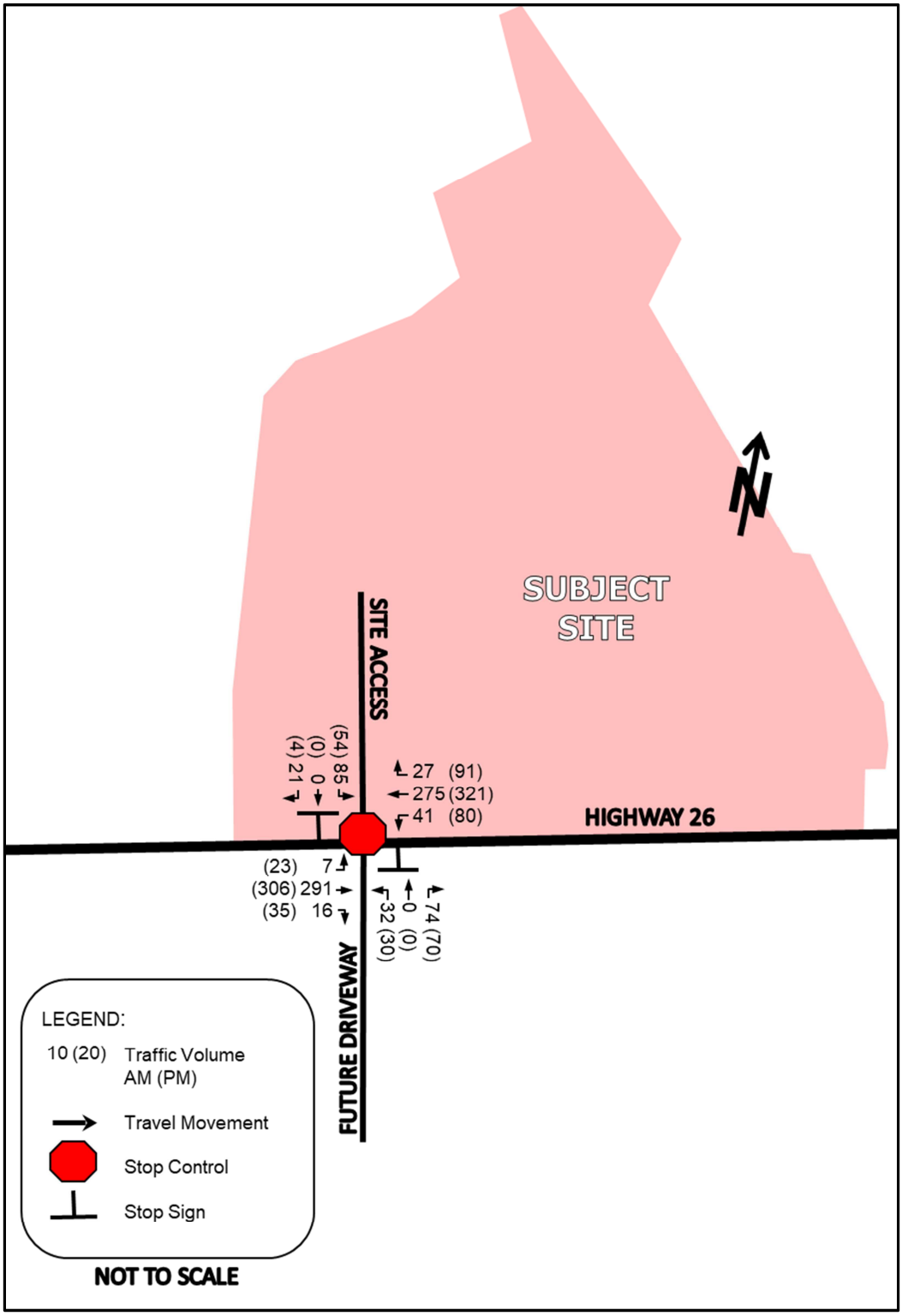


Figure 7 – Total (2028) Traffic Volumes

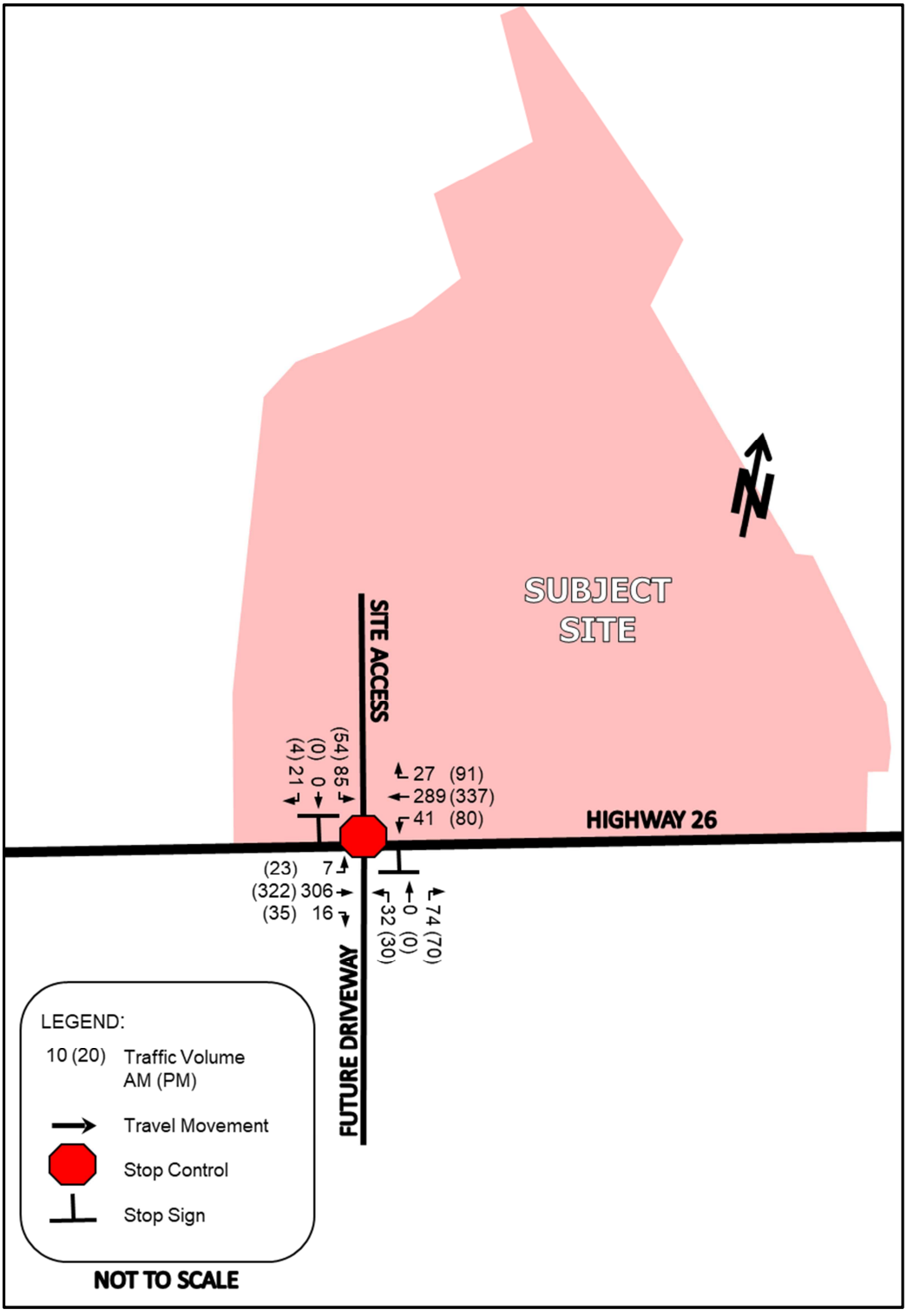
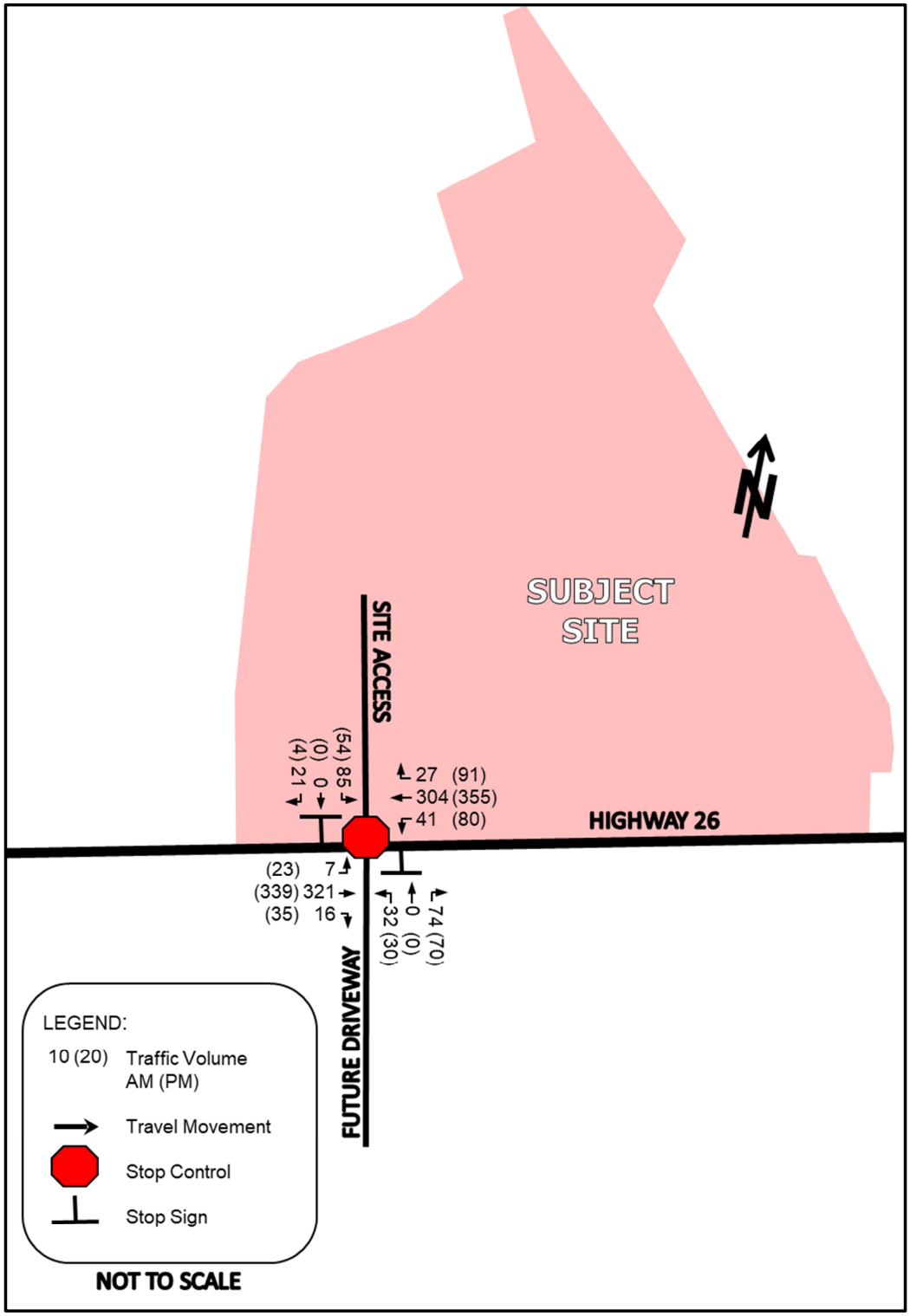


Figure 8 – Total (2033) Traffic Volumes



4 Intersection Operation with Proposed Development

4.1 Intersection Capacity Analysis Criteria

Intersection performance was measured using the traffic analysis software, Synchro 10, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analysing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 10 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 4.** A description of traffic performance characteristics is included for each LOS.

Table 4 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	**Stop Controlled Intersections**
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

4.2 Total (2023) Intersection Operation

The results of the LOS analysis under total (2023) traffic volumes during the AM and PM peak hours can be found below in **Table 5**. The proposed improvements noted in Section 2.2 and existing traffic control have been utilized for the scenario.

An analysis was completed for left turn movements at the Highway 26 / Site Access & Future Driveway intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the above noted criteria an eastbound and westbound left-turn lane is warranted on Highway 26 (results provided in **Appendix E**). The following improvements are recommended at the Highway 26 / Site Access & Future Driveway intersection prior to occupancy of the proposed development:

- Construct an eastbound left turn lane on Highway 26 with an 85 metre parallel length and 105 metre taper length.
- Construct a westbound left turn lane on Highway 26 with a 95 metre parallel length and 105 metre taper length.

It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.

Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 5 - Total (2023) LOS

Location (E-W Street / N-S Street	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.2	A	-	-	-	4.3	A	-	-
NB	0.27	15.3	C	-	-	0.24	15.9	C	-	-
SB	0.49	31.5	D	20	-	0.33	29.8	D	11	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 20 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.3 Total (2028) Intersection Operation

The results of the LOS analysis under total (2028) traffic volumes during the AM and PM peak hours can be found below in **Table 6**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 6 - Total (2028) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.4	A	-	-	-	4.4	A	-	-
NB	0.28	15.9	C	-	-	0.25	16.5	C	-	-
SB	0.52	34.5	D	22	-	0.35	32.0	D	12	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 22 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.4 Total (2033) Intersection Operation

The results of the LOS analysis under total (2033) traffic volumes during the AM and PM peak hours can be found below in **Table 7**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 7 - Total (2033) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.6	A	-	-	-	4.5	A	-	-
NB	0.29	16.5	C	-	-	0.27	17.6	C	-	-
SB	0.55	38.0	E	24	-	0.38	36.0	E	14	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 24 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.5 Site Access

The Site Access will operate efficiently as a full-movement access, with southbound stop control for the Site Access and future northbound stop control for the Meaford Haven Future Driveway. A single ingress and egress lane for the Site Access will provide the necessary capacity to service the proposed development.

The proposed spacing between the Site Access and 7th Line and between the Site Access and Ridge Road (measured centre of driveway to centre of roadway) is less than the desirable spacing requirements as identified in the MTO Highway Corridor Management Manual [MTO HCMM] – Table 4.6.1 (Spacing and density of various access connection types) – 800 metres for a Class 2B MTO highway; however, as noted in Section 4.4 there are no issues with the anticipated queuing eastbound and westbound at the Highway 26 / Site Access intersection and the intersection is operating within typical design limits as noted in Section 4.1.

As noted in Section 4.4, there are no issues with the anticipated queuing for southbound vehicles at the Highway 26 / Site Access intersection in relation to the proposed internal roadway network.

According to the County's Official Plan, new developments with greater than 150 residential units are required to have two or more full-movement accesses. As noted in Section 4.3 there are no safety or operational issues with the single public access onto Highway 26. The traffic operations at the Highway 26 / Site Access & Future Driveway intersection are expected to be within the typical design

limits noted in Section 3.1. With respect to emergency access, the National Fire Protection Agency [NFPA] 1141 Guidelines (2017) Table 5.1.4.1 (a) identifies a need for two access routes (with one of the means of access restricted for emergency use only) for a residential subdivision between 101 units and 600 units. Furthermore, Highway 26 is under the jurisdiction of MTO and their preference is to include a secondary emergency access rather than a secondary public access. Consequently, the proposed configuration of the Site Access and Emergency Access is acceptable for the intended use.

4.6 Sight Distance Review

A review of the sight distance on North Access and South Access was completed as part of this analysis

The sight distance west of the Site Access on Highway 26 (178 metres) is greater than the minimum stopping sight distance requirements as identified in the TAC Guidelines for a design speed of 70km/h (165 metres).

The sight distance east of the Site Access on Highway 26 (230 metres) is significantly greater than the minimum stopping sight distance requirements as identified in the TAC Guidelines for a design speed of 70km/h (165 metres).

Consequently, there are no issues with the sight distance available for the proposed Site Access.

4.7 Sensitivity Analysis - Left Turn Lane Warrant Trigger

The following additional review was completed to assess the development trigger for the construction of the auxiliary left turn lanes recommended in Section 4.2. For the purpose of this supplemental analysis, we have assumed that the proposed development will proceed ahead of the Meaford Haven development on the south side of Highway 26. We have assumed that 100 units (50 single detached units and 50 townhouse units) will be developed in the initial phase(s) of the proposed development and used 2025 as the future horizon year. Applying these parametres would result in an advancing (eastbound) traffic volume of 339 vehicles, and opposing (westbound) traffic volume of 385 vehicles and a 3% left turns in volume advancing. Based on the MTO DS criteria, an eastbound left-turn lane is not warranted on Highway 26 for this scenario (results provided in **Appendix E**).

Consequently, the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site or 2025, assuming there is no development in the Meaford Heaven development.

5 Summary

LC Development Group Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford, County of Grey. The site plan provided by the Developer is included in **Appendix A.** This chapter summarizes the methodology, conclusions and recommendations from the study.

The proposed development is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units

1. The proposed development is expected to generate 140 AM and 181 PM new peak hour trips in the study area.

2. Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26 west of Ridge Road, completed on Thursday, December 5th, 2019.
3. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersection.
4. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended:

   Highway 26 / Site Access & Future Driveway

   Opening Day (2023) traffic volumes

   - Eastbound left-turn lane on Highway 26 with an 85 metre parallel length and a 105 metre taper length.
   - Westbound left turn lane on Highway 26 with a 95 metre parallel length and a 105 metre taper length.
   - It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.
5. The Site Access will operate efficiently as a full-movement access, with southbound stop control. A single lane for ingress and egress movements at the Site Access driveway will provide the necessary capacity to convey the traffic volume generated by the proposed development.
6. There are no issues with the sight distance available for the proposed Site Access.
7. Assuming there is no occupancy in the Meaford Heaven development prior to 2028; the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site.
8. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Appendix A – Site Plan

APPROXIMATE EDGE OF EXISTING STREAM

REMNANT LOT = 1.77ha

30m SETBACK FROM APPROXIMATE EDGE OF EXISTING STREAM

STORMWATER MANAGEMENT FACILITY BLOCK 0.60ha±

6m SWM FACILITY ACCESS

10m DRIVEWAY TO REMNANT LOT

6m SWM POND OUTLET EASMENT

ONTARIO REGULATION 151/06 (APPROX.)

NATURAL HAZARD (APPROX.)

14m MTO SETBACK

HIGHWAY 26

EMERGENCY ACCESS

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

CLIENT/PROJECT

LOON CALL
MEAFORD PROPERTY - M-1

DRAWING TITLE

LOT CONCEPT SKETCH

SEAL

NORTH ARROW

KEY MAP

PROJECT NO.	19-11471-M
DRAWING NO.	SP-1
DESIGN BY:	T.H.
DRAWN BY:	G.N.
CHECKED	T.H.
DATE:	FEBRUARY 2020
SCALE:	1:800

NOTES

1. LEGAL INFORMATION FROM REGISTERED PLANS 16R-5037 AND 16R-10913
2. AERIAL PHOTO INFORMATION FROM COUNTY OF GREY-BRUCE GIS. LOCATION AND SCALE OF PHOTO IS APPROXIMATE. YEAR OF IMAGE IS 2015.

Appendix B –
Meaford Haven TIS Excerpts

TRAFFIC IMPACT STUDY

7109 MAIN STREET, STAYNER

DUO INVESTEMENTS INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
110 PINE STREET
COLLINGWOOD, ONTARIO
L9Y 2N9

FEBRUARY 2011

CFCA FILE NO. 446-3026

approximately at the east boundary of the subject property. At the intersection of Highway 26 and Ford Avenue, 150 metres east of Ridge Road, the highway is under the jurisdiction of the Municipality of Meaford through the connecting links program.

7th Line is a two lane north-south rural roadway under the jurisdiction of the Municipality of Meaford. The roadway is designated a local roadway within the Meaford Official Plan. The speed limit is not posted and is therefore 80 km/h per municipal regulation. The roadway is approximately 800 metres west of the subject lands.

Ridge Road is a two-lane north-south rural roadway under the jurisdiction of the Municipality of Meaford. The roadway is designated a local roadway with the Meaford Official Plan. The speed limit is not posted and is therefore 50 km/h per municipal regulation. The roadway is approximately 400 metres east of the subject lands.

St. Andrews Drive is a two-lane east-west urban roadway under the jurisdiction of the Municipality of Meaford. The roadway is not identified in the Municipality of Meaford Official Plan as the roadway has been recently constructed as part of a subdivision development. The speed limit is not posted and is therefore 50 km/h per municipal regulation.

The four-legged intersection of Highway 26 (east and west approaches) and 7th Line (north and south approaches) is unsignalized. The west approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane and a right-turn taper. The east approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane and a right-turn lane. The north and south approaches (7th Line) are stop-controlled with no exclusive turn lanes.

The three-legged intersection of Highway 26 (east and west approaches) and Ridge Road (south approach) is unsignalized. The west approach (Highway 26) has no restriction to free-flow and consists of a through lane and a right turn taper. The east approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane. The south approach (Ridge Road) is stop controlled and consists of a shared right/left-turn lane. No north approach exists at the intersection.

The three-legged intersection of Ridge Road (north and south approaches) and St. Andrews Drive (east approach) is unsignalized. The north approach (Ridge Road) has no restriction to free-flow and consists of a shared through/left-turn lane. The south approach (Ridge Road) has no restriction to free-flow and consists of a shared through/right-turn lane. The east approach (St. Andrews Drive) is stop-controlled and consists of a shared right/left-turn lane. No west approach exists at the intersection.

3.4 Development Proposal

The proposed development is to consist of mixed commercial and residential uses. The commercial use will consist of a 12,000 square foot gross floor area contained within a single building in the northeast area of the property. All remaining areas will contain a variety of residential dwelling unit types. In addition, a private community centre will be provided for the residents. Table 1 provides information on the various uses and the corresponding Institute of Transportation Engineers (ITE) land use codes used for trip generation. Since the time of analysis, a reduction of five residential units has occurred. Table 1 reflects the penultimate concept plan.

Table 1
Development Components

Type	Units	ITE Code	ITE Category
Single Family Lots	18	210	Single-Family Detached Housing
Seniors Apartments	60	252	Senior Adult Housing – Attached
Condo Apartments	96	232	High-Rise Residential Condominium/Townhouse
Bungalows	192	231	Low-Rise Residential Condominium/Townhouse
Above-Commercial Condo	12	231	Low-Rise Residential Condominium/Townhouse
Medical Offices	6,500 ft²	720	Medical-Dental Office Building
Pharmacy	5,500 ft²	880	Pharmacy/Drugstore without Drive-Through Window

The tenure of the proposed development is to be primarily condominium with private roadways. Access to Highway 26 will be through a public roadway which will terminate at a gate facility 130 metres south of the Highway 26 right-of-way. A private road connection secured by a gate facility will be made to the termini of Fairway Avenue.

Refer to Figure 2 for the concept plan prepared by Hensel Design Group, January, 2011.

3.5 Traffic Data

Turning movement counts at the intersections of Highway 26 and 7th Line, Highway 26 and Ridge Road, and Ridge Road and St. Andrews Drive were undertaken by C. F. Crozier & Associates staff from 7:00 to 9:00 a.m. and from 4:00 to 6:00 p.m. on Friday, November 19, 2010. A Friday was selected to capture both commuter and weekend recreational traffic in the Georgian Triangle Area.

The intersection of Highway 26 and the site entrance will operate at a Level of Service "C" and "D" during the 2030 a.m. and p.m. peak hours, respectively. The entrance will have a maximum volume-to-capacity ratio of 0.46, indicating significant reserve capacity should there be an increase in site generated traffic volumes. The maximum 95th percentile queue length will be 17.0 metres, equivalent to three vehicles. As such, there will be no interference between exiting vehicles and the entry gatehouse to the private roadway areas of the development.

6.5 Local Road Affects

The proposed development will result in the addition of traffic volumes to local roads east of the site. During the critical Friday p.m. peak hour, this addition in both directions will total of 76 vehicles, which equates to 1.3 vehicles per minute, or one vehicle every 47 seconds. This additional traffic will not materially alter the urban local nature of the roadway, which is described by the Transportation Association of Canada as a roadway experiencing fewer than one thousand vehicles per day.

Two-way traffic volumes on St. Andrews Drive will increase by a total of 39 vehicles during the critical Friday p.m. peak hour. This volume equates to 0.65 vehicles per minute, or one vehicle every 92 seconds. As before, this additional traffic will not materially alter the urban local roadway.

7.0 Conclusions and Recommendations

Turning movement counts undertaken on Friday, November 19, 2010 were scaled by a factor of 1.34 to reflect traffic volumes during the peak summer driving season.

Intersection analyses of existing traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Street operate at a LOS "C" in the critical Friday p.m. peak hour. The intersection of Ridge Road and St. Andrews Drive operates at a LOS "A" during both the Friday a.m. and p.m. peak hours.

Intersection analyses of the 2020, 2025 and 2030 future background traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Road are expected to operate at a LOS "C" during the Friday a.m. peak hours and LOS "D" (Ridge Road) and LOS "F" (7th Line) or better during the Friday p.m. peak hour. The decrease in Level of Service is a result of general traffic growth over the 20 year horizon.

The proposed development is expected to add 192 and 223 residential trips to the boundary road system in the a.m. and p.m. peak hours, respectively. In addition, 23 and 44 primary commercial trips are expected in the a.m. and p.m. peak hours, respectively.

A left-turn lane analysis was undertaken for the intersection of Highway 26 and the site entrance. It was concluded that a westbound left turn lane is warranted. It is recommended that a westbound left turn lane be implemented at the site entrance consisting of 50 metres of storage length, 60 metres of parallel lane length, and 145 metres of taper length.

Intersection analysis of the 2020, 2025 and 2030 total background traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Road will experience greater delay and culminate in a LOS "F" at 7th Line during the 2030 p.m. peak hour. It is recommended that the intersection of Highway 26 and 7th Line be monitored in the 20 year horizon to determine if traffic volumes outside of the critical Friday

p.m. peak hour are sufficient to trigger a signal warrant.

The analysis undertaken within was prepared using the most recent draft plan. Any minor changes to the plan will not materially affect the conclusions and recommendations contained within this report.

It is concluded that the traffic affects associated with the proposed development can be mitigated through the implementation of a westbound left-turn lane at the site entrance.

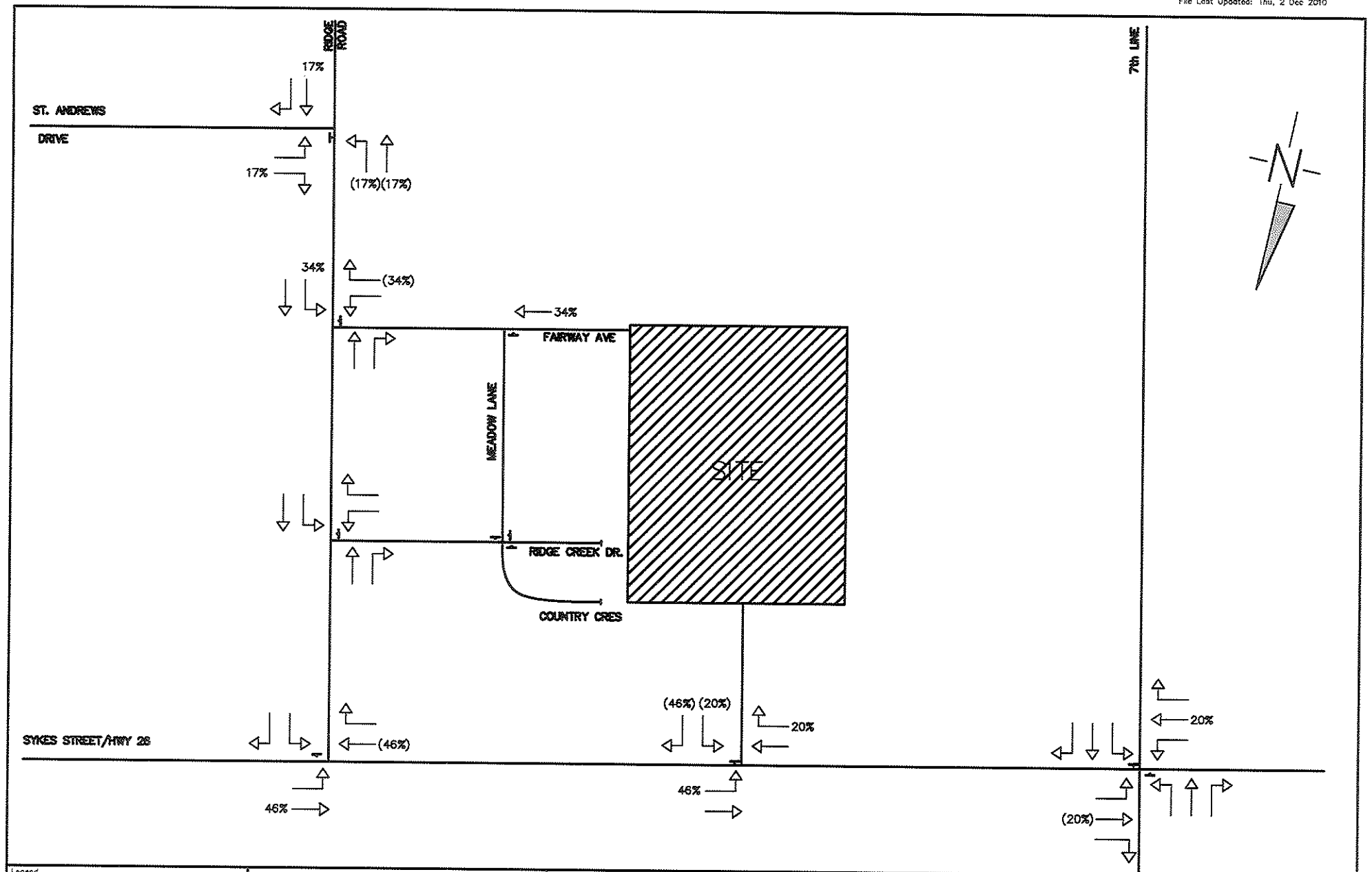
Prepared by,

C.F. CROZIER & ASSOCIATES INC.:

LICENSED PROFESSIONAL ENGINEER
A. J. W. FLEMING
100012282
PROVINCE OF ONTARIO

Alexander J. W. Fleming, MBA, P.Eng., PTOE

J:\400\446 - Pierre Boiron\3026 - Meaford West Property\Traffic\Meaford West TIS.doc



Legend

STOP CONTROL

XX(YY) INBOUND (OUTBOUND)

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

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TOWN OF MEAFORD

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INFO@CFCROZIER.CA

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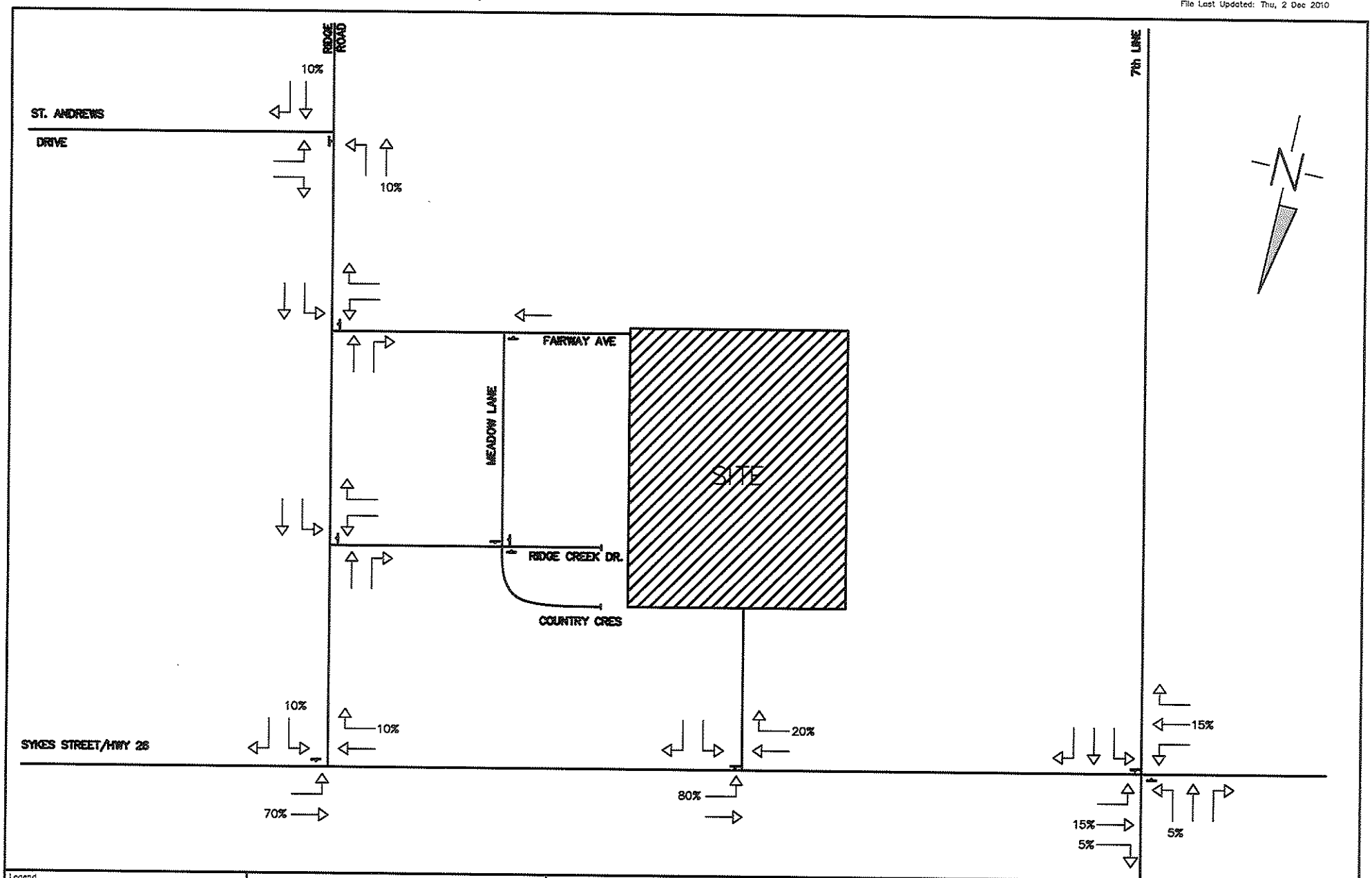
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 7



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STOP CONTROL

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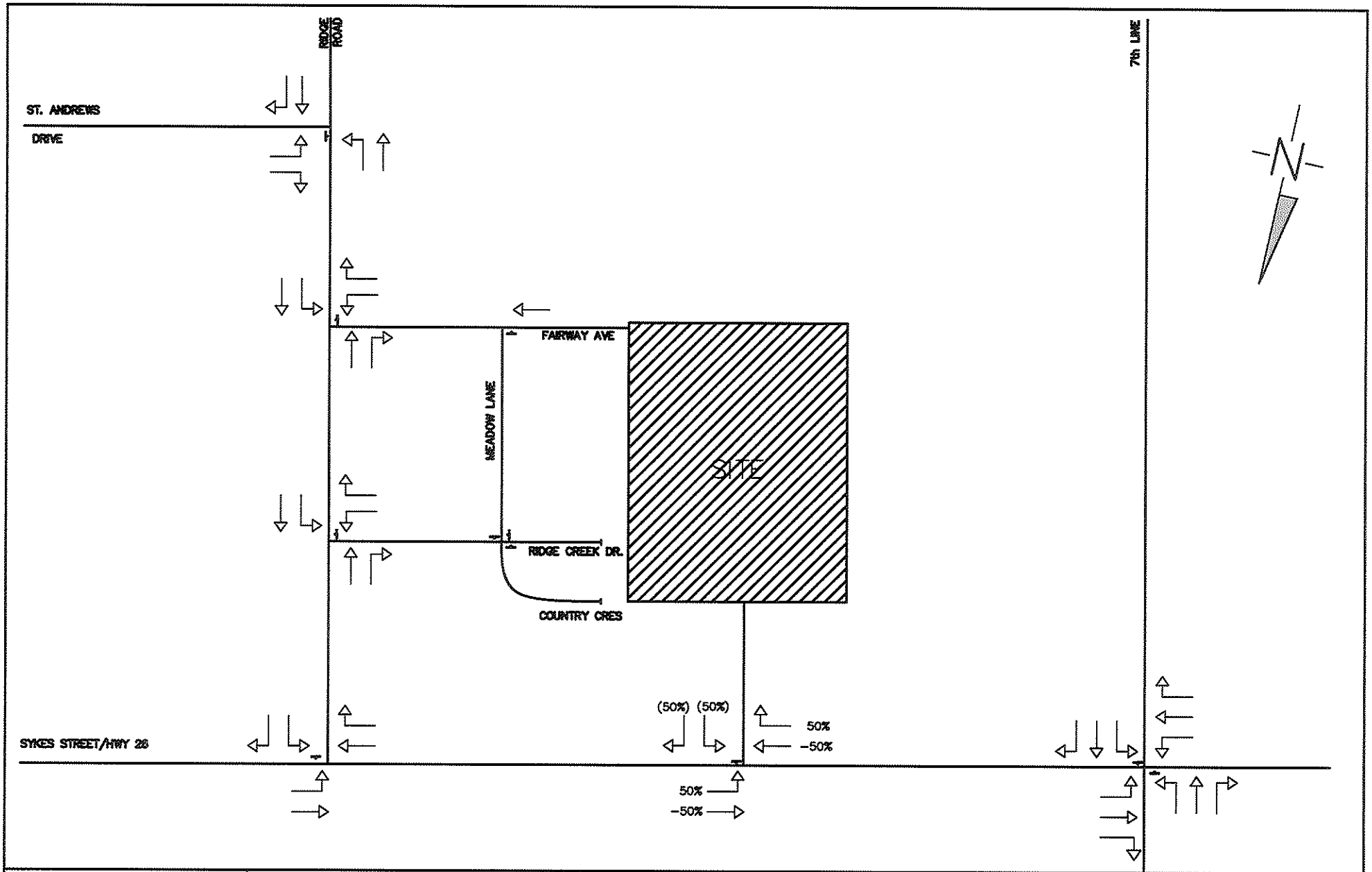
INFO@CFCROZIER.CA

Drawn By	R.F.	Check By	A.J.F.	Project No.	446-3026
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 8



Legend

STOP CONTROL

XX(YY) INBOUND (OUTBOUND)

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TOWN OF MEAFORD

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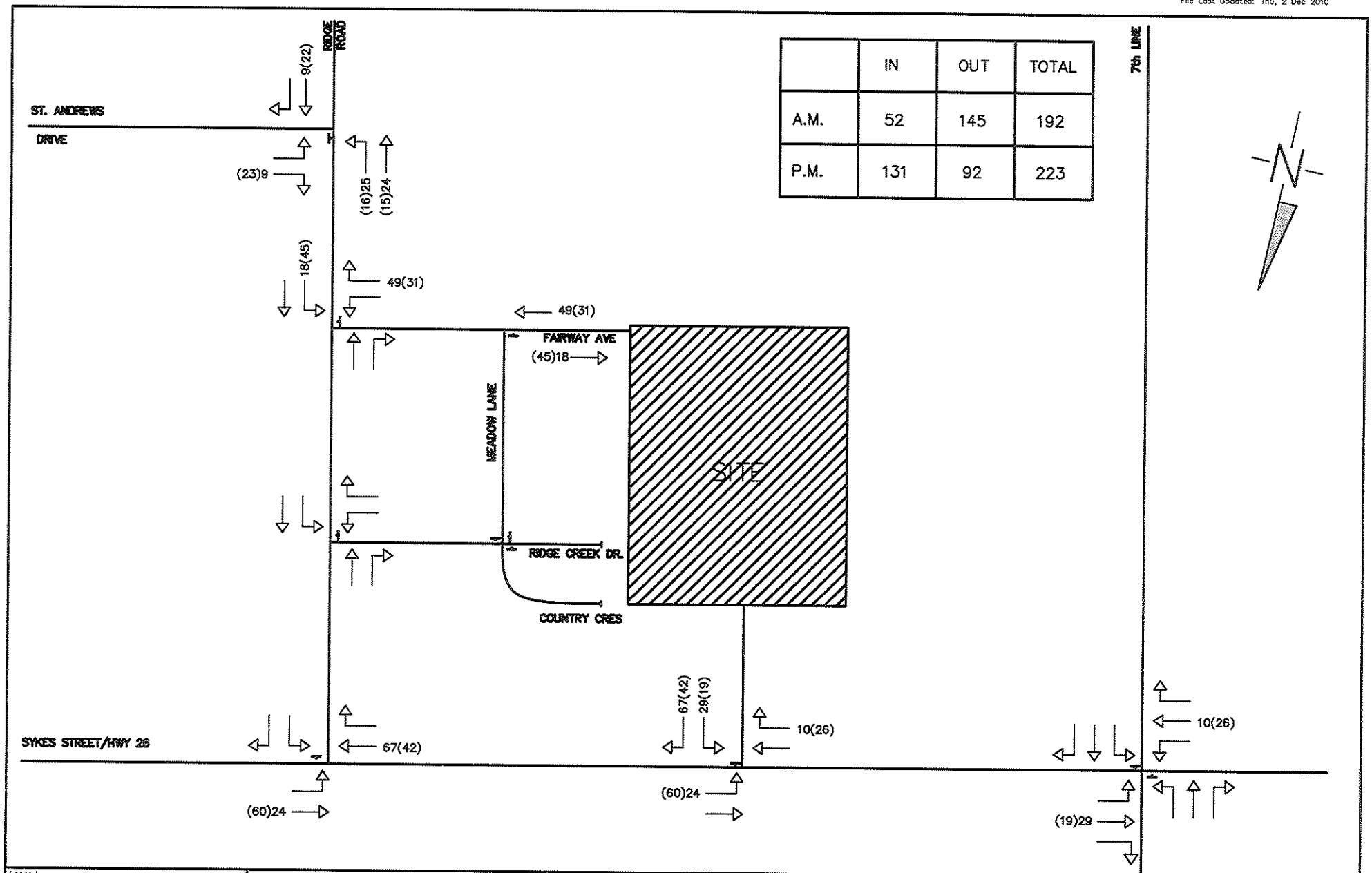
Drawn By	R.F.	Check By	A.J.F.	Project No.	446-3026
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 9



	IN	OUT	TOTAL
A.M.	52	145	192
P.M.	131	92	223

Legend

STOP CONTROL

XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

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COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

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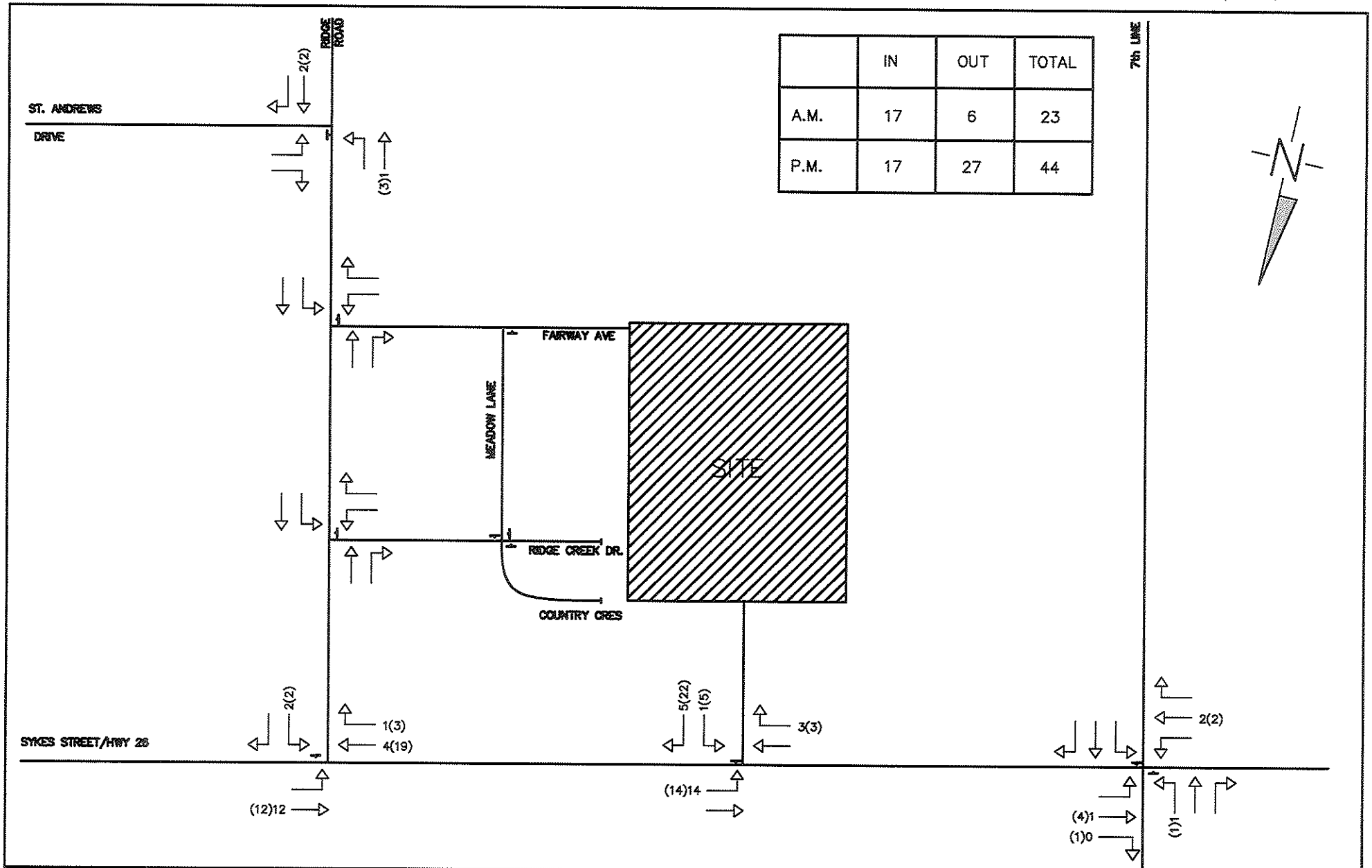
N.T.S.	12/1/2010	FIG. 10



	IN	OUT	TOTAL
A.M.	17	6	23
P.M.	17	27	44

Legend

STOP CONTROL

XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

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COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

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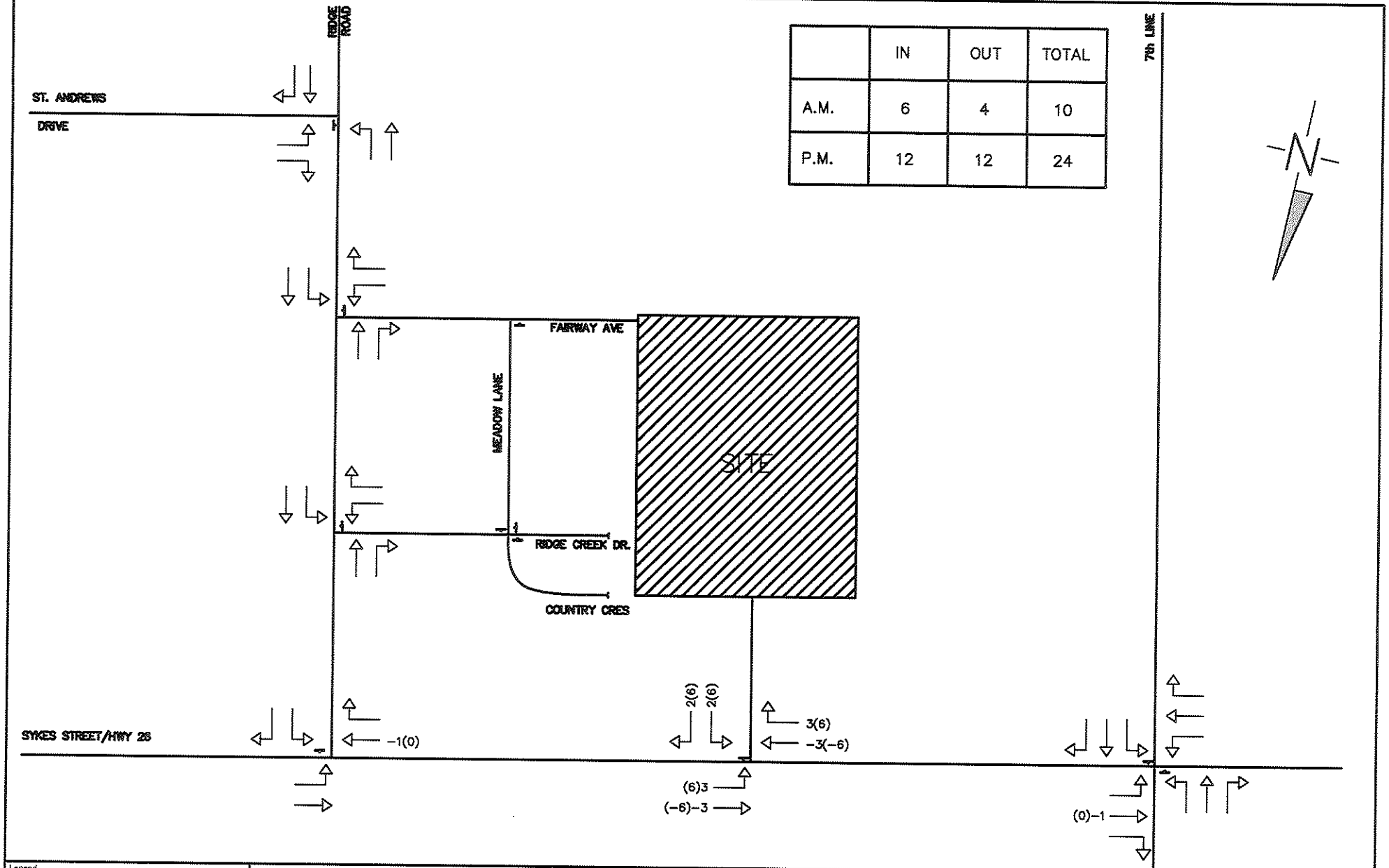
Scale N.T.S.	Date 12/1/2010	Drawing No.	FIG. 11



	IN	OUT	TOTAL
A.M.	6	4	10
P.M.	12	12	24

Legend

STOP CONTROL

XX(YY) A.M (P.M.) PEAK HOUR TRAFFIC VOLUMES

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TOWN OF MEAFORD

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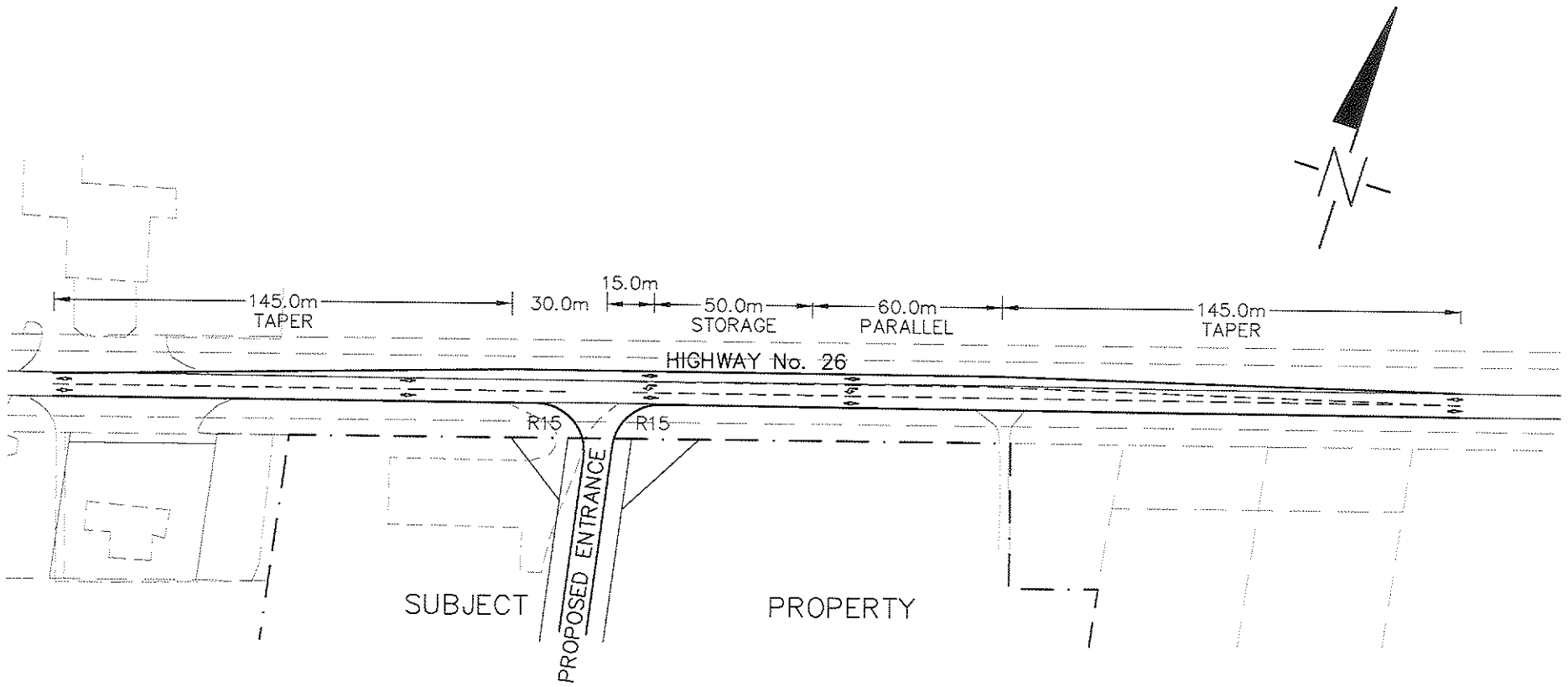
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By R.F.	Check By A.J.F.	Project No.	446-3026
Scale N.T.S.	Date 12/1/2010	Drawing No.	FIG. 12



Project
MEAFORD HAVEN DEVELOPMENT
TOWN OF MEAFORD

Drawing
PRELIMINARY DESIGN
LEFT TURN LANE

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Consulting Engineers
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COLLINGWOOD, ON L9Y 2X9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
J.O.	A.F.	446-3026
Scale	Date	Check By	Drawing
1:2000	02/07/11	A.F.	Fig. 16

Appendix C –
Traffic Count Data

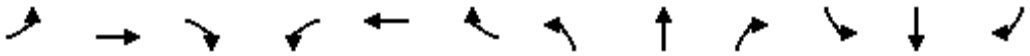
Ontario Traffic Inc

17705 Leslie Street, Unit 6
Newmarket, ON L3Y 3E3, Canada

Site Code:
Station ID:
Hwy 26 west of Ridge Rd

Start Time	05-Dec-19 Thu	Car (EB)	Truck (EB)	Car (WB)	Truck (WB)					Total
12:00 AM		0	0	0	0					0
01:00		0	0	0	0					0
02:00		0	0	0	0					0
03:00		0	0	0	0					0
04:00		0	0	0	0					0
05:00		0	0	0	0					0
06:00		0	0	0	0					0
07:00		160	18	209	8					395
08:00		**232**	**25**	**222**	**22**					**501**
09:00		0	0	0	0					0
10:00		0	0	0	0					0
11:00		186	24	177	22					409
12:00 PM		222	16	217	26					481
01:00		213	21	232	18					484
02:00		0	0	0	0					0
03:00		233	**27**	234	23					517
04:00		**236**	25	**242**	**33**					**536**
05:00		200	15	189	11					415
06:00		0	0	0	0					0
07:00		0	0	0	0					0
08:00		0	0	0	0					0
09:00		0	0	0	0					0
10:00		0	0	0	0					0
11:00		0	0	0	0					0
Total		1682	171	1722	163					3738
Percent		45.0%	4.6%	46.1%	4.4%					
AM Peak	-	08:00	08:00	08:00	08:00	-	-	-	-	08:00
Vol.	-	232	25	222	22	-	-	-	-	501
PM Peak	-	16:00	15:00	16:00	16:00	-	-	-	-	16:00
Vol.	-	236	27	242	33	-	-	-	-	536
Grand Total		1682	171	1722	163					3738
Percent		45.0%	4.6%	46.1%	4.4%					
ADT		ADT 3,738		AADT 3,738						

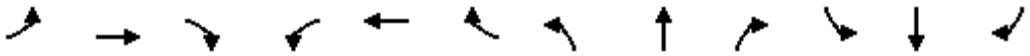
Appendix D –
Synchro Analysis Output –
Total Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	291	16	41	275	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	291	16	41	275	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	346	19	49	327	32	38	0	88	101	0	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	359			365			822	828	356	891	822	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			365			822	828	356	891	822	343
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			86	100	87	55	100	96
cM capacity (veh/h)	1211			1194			275	294	693	223	296	704

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	365	49	359	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1211	1700	1194	1700	475	258
Volume to Capacity	0.01	0.21	0.04	0.21	0.27	0.49
Queue Length 95th (m)	0.2	0.0	1.0	0.0	8.5	19.9
Control Delay (s)	8.0	0.0	8.1	0.0	15.3	31.5
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		1.0		15.3	31.5
Approach LOS					C	D

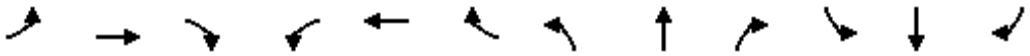
Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	42.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	306	35	80	321	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	306	35	80	321	91	30	0	70	54	0	13
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)	24	326	37	85	341	97	32	0	74	57	0	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	438			363			918	1000	344	1008	970	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	438			363			918	1000	344	1008	970	390
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			86	100	89	69	100	98
cM capacity (veh/h)	1133			1196			232	223	703	184	232	663

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	363	85	438	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1133	1700	1196	1700	436	215
Volume to Capacity	0.02	0.21	0.07	0.26	0.24	0.33
Queue Length 95th (m)	0.5	0.0	1.8	0.0	7.5	11.0
Control Delay (s)	8.2	0.0	8.2	0.0	15.9	29.8
Lane LOS	A		A		C	D
Approach Delay (s)	0.5		1.3		15.9	29.8
Approach LOS					C	D

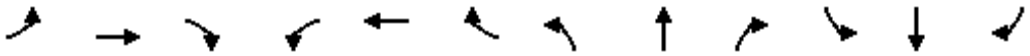
Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	44.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	306	16	41	289	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	306	16	41	289	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	364	19	49	344	32	38	0	88	101	0	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	376			383			856	864	374	926	857	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			383			856	864	374	926	857	360
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			85	100	87	52	100	96
cM capacity (veh/h)	1194			1175			260	280	677	211	283	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	383	49	376	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1194	1700	1175	1700	456	244
Volume to Capacity	0.01	0.23	0.04	0.22	0.28	0.52
Queue Length 95th (m)	0.2	0.0	1.0	0.0	8.9	21.6
Control Delay (s)	8.0	0.0	8.2	0.0	15.9	34.5
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		0.9		15.9	34.5
Approach LOS					C	D

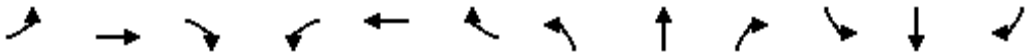
Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	43.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	322	35	80	337	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	322	35	80	337	91	30	0	70	54	0	13
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)	24	343	37	85	359	97	32	0	74	57	0	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	456			380			952	1036	362	1042	1006	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456			380			952	1036	362	1042	1006	408
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			85	100	89	67	100	98
cM capacity (veh/h)	1115			1178			219	212	688	174	221	648

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	380	85	456	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1115	1700	1178	1700	418	203
Volume to Capacity	0.02	0.22	0.07	0.27	0.25	0.35
Queue Length 95th (m)	0.5	0.0	1.9	0.0	8.0	11.8
Control Delay (s)	8.3	0.0	8.3	0.0	16.5	32.0
Lane LOS	A		A		C	D
Approach Delay (s)	0.5		1.3		16.5	32.0
Approach LOS					C	D

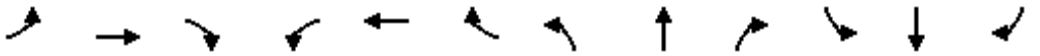
Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	321	16	41	304	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	321	16	41	304	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	382	19	49	362	32	38	0	88	101	0	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	394			401			892	900	392	962	893	378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394			401			892	900	392	962	893	378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			85	100	87	49	100	96
cM capacity (veh/h)	1176			1158			245	267	662	198	269	673

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	401	49	394	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1176	1700	1158	1700	438	230
Volume to Capacity	0.01	0.24	0.04	0.23	0.29	0.55
Queue Length 95th (m)	0.2	0.0	1.1	0.0	9.4	23.6
Control Delay (s)	8.1	0.0	8.2	0.0	16.5	38.0
Lane LOS	A		A		C	E
Approach Delay (s)	0.2		0.9		16.5	38.0
Approach LOS					C	E

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	43.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	349	35	80	364	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	349	35	80	364	91	30	0	70	54	0	13
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)	24	371	37	85	387	97	32	0	74	57	0	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	484			408			1008	1092	390	1098	1062	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			408			1008	1092	390	1098	1062	436
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			84	100	89	64	100	98
cM capacity (veh/h)	1089			1151			200	196	663	158	204	625

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	408	85	484	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1089	1700	1151	1700	391	185
Volume to Capacity	0.02	0.24	0.07	0.28	0.27	0.38
Queue Length 95th (m)	0.5	0.0	1.9	0.0	8.7	13.3
Control Delay (s)	8.4	0.0	8.4	0.0	17.6	36.0
Lane LOS	A		A		C	E
Approach Delay (s)	0.5		1.3		17.6	36.0
Approach LOS					C	E

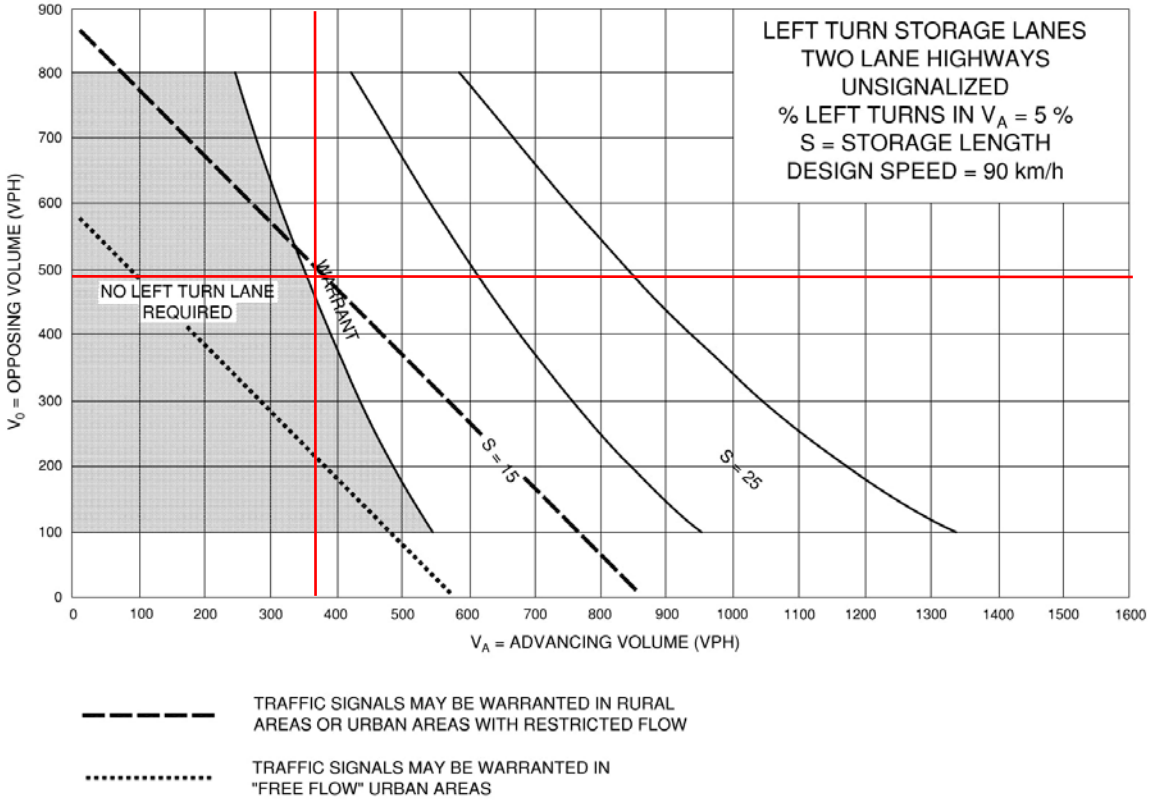
Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			

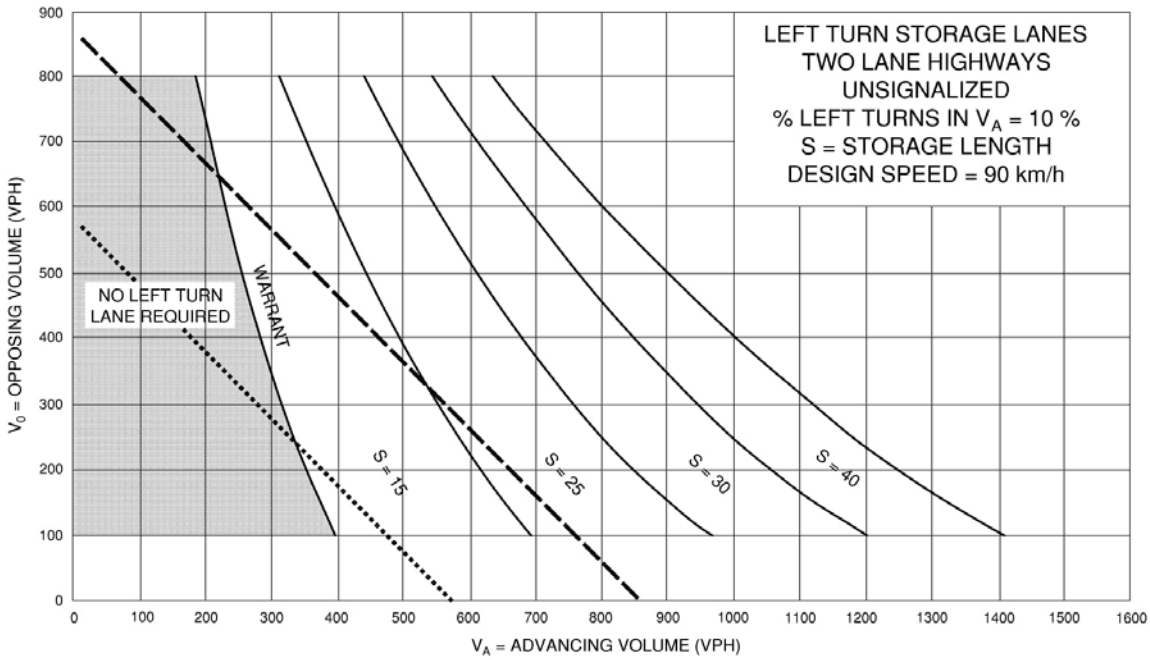
Appendix E –
MTO Left Turn Analysis

Highway 26 / Site Access & Future Driveway

2023 Total - Eastbound **Exhibit 9A-18**

Critical Case - PM Peak Hour

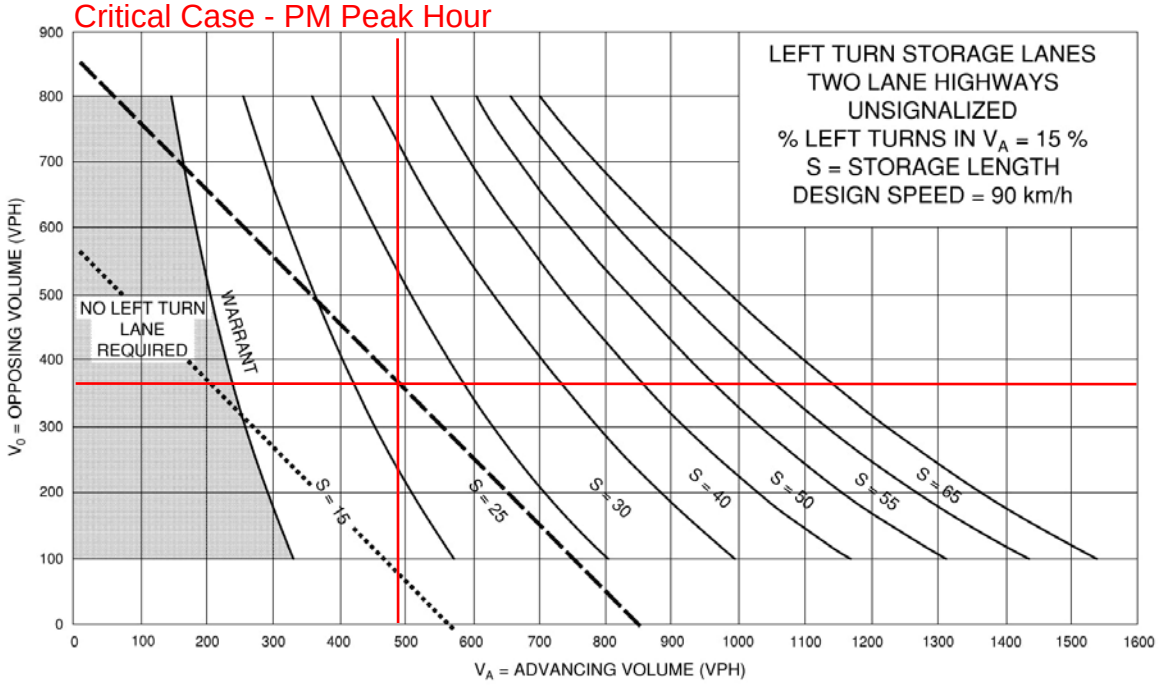




Highway 26 / Site Access & Future Driveway

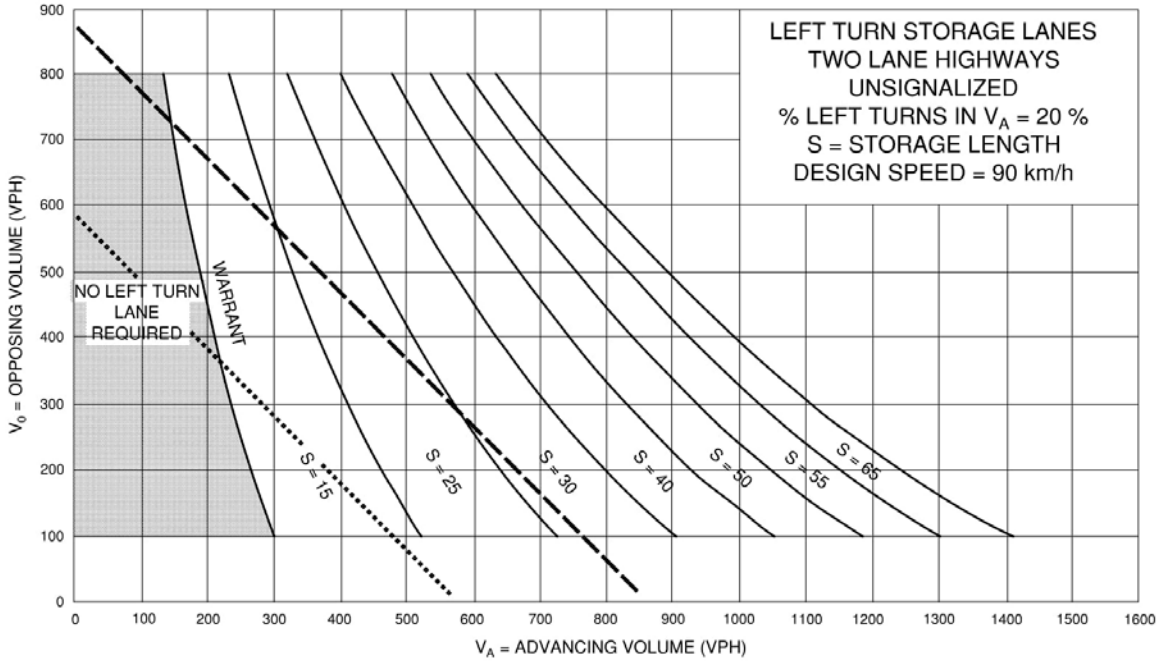
2023 Total - Westbound **Exhibit 9A-19**

Critical Case - PM Peak Hour



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

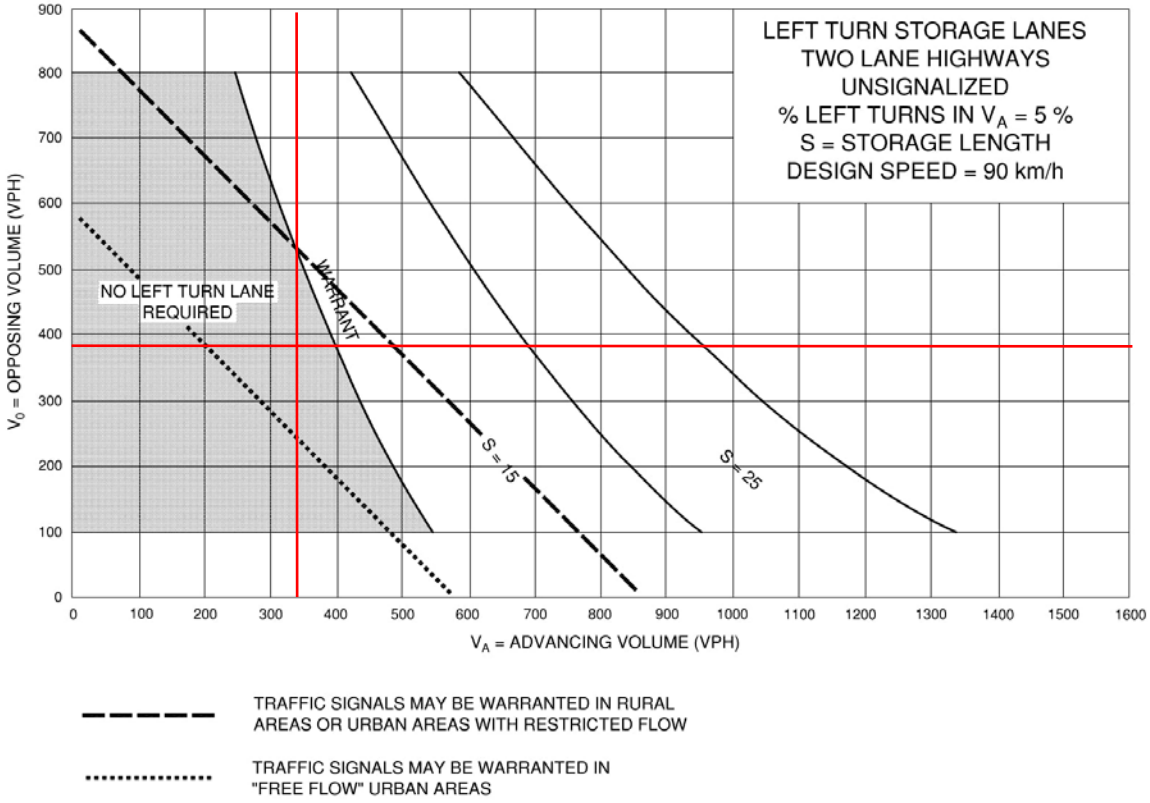
TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

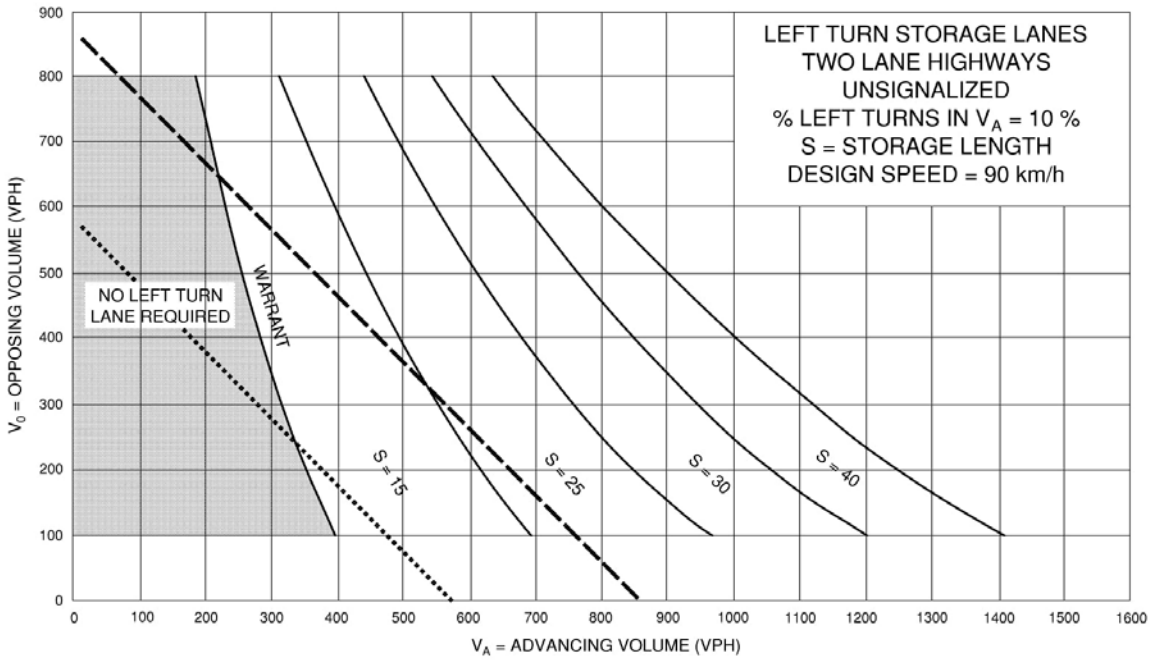


Sensitivity Analysis - Highway 26 / Site Access

2028 Total - Eastbound **Exhibit 9A-18**

Critical Case - PM Peak Hour





Appendix F –
OTM Signal Justification Sheets

Justification No. 7 - 2033 Total Traffic (Critical Case)

Highway 26 / Site Access & Future Driveway intersectior

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Free Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	505	105%	53%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	120	95	79%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	368	77%	51%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	50	101%		NO	YES

APPENDIX E

Level of Service Definitions

Level of Service Definitions

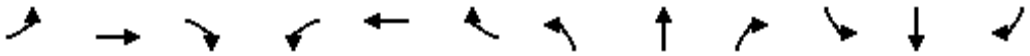
Two-Way Stop Controlled Intersections

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 F

Capacity Analysis Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	167	7	8	199	34	13	11	18	54	10	15
Future Volume (Veh/h)	22	167	7	8	199	34	13	11	18	54	10	15
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)	25	190	8	9	226	39	15	12	20	61	11	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	265			198			506	523	190	510	492	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	265			198			506	523	190	510	492	226
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	98			99			97	97	98	86	98	98
cM capacity (veh/h)	1167			1387			451	449	857	444	463	771

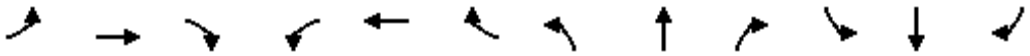
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	25	190	8	9	226	39	47	89
Volume Left	25	0	0	9	0	0	15	61
Volume Right	0	0	8	0	0	39	20	17
cSH	1167	1700	1700	1387	1700	1700	564	486
Volume to Capacity	0.02	0.11	0.00	0.01	0.13	0.02	0.08	0.18
Queue Length 95th (m)	0.5	0.0	0.0	0.2	0.0	0.0	2.2	5.3
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	12.0	14.1
Lane LOS	A			A			B	B
Approach Delay (s)	0.9			0.3			12.0	14.1
Approach LOS							B	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	32.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	227	12	14	217	23	13
Future Volume (Veh/h)	227	12	14	217	23	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	258	14	16	247	26	15
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			272		544	265
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			272		544	265
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		95	98
cM capacity (veh/h)			1303		491	779

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	272	16	247	41
Volume Left	0	16	0	26
Volume Right	14	0	0	15
cSH	1700	1303	1700	567
Volume to Capacity	0.16	0.01	0.15	0.07
Queue Length 95th (m)	0.0	0.3	0.0	1.9
Control Delay (s)	0.0	7.8	0.0	11.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		11.8
Approach LOS				B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	287	22	17	271	82	6	14	3	99	19	57
Future Volume (Veh/h)	29	287	22	17	271	82	6	14	3	99	19	57
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	326	25	19	308	93	7	16	3	112	22	65
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	401			351			814	831	326	749	763	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	401			351			814	831	326	749	763	308
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			97	95	100	63	93	91
cM capacity (veh/h)	1169			1219			250	294	720	305	322	737

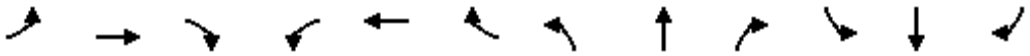
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	326	25	19	308	93	26	199
Volume Left	33	0	0	19	0	0	7	112
Volume Right	0	0	25	0	0	93	3	65
cSH	1169	1700	1700	1219	1700	1700	300	380
Volume to Capacity	0.03	0.19	0.01	0.02	0.18	0.05	0.09	0.52
Queue Length 95th (m)	0.7	0.0	0.0	0.4	0.0	0.0	2.3	23.4
Control Delay (s)	8.2	0.0	0.0	8.0	0.0	0.0	18.1	24.4
Lane LOS	A			A			C	C
Approach Delay (s)	0.7			0.4			18.1	24.4
Approach LOS							C	C

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	45.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	355	34	19	346	24	8
Future Volume (Veh/h)	355	34	19	346	24	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	403	39	22	393	27	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			442		860	422
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			442		860	422
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			98		91	99
cM capacity (veh/h)			1097		317	636

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	442	22	393	36
Volume Left	0	22	0	27
Volume Right	39	0	0	9
cSH	1700	1097	1700	363
Volume to Capacity	0.26	0.02	0.23	0.10
Queue Length 95th (m)	0.0	0.5	0.0	2.6
Control Delay (s)	0.0	8.3	0.0	16.0
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		16.0
Approach LOS				C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	178	7	8	224	34	14	12	19	55	11	16
Future Volume (Veh/h)	23	178	7	8	224	34	14	12	19	55	11	16
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)	26	202	8	9	255	39	16	14	22	62	12	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	294			210			551	566	202	556	535	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	294			210			551	566	202	556	535	255
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	98			99			96	97	97	85	97	98
cM capacity (veh/h)	1138			1373			419	424	844	410	437	742

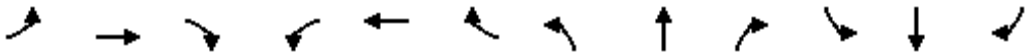
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	26	202	8	9	255	39	52	92
Volume Left	26	0	0	9	0	0	16	62
Volume Right	0	0	8	0	0	39	22	18
cSH	1138	1700	1700	1373	1700	1700	534	453
Volume to Capacity	0.02	0.12	0.00	0.01	0.15	0.02	0.10	0.20
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	2.6	6.0
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	12.5	15.0
Lane LOS	A			A			B	B
Approach Delay (s)	0.9			0.2			12.5	15.0
Approach LOS							B	B

Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	34.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	317	12	15	249	24	14
Future Volume (Veh/h)	317	12	15	249	24	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	360	14	17	283	27	16
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			374		684	367
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			374		684	367
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		93	98
cM capacity (veh/h)			1196		397	683

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	374	17	283	43
Volume Left	0	17	0	27
Volume Right	14	0	0	16
cSH	1700	1196	1700	470
Volume to Capacity	0.22	0.01	0.17	0.09
Queue Length 95th (m)	0.0	0.3	0.0	2.4
Control Delay (s)	0.0	8.1	0.0	13.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		13.4
Approach LOS				B

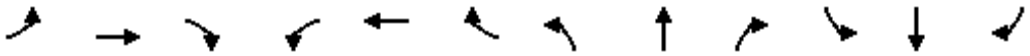
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	245	0	0	246	27	0	0	0	85	0	21
Future Volume (Veh/h)	7	245	0	0	246	27	0	0	0	85	0	21
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)	8	278	0	0	280	31	0	0	0	97	0	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	311			278			614	605	278	590	590	296
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311			278			614	605	278	590	590	296
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	77	100	97
cM capacity (veh/h)	1249			1285			389	409	761	417	418	744

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	286	311	0	121
Volume Left	8	0	0	97
Volume Right	0	31	0	24
cSH	1249	1285	1700	457
Volume to Capacity	0.01	0.00	0.00	0.26
Queue Length 95th (m)	0.2	0.0	0.0	8.4
Control Delay (s)	0.3	0.0	0.0	15.7
Lane LOS	A		A	C
Approach Delay (s)	0.3	0.0	0.0	15.7
Approach LOS			A	C

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	31.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	315	23	18	290	83	6	15	3	101	20	58
Future Volume (Veh/h)	29	315	23	18	290	83	6	15	3	101	20	58
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	358	26	20	330	94	7	17	3	115	23	66
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	424			384			872	888	358	806	820	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			384			872	888	358	806	820	330
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			97	94	100	59	92	91
cM capacity (veh/h)	1146			1186			226	272	691	277	298	716

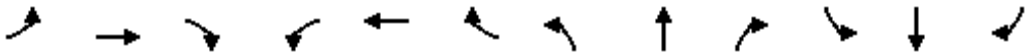
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	358	26	20	330	94	27	204
Volume Left	33	0	0	20	0	0	7	115
Volume Right	0	0	26	0	0	94	3	66
cSH	1146	1700	1700	1186	1700	1700	276	349
Volume to Capacity	0.03	0.21	0.02	0.02	0.19	0.06	0.10	0.58
Queue Length 95th (m)	0.7	0.0	0.0	0.4	0.0	0.0	2.6	28.2
Control Delay (s)	8.2	0.0	0.0	8.1	0.0	0.0	19.5	28.8
Lane LOS	A			A			C	D
Approach Delay (s)	0.7			0.4			19.5	28.8
Approach LOS							C	D

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	416	34	20	444	25	8
Future Volume (Veh/h)	416	34	20	444	25	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	473	39	23	505	28	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			512		1044	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			512		1044	492
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		89	98
cM capacity (veh/h)			1064		246	580

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	512	23	505	37
Volume Left	0	23	0	28
Volume Right	39	0	0	9
cSH	1700	1064	1700	286
Volume to Capacity	0.30	0.02	0.30	0.13
Queue Length 95th (m)	0.0	0.5	0.0	3.5
Control Delay (s)	0.0	8.5	0.0	19.4
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		19.4
Approach LOS				C

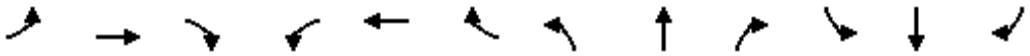
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	396	0	0	378	91	0	0	0	54	0	13
Future Volume (Veh/h)	23	396	0	0	378	91	0	0	0	54	0	13
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)	26	450	0	0	430	103	0	0	0	61	0	15
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	533			450			998	1035	450	984	984	482
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533			450			998	1035	450	984	984	482
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	73	100	97
cM capacity (veh/h)	1035			1110			213	226	609	223	242	585

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	476	533	0	76
Volume Left	26	0	0	61
Volume Right	0	103	0	15
cSH	1035	1110	1700	254
Volume to Capacity	0.03	0.00	0.00	0.30
Queue Length 95th (m)	0.6	0.0	0.0	9.7
Control Delay (s)	0.7	0.0	0.0	25.1
Lane LOS	A		A	D
Approach Delay (s)	0.7	0.0	0.0	25.1
Approach LOS			A	D

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	50.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	186	8	9	234	36	14	12	20	58	11	16
Future Volume (Veh/h)	24	186	8	9	234	36	14	12	20	58	11	16
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)	27	211	9	10	266	41	16	14	23	66	12	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	307			220			575	592	211	581	560	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	307			220			575	592	211	581	560	266
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	98			99			96	97	97	83	97	98
cM capacity (veh/h)	1125			1361			402	409	834	393	422	731

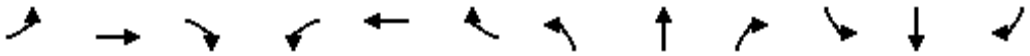
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	27	211	9	10	266	41	53	96
Volume Left	27	0	0	10	0	0	16	66
Volume Right	0	0	9	0	0	41	23	18
cSH	1125	1700	1700	1361	1700	1700	522	434
Volume to Capacity	0.02	0.12	0.01	0.01	0.16	0.02	0.10	0.22
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	2.7	6.7
Control Delay (s)	8.3	0.0	0.0	7.7	0.0	0.0	12.7	15.6
Lane LOS	A			A			B	C
Approach Delay (s)	0.9			0.2			12.7	15.6
Approach LOS							B	C

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	35.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	329	13	15	260	25	14
Future Volume (Veh/h)	329	13	15	260	25	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	374	15	17	295	28	16
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			389		710	382
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			389		710	382
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		93	98
cM capacity (veh/h)			1181		382	670

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	389	17	295	44
Volume Left	0	17	0	28
Volume Right	15	0	0	16
cSH	1700	1181	1700	453
Volume to Capacity	0.23	0.01	0.17	0.10
Queue Length 95th (m)	0.0	0.4	0.0	2.6
Control Delay (s)	0.0	8.1	0.0	13.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		13.8
Approach LOS				B

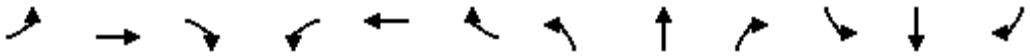
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	257	0	0	258	27	0	0	0	85	0	21
Future Volume (Veh/h)	7	257	0	0	258	27	0	0	0	85	0	21
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)	8	292	0	0	293	31	0	0	0	97	0	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	324			292			640	632	292	616	616	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			292			640	632	292	616	616	308
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	76	100	97
cM capacity (veh/h)	1236			1270			373	395	747	400	403	732

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	300	324	0	121
Volume Left	8	0	0	97
Volume Right	0	31	0	24
cSH	1236	1270	1700	440
Volume to Capacity	0.01	0.00	0.00	0.28
Queue Length 95th (m)	0.2	0.0	0.0	8.9
Control Delay (s)	0.3	0.0	0.0	16.3
Lane LOS	A		A	C
Approach Delay (s)	0.3	0.0	0.0	16.3
Approach LOS			A	C

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	31.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	330	24	19	304	87	7	15	3	106	21	61
Future Volume (Veh/h)	31	330	24	19	304	87	7	15	3	106	21	61
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)	35	375	27	22	345	99	8	17	3	120	24	69
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	444			402			915	933	375	846	861	345
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	444			402			915	933	375	846	861	345
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			96	93	100	54	91	90
cM capacity (veh/h)	1127			1168			207	255	676	259	281	702

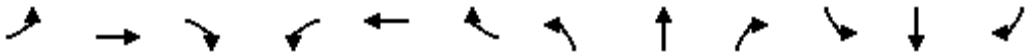
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	35	375	27	22	345	99	28	213
Volume Left	35	0	0	22	0	0	8	120
Volume Right	0	0	27	0	0	99	3	69
cSH	1127	1700	1700	1168	1700	1700	255	329
Volume to Capacity	0.03	0.22	0.02	0.02	0.20	0.06	0.11	0.65
Queue Length 95th (m)	0.8	0.0	0.0	0.5	0.0	0.0	2.9	34.0
Control Delay (s)	8.3	0.0	0.0	8.1	0.0	0.0	20.8	33.9
Lane LOS	A			A			C	D
Approach Delay (s)	0.7			0.4			20.8	33.9
Approach LOS							C	D

Intersection Summary				
Average Delay	7.2			
Intersection Capacity Utilization	48.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	435	36	21	462	26	9
Future Volume (Veh/h)	435	36	21	462	26	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	494	41	24	525	30	10
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			535		1088	514
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			535		1088	514
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			98		87	98
cM capacity (veh/h)			1013		231	564

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	535	24	525	40
Volume Left	0	24	0	30
Volume Right	41	0	0	10
cSH	1700	1013	1700	271
Volume to Capacity	0.31	0.02	0.31	0.15
Queue Length 95th (m)	0.0	0.6	0.0	4.1
Control Delay (s)	0.0	8.6	0.0	20.6
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		20.6
Approach LOS				C

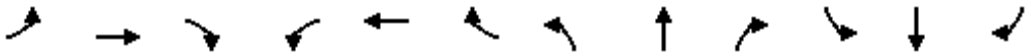
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	417	0	0	397	91	0	0	0	54	0	13
Future Volume (Veh/h)	23	417	0	0	397	91	0	0	0	54	0	13
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)	26	474	0	0	451	103	0	0	0	61	0	15
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	554			474			1044	1080	474	1028	1028	502
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554			474			1044	1080	474	1028	1028	502
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	71	100	97
cM capacity (veh/h)	1016			1088			198	212	590	208	228	569

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	500	554	0	76
Volume Left	26	0	0	61
Volume Right	0	103	0	15
cSH	1016	1088	1700	238
Volume to Capacity	0.03	0.00	0.00	0.32
Queue Length 95th (m)	0.6	0.0	0.0	10.6
Control Delay (s)	0.7	0.0	0.0	27.1
Lane LOS	A		A	D
Approach Delay (s)	0.7	0.0	0.0	27.1
Approach LOS			A	D

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	51.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	196	8	9	245	38	15	13	21	61	11	17
Future Volume (Veh/h)	25	196	8	9	245	38	15	13	21	61	11	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)	28	223	9	10	278	43	17	15	24	69	12	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	321			232			602	620	223	608	586	278
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			232			602	620	223	608	586	278
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	97			99			96	96	97	82	97	97
cM capacity (veh/h)	1111			1348			385	393	822	375	407	720

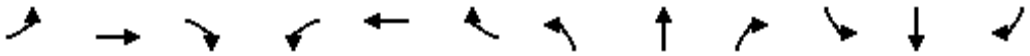
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	28	223	9	10	278	43	56	100
Volume Left	28	0	0	10	0	0	17	69
Volume Right	0	0	9	0	0	43	24	19
cSH	1111	1700	1700	1348	1700	1700	502	417
Volume to Capacity	0.03	0.13	0.01	0.01	0.16	0.03	0.11	0.24
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	3.0	7.4
Control Delay (s)	8.3	0.0	0.0	7.7	0.0	0.0	13.1	16.4
Lane LOS	A			A			B	C
Approach Delay (s)	0.9			0.2			13.1	16.4
Approach LOS							B	C

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	36.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	341	14	16	272	26	15
Future Volume (Veh/h)	341	14	16	272	26	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	388	16	18	309	30	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			404		741	396
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			404		741	396
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		92	97
cM capacity (veh/h)			1166		366	658

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	404	18	309	47
Volume Left	0	18	0	30
Volume Right	16	0	0	17
cSH	1700	1166	1700	436
Volume to Capacity	0.24	0.02	0.18	0.11
Queue Length 95th (m)	0.0	0.4	0.0	2.9
Control Delay (s)	0.0	8.1	0.0	14.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		14.2
Approach LOS				B

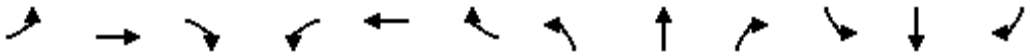
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	270	0	0	271	27	0	0	0	85	0	21
Future Volume (Veh/h)	7	270	0	0	271	27	0	0	0	85	0	21
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)	8	307	0	0	308	31	0	0	0	97	0	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	339			307			670	662	307	646	646	324
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	339			307			670	662	307	646	646	324
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	75	100	97
cM capacity (veh/h)	1220			1254			356	380	733	382	387	717

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	315	339	0	121
Volume Left	8	0	0	97
Volume Right	0	31	0	24
cSH	1220	1254	1700	421
Volume to Capacity	0.01	0.00	0.00	0.29
Queue Length 95th (m)	0.2	0.0	0.0	9.4
Control Delay (s)	0.3	0.0	0.0	16.9
Lane LOS	A		A	C
Approach Delay (s)	0.3	0.0	0.0	16.9
Approach LOS			A	C

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	32.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	346	25	20	319	92	7	16	3	112	22	64
Future Volume (Veh/h)	32	346	25	20	319	92	7	16	3	112	22	64
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)	36	393	28	23	362	105	8	18	3	127	25	73
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	467			421			958	978	393	885	901	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			421			958	978	393	885	901	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			96	92	100	47	91	89
cM capacity (veh/h)	1105			1149			190	239	660	241	265	687

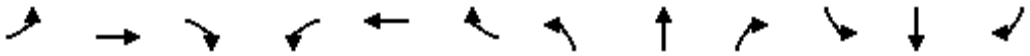
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	36	393	28	23	362	105	29	225
Volume Left	36	0	0	23	0	0	8	127
Volume Right	0	0	28	0	0	105	3	73
cSH	1105	1700	1700	1149	1700	1700	238	310
Volume to Capacity	0.03	0.23	0.02	0.02	0.21	0.06	0.12	0.73
Queue Length 95th (m)	0.8	0.0	0.0	0.5	0.0	0.0	3.3	42.5
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	22.2	42.2
Lane LOS	A			A			C	E
Approach Delay (s)	0.7			0.4			22.2	42.2
Approach LOS							C	E

Intersection Summary				
Average Delay	8.9			
Intersection Capacity Utilization	49.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	454	38	22	481	28	9
Future Volume (Veh/h)	454	38	22	481	28	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	516	43	25	547	32	10
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			559		1134	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			559		1134	538
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			97		85	98
cM capacity (veh/h)			992		216	547

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	559	25	547	42
Volume Left	0	25	0	32
Volume Right	43	0	0	10
cSH	1700	992	1700	253
Volume to Capacity	0.33	0.03	0.32	0.17
Queue Length 95th (m)	0.0	0.6	0.0	4.7
Control Delay (s)	0.0	8.7	0.0	22.1
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		22.1
Approach LOS				C

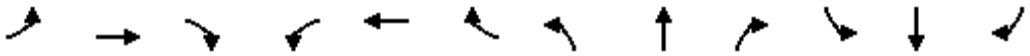
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	438	0	0	417	91	0	0	0	54	0	13
Future Volume (Veh/h)	23	438	0	0	417	91	0	0	0	54	0	13
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)	26	498	0	0	474	103	0	0	0	61	0	15
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	577			498			1090	1127	498	1076	1076	526
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	577			498			1090	1127	498	1076	1076	526
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	68	100	97
cM capacity (veh/h)	996			1066			184	199	572	193	214	552

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	524	577	0	76
Volume Left	26	0	0	61
Volume Right	0	103	0	15
cSH	996	1066	1700	222
Volume to Capacity	0.03	0.00	0.00	0.34
Queue Length 95th (m)	0.6	0.0	0.0	11.6
Control Delay (s)	0.7	0.0	0.0	29.5
Lane LOS	A		A	D
Approach Delay (s)	0.7	0.0	0.0	29.5
Approach LOS			A	D

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	188	7	8	246	34	14	11	19	55	10	15
Future Volume (Veh/h)	23	188	7	8	246	34	14	11	19	55	10	15
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)	26	214	8	9	280	39	16	12	22	62	11	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	319			222			586	603	214	592	572	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	319			222			586	603	214	592	572	280
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	98			99			96	97	97	84	97	98
cM capacity (veh/h)	1113			1359			397	403	831	389	416	718

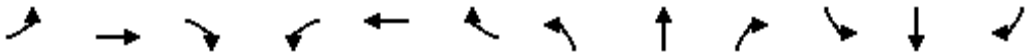
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	26	214	8	9	280	39	50	90
Volume Left	26	0	0	9	0	0	16	62
Volume Right	0	0	8	0	0	39	22	17
cSH	1113	1700	1700	1359	1700	1700	518	429
Volume to Capacity	0.02	0.13	0.00	0.01	0.16	0.02	0.10	0.21
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	2.6	6.3
Control Delay (s)	8.3	0.0	0.0	7.7	0.0	0.0	12.7	15.6
Lane LOS	A			A			B	C
Approach Delay (s)	0.9			0.2			12.7	15.6
Approach LOS							B	C

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	34.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	362	13	18	274	26	24
Future Volume (Veh/h)	362	13	18	274	26	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	411	15	20	311	30	27
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			426		770	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			426		770	418
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		91	96
cM capacity (veh/h)			1144		352	639

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	426	20	311	57
Volume Left	0	20	0	30
Volume Right	15	0	0	27
cSH	1700	1144	1700	447
Volume to Capacity	0.25	0.02	0.18	0.13
Queue Length 95th (m)	0.0	0.4	0.0	3.5
Control Delay (s)	0.0	8.2	0.0	14.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		14.2
Approach LOS				B

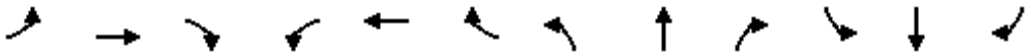
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	229	26	44	229	27	32	0	56	85	0	21
Future Volume (Veh/h)	7	229	26	44	229	27	32	0	56	85	0	21
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)	8	260	30	50	260	31	36	0	64	97	0	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	291			290			675	682	275	716	682	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291			290			675	682	275	716	682	276
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			90	100	92	68	100	97
cM capacity (veh/h)	1271			1272			344	355	764	306	356	763

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	290	50	291	100	121
Volume Left	8	0	50	0	36	97
Volume Right	0	30	0	31	64	24
cSH	1271	1700	1272	1700	531	347
Volume to Capacity	0.01	0.17	0.04	0.17	0.19	0.35
Queue Length 95th (m)	0.2	0.0	1.0	0.0	5.5	12.2
Control Delay (s)	7.9	0.0	7.9	0.0	13.4	20.8
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		1.2		13.4	20.8
Approach LOS					B	C

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	39.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	337	23	18	304	83	6	15	3	101	20	58
Future Volume (Veh/h)	29	337	23	18	304	83	6	15	3	101	20	58
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	383	26	20	345	94	7	17	3	115	23	66
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	439			409			912	928	383	846	860	345
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	439			409			912	928	383	846	860	345
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			97	93	100	56	92	91
cM capacity (veh/h)	1132			1161			211	258	669	260	282	702

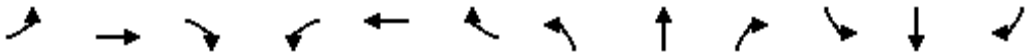
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	383	26	20	345	94	27	204
Volume Left	33	0	0	20	0	0	7	115
Volume Right	0	0	26	0	0	94	3	66
cSH	1132	1700	1700	1161	1700	1700	260	330
Volume to Capacity	0.03	0.23	0.02	0.02	0.20	0.06	0.10	0.62
Queue Length 95th (m)	0.7	0.0	0.0	0.4	0.0	0.0	2.7	31.1
Control Delay (s)	8.3	0.0	0.0	8.2	0.0	0.0	20.4	32.0
Lane LOS	A			A			C	D
Approach Delay (s)	0.6			0.4			20.4	32.0
Approach LOS							C	D

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	47.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	445	35	30	485	26	14
Future Volume (Veh/h)	445	35	30	485	26	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	506	40	34	551	30	16
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			546		1145	526
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			546		1145	526
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			97		86	97
cM capacity (veh/h)			1003		211	556

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	546	34	551	46
Volume Left	0	34	0	30
Volume Right	40	0	0	16
cSH	1700	1003	1700	269
Volume to Capacity	0.32	0.03	0.32	0.17
Queue Length 95th (m)	0.0	0.8	0.0	4.8
Control Delay (s)	0.0	8.7	0.0	21.1
Lane LOS		A		C
Approach Delay (s)	0.0	0.5		21.1
Approach LOS				C

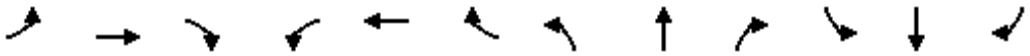
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	389	29	49	371	91	22	0	37	54	0	13
Future Volume (Veh/h)	23	389	29	49	371	91	22	0	37	54	0	13
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)	26	442	33	56	422	103	25	0	42	61	0	15
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	525			475			1060	1148	458	1122	1112	474
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	525			475			1060	1148	458	1122	1112	474
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			87	100	93	62	100	97
cM capacity (veh/h)	1042			1087			186	184	602	161	193	591

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	26	475	56	525	67	76
Volume Left	26	0	56	0	25	61
Volume Right	0	33	0	103	42	15
cSH	1042	1700	1087	1700	328	188
Volume to Capacity	0.02	0.28	0.05	0.31	0.20	0.40
Queue Length 95th (m)	0.6	0.0	1.3	0.0	6.0	14.5
Control Delay (s)	8.5	0.0	8.5	0.0	18.8	36.7
Lane LOS	A		A		C	E
Approach Delay (s)	0.4		0.8		18.8	36.7
Approach LOS					C	E

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	45.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	196	8	9	256	36	14	12	20	58	11	16
Future Volume (Veh/h)	24	196	8	9	256	36	14	12	20	58	11	16
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)	27	223	9	10	291	41	16	14	23	66	12	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	332			232			612	629	223	618	597	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			232			612	629	223	618	597	291
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	98			99			96	96	97	82	97	97
cM capacity (veh/h)	1100			1348			379	389	822	370	402	707

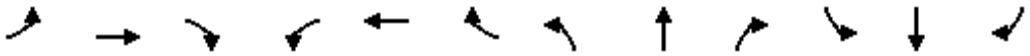
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	27	223	9	10	291	41	53	96
Volume Left	27	0	0	10	0	0	16	66
Volume Right	0	0	9	0	0	41	23	18
cSH	1100	1700	1700	1348	1700	1700	499	411
Volume to Capacity	0.02	0.13	0.01	0.01	0.17	0.02	0.11	0.23
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	2.8	7.1
Control Delay (s)	8.4	0.0	0.0	7.7	0.0	0.0	13.1	16.4
Lane LOS	A			A			B	C
Approach Delay (s)	0.9			0.2			13.1	16.4
Approach LOS							B	C

Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	36.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	374	14	18	285	27	24
Future Volume (Veh/h)	374	14	18	285	27	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	425	16	20	324	31	27
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			441		797	433
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			441		797	433
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		91	96
cM capacity (veh/h)			1130		339	627

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	441	20	324	58
Volume Left	0	20	0	31
Volume Right	16	0	0	27
cSH	1700	1130	1700	431
Volume to Capacity	0.26	0.02	0.19	0.13
Queue Length 95th (m)	0.0	0.4	0.0	3.7
Control Delay (s)	0.0	8.2	0.0	14.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		14.7
Approach LOS				B

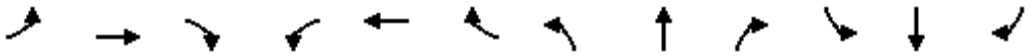
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	241	26	44	241	27	32	0	56	85	0	21
Future Volume (Veh/h)	7	241	26	44	241	27	32	0	56	85	0	21
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)	8	274	30	50	274	31	36	0	64	97	0	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	305			304			703	710	289	744	710	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	305			304			703	710	289	744	710	290
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			89	100	91	67	100	97
cM capacity (veh/h)	1256			1257			329	342	750	292	342	750

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	304	50	305	100	121
Volume Left	8	0	50	0	36	97
Volume Right	0	30	0	31	64	24
cSH	1256	1700	1257	1700	514	332
Volume to Capacity	0.01	0.18	0.04	0.18	0.19	0.36
Queue Length 95th (m)	0.2	0.0	1.0	0.0	5.7	13.0
Control Delay (s)	7.9	0.0	8.0	0.0	13.7	21.9
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		1.1		13.7	21.9
Approach LOS					B	C

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	352	24	19	318	87	7	15	3	106	21	61
Future Volume (Veh/h)	31	352	24	19	318	87	7	15	3	106	21	61
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)	35	400	27	22	361	99	8	17	3	120	24	69
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	460			427			956	974	400	886	902	361
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	460			427			956	974	400	886	902	361
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			96	93	100	50	91	90
cM capacity (veh/h)	1112			1143			193	241	654	242	266	688

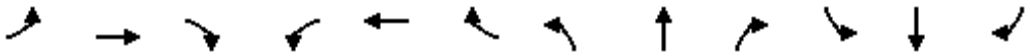
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	35	400	27	22	361	99	28	213
Volume Left	35	0	0	22	0	0	8	120
Volume Right	0	0	27	0	0	99	3	69
cSH	1112	1700	1700	1143	1700	1700	240	310
Volume to Capacity	0.03	0.24	0.02	0.02	0.21	0.06	0.12	0.69
Queue Length 95th (m)	0.8	0.0	0.0	0.5	0.0	0.0	3.1	37.8
Control Delay (s)	8.3	0.0	0.0	8.2	0.0	0.0	21.9	38.6
Lane LOS	A			A			C	E
Approach Delay (s)	0.6			0.4			21.9	38.6
Approach LOS							C	E

Intersection Summary				
Average Delay	7.9			
Intersection Capacity Utilization	49.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	464	37	31	503	27	15
Future Volume (Veh/h)	464	37	31	503	27	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	527	42	35	572	31	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			569		1190	548
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			569		1190	548
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		84	97
cM capacity (veh/h)			984		198	540

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	569	35	572	48
Volume Left	0	35	0	31
Volume Right	42	0	0	17
cSH	1700	984	1700	255
Volume to Capacity	0.33	0.04	0.34	0.19
Queue Length 95th (m)	0.0	0.9	0.0	5.4
Control Delay (s)	0.0	8.8	0.0	22.3
Lane LOS		A		C
Approach Delay (s)	0.0	0.5		22.3
Approach LOS				C

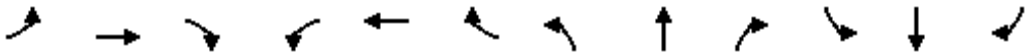
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	410	29	49	390	91	22	0	37	54	0	13
Future Volume (Veh/h)	23	410	29	49	390	91	22	0	37	54	0	13
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)	26	466	33	56	443	103	25	0	42	61	0	15
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	546			499			1104	1192	482	1166	1158	494
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	546			499			1104	1192	482	1166	1158	494
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			95			86	100	93	59	100	97
cM capacity (veh/h)	1023			1065			173	173	584	149	181	575

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	26	499	56	546	67	76
Volume Left	26	0	56	0	25	61
Volume Right	0	33	0	103	42	15
cSH	1023	1700	1065	1700	309	175
Volume to Capacity	0.03	0.29	0.05	0.32	0.22	0.44
Queue Length 95th (m)	0.6	0.0	1.3	0.0	6.5	15.9
Control Delay (s)	8.6	0.0	8.6	0.0	19.8	40.6
Lane LOS	A		A		C	E
Approach Delay (s)	0.4		0.8		19.8	40.6
Approach LOS					C	E

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	206	8	9	267	38	15	13	21	61	11	17
Future Volume (Veh/h)	25	206	8	9	267	38	15	13	21	61	11	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)	28	234	9	10	303	43	17	15	24	69	12	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	346			243			638	656	234	644	622	303
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346			243			638	656	234	644	622	303
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	97			99			95	96	97	80	97	97
cM capacity (veh/h)	1086			1335			363	375	810	354	388	696

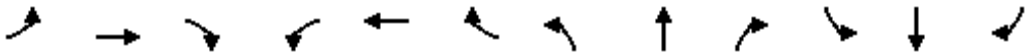
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	28	234	9	10	303	43	56	100
Volume Left	28	0	0	10	0	0	17	69
Volume Right	0	0	9	0	0	43	24	19
cSH	1086	1700	1700	1335	1700	1700	481	395
Volume to Capacity	0.03	0.14	0.01	0.01	0.18	0.03	0.12	0.25
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	3.1	7.9
Control Delay (s)	8.4	0.0	0.0	7.7	0.0	0.0	13.5	17.2
Lane LOS	A			A			B	C
Approach Delay (s)	0.9			0.2			13.5	17.2
Approach LOS							B	C

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	37.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	386	39	14	297	28	15
Future Volume (Veh/h)	386	39	14	297	28	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	439	44	16	338	32	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			483		831	461
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			483		831	461
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		90	97
cM capacity (veh/h)			1090		324	605

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	483	16	338	49
Volume Left	0	16	0	32
Volume Right	44	0	0	17
cSH	1700	1090	1700	386
Volume to Capacity	0.28	0.01	0.20	0.13
Queue Length 95th (m)	0.0	0.4	0.0	3.5
Control Delay (s)	0.0	8.4	0.0	15.7
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		15.7
Approach LOS				C

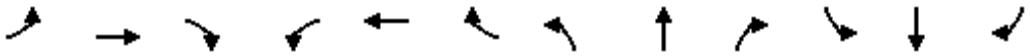
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	254	26	44	254	27	32	0	56	85	0	21
Future Volume (Veh/h)	7	254	26	44	254	27	32	0	56	85	0	21
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)	8	289	30	50	289	31	36	0	64	97	0	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	320			319			733	740	304	774	740	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			319			733	740	304	774	740	304
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			89	100	91	65	100	97
cM capacity (veh/h)	1240			1241			314	329	736	278	329	735

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	319	50	320	100	121
Volume Left	8	0	50	0	36	97
Volume Right	0	30	0	31	64	24
cSH	1240	1700	1241	1700	496	317
Volume to Capacity	0.01	0.19	0.04	0.19	0.20	0.38
Queue Length 95th (m)	0.2	0.0	1.0	0.0	6.0	13.8
Control Delay (s)	7.9	0.0	8.0	0.0	14.1	23.2
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		1.1		14.1	23.2
Approach LOS					B	C

Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	368	25	20	333	92	7	16	3	112	22	64
Future Volume (Veh/h)	32	368	25	20	333	92	7	16	3	112	22	64
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)	36	418	28	23	378	105	8	18	3	127	25	73
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	483			446			1000	1019	418	926	942	378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483			446			1000	1019	418	926	942	378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			95	92	100	44	90	89
cM capacity (veh/h)	1090			1125			177	226	639	225	251	673

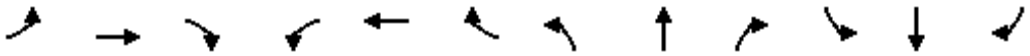
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	36	418	28	23	378	105	29	225
Volume Left	36	0	0	23	0	0	8	127
Volume Right	0	0	28	0	0	105	3	73
cSH	1090	1700	1700	1125	1700	1700	224	292
Volume to Capacity	0.03	0.25	0.02	0.02	0.22	0.06	0.13	0.77
Queue Length 95th (m)	0.8	0.0	0.0	0.5	0.0	0.0	3.5	47.3
Control Delay (s)	8.4	0.0	0.0	8.3	0.0	0.0	23.4	49.1
Lane LOS	A			A			C	E
Approach Delay (s)	0.6			0.4			23.4	49.1
Approach LOS							C	E

Intersection Summary				
Average Delay	9.8			
Intersection Capacity Utilization	50.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	39	32	522	29	15
Future Volume (Veh/h)	483	39	32	522	29	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	549	44	36	593	33	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			593		1236	571
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			593		1236	571
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		82	97
cM capacity (veh/h)			964		185	524

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	593	36	593	50
Volume Left	0	36	0	33
Volume Right	44	0	0	17
cSH	1700	964	1700	238
Volume to Capacity	0.35	0.04	0.35	0.21
Queue Length 95th (m)	0.0	0.9	0.0	6.2
Control Delay (s)	0.0	8.9	0.0	24.1
Lane LOS		A		C
Approach Delay (s)	0.0	0.5		24.1
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	431	29	49	410	91	22	0	37	54	0	13
Future Volume (Veh/h)	23	431	29	49	410	91	22	0	37	54	0	13
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)	26	490	33	56	466	103	25	0	42	61	0	15
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	569			523			1152	1240	506	1214	1204	518
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569			523			1152	1240	506	1214	1204	518
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			95			84	100	93	56	100	97
cM capacity (veh/h)	1003			1043			160	162	566	138	170	558

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	26	523	56	569	67	76
Volume Left	26	0	56	0	25	61
Volume Right	0	33	0	103	42	15
cSH	1003	1700	1043	1700	291	162
Volume to Capacity	0.03	0.31	0.05	0.33	0.23	0.47
Queue Length 95th (m)	0.6	0.0	1.4	0.0	7.0	17.6
Control Delay (s)	8.7	0.0	8.6	0.0	21.1	45.5
Lane LOS	A		A		C	E
Approach Delay (s)	0.4		0.8		21.1	45.5
Approach LOS					C	E

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	47.9%	ICU Level of Service		A
Analysis Period (min)	15			

APPENDIX G

ITE Trip Generation Manual, 10th Edition Excerpts

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

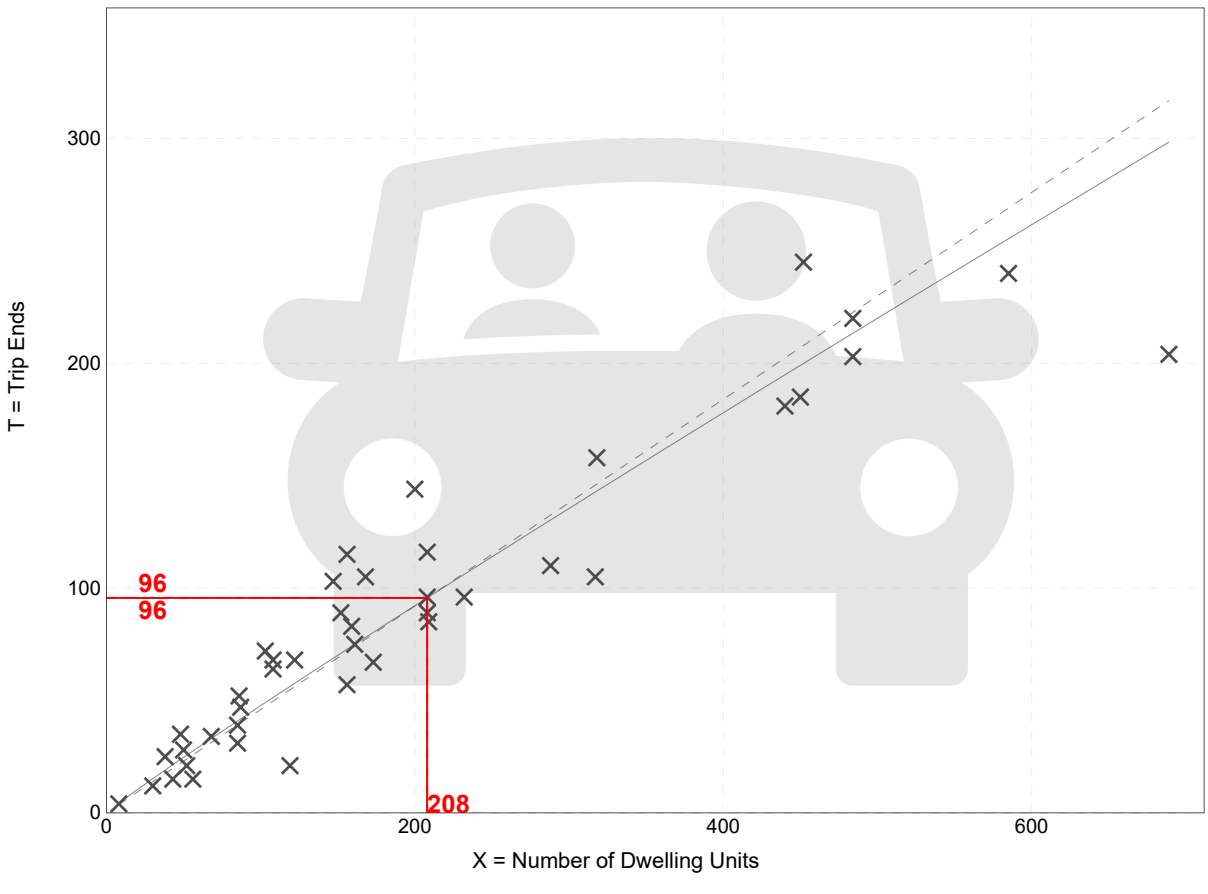
Multifamily Housing (Low-Rise)
(220)

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



Fitted Curve Equation: Ln(T) = 0.95 Ln(X) - 0.51

R^2= 0.90

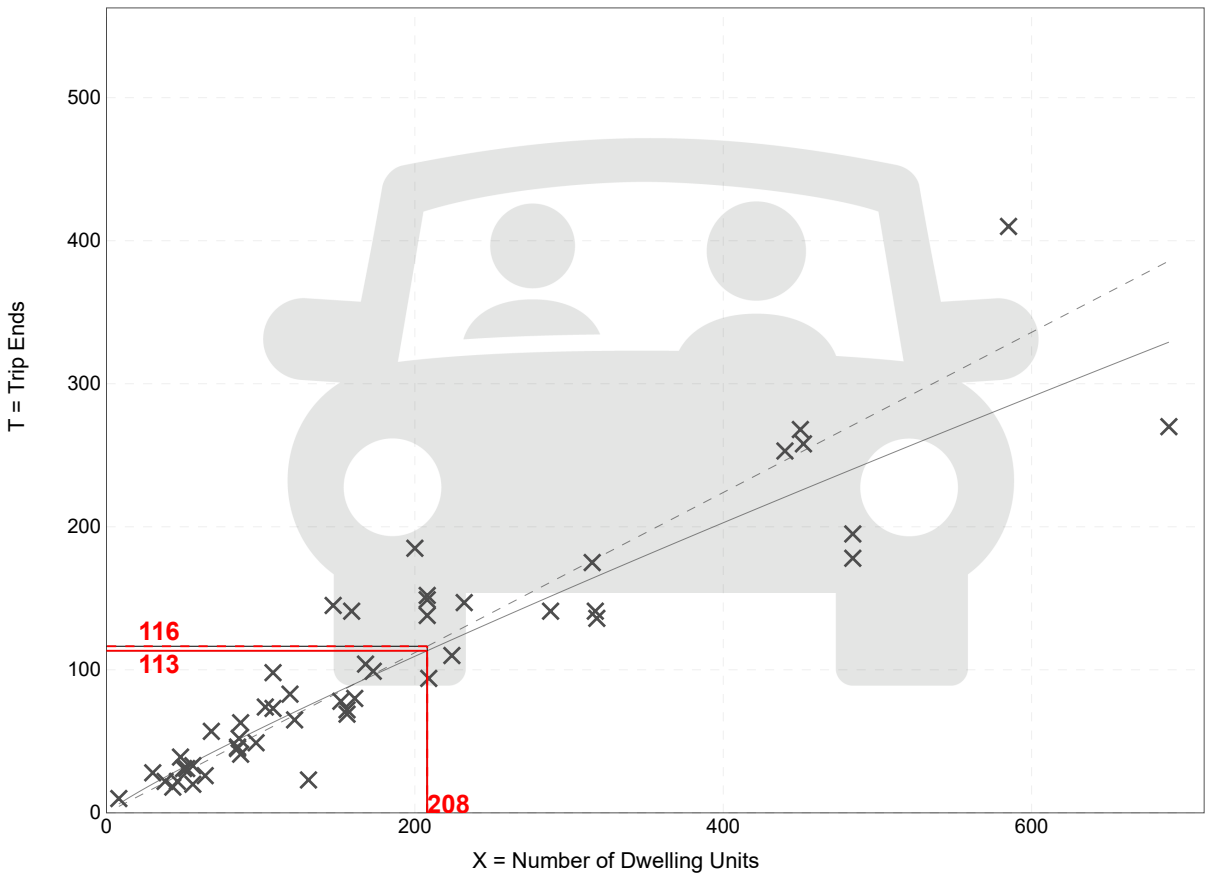
Multifamily Housing (Low-Rise)
(220)

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



Fitted Curve Equation: Ln(T) = 0.89 Ln(X) - 0.02

R^2= 0.86

Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors). Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (Land Use 225), and mid-rise residential with 1st-floor commercial (Land Use 231) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the mid-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 six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.46 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 95.7 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the eight general urban/suburban sites with 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 4:45 and 5:45 p.m., respectively.

For the four dense multi-use urban sites with 24-hour count 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 4:15 and 5:15 p.m., respectively. For the three center city core sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 6:45 and 7:45 a.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.46 residents per occupied dwelling unit.

For the five sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 95.7 percent of the units were occupied.

The average numbers of person trips per vehicle trip at the five center city core sites at which both person trip and vehicle trip data were collected were as follows:

- 1.84 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.94 during Weekday, AM Peak Hour of Generator
- 2.07 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.59 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 32 dense multi-use urban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.90 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.90 during Weekday, AM Peak Hour of Generator
- 2.00 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.08 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 13 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.56 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.88 during Weekday, AM Peak Hour of Generator
- 1.70 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.07 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Delaware, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Virginia, and Wisconsin.

Source Numbers

168, 188, 204, 305, 306, 321, 357, 390, 436, 525, 530, 579, 638, 818, 857, 866, 901, 904, 910, 912, 918, 934, 936, 939, 944, 947, 948, 949, 959, 963, 964, 966, 967, 969, 970

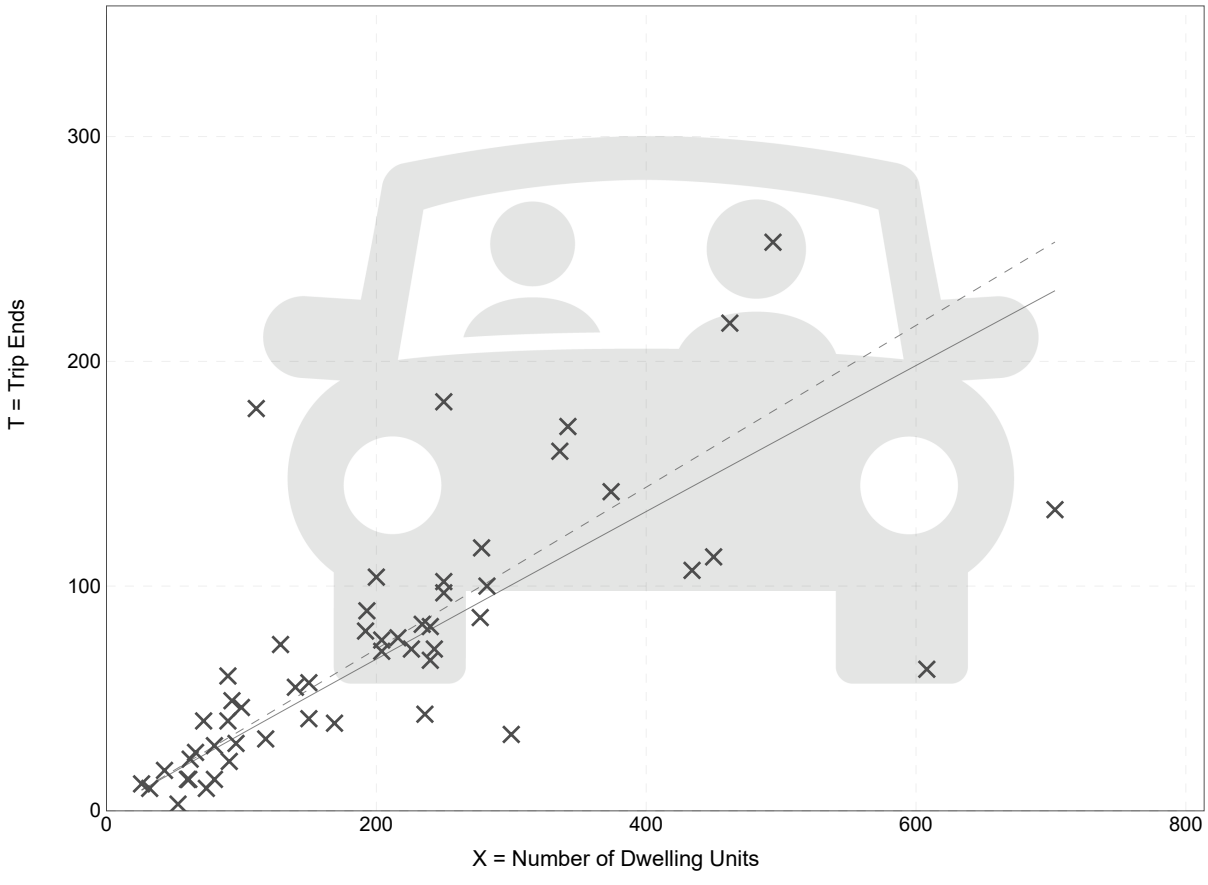
Multifamily Housing (Mid-Rise)
(221)

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: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.98 Ln(X) - 0.98

R^2= 0.67

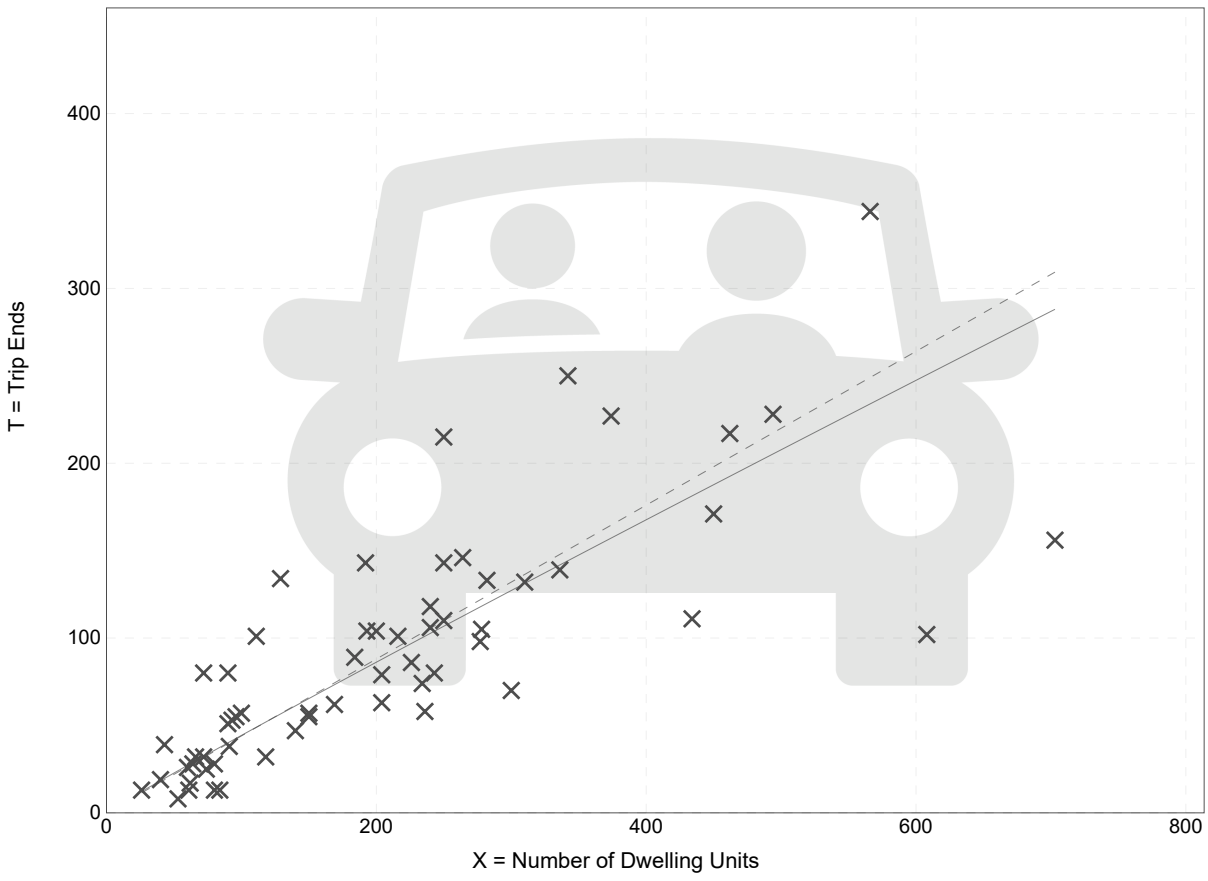
Multifamily Housing (Mid-Rise)
(221)

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: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.96 Ln(X) - 0.63

R^2= 0.72

Land Use: 820
Shopping Center

Description

A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands. Factory outlet center (Land Use 823) is a related use.

Additional Data

Shopping centers, including neighborhood centers, community centers, regional centers, and super regional centers, were surveyed for this land use. Some of these centers contained non-merchandising facilities, such as office buildings, movie theaters, restaurants, post offices, banks, health clubs, and recreational facilities (for example, ice skating rinks or indoor miniature golf courses).

Many shopping centers, in addition to the integrated unit of shops in one building or enclosed around a mall, include outparcels (peripheral buildings or pads located on the perimeter of the center adjacent to the streets and major access points). These buildings are typically drive-in banks, retail stores, restaurants, or small offices. Although the data herein do not indicate which of the centers studied included peripheral buildings, it can be assumed that some of the data show their effect.

The vehicle trips generated at a shopping center are based upon the total GLA of the center. In cases of smaller centers without an enclosed mall or peripheral buildings, the GLA could be the same as the gross floor area of the building.

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 11:45 a.m. and 12:45 p.m. and 12:15 and 1:15 p.m., respectively.

The average numbers of person trips per vehicle trip at the 27 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.31 during Weekday, AM Peak Hour of Generator
- 1.43 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 1.46 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

Source Numbers

105, 110, 154, 156, 159, 186, 190, 198, 199, 202, 204, 211, 213, 239, 251, 259, 260, 269, 294, 295, 299, 300, 301, 304, 305, 307, 308, 309, 310, 311, 314, 315, 316, 317, 319, 358, 365, 376, 385, 390, 400, 404, 414, 420, 423, 428, 437, 440, 442, 444, 446, 507, 562, 580, 598, 629, 658, 702, 715, 728, 868, 870, 871, 880, 899, 908, 912, 915, 926, 936, 944, 946, 960, 961, 962, 973, 974, 978

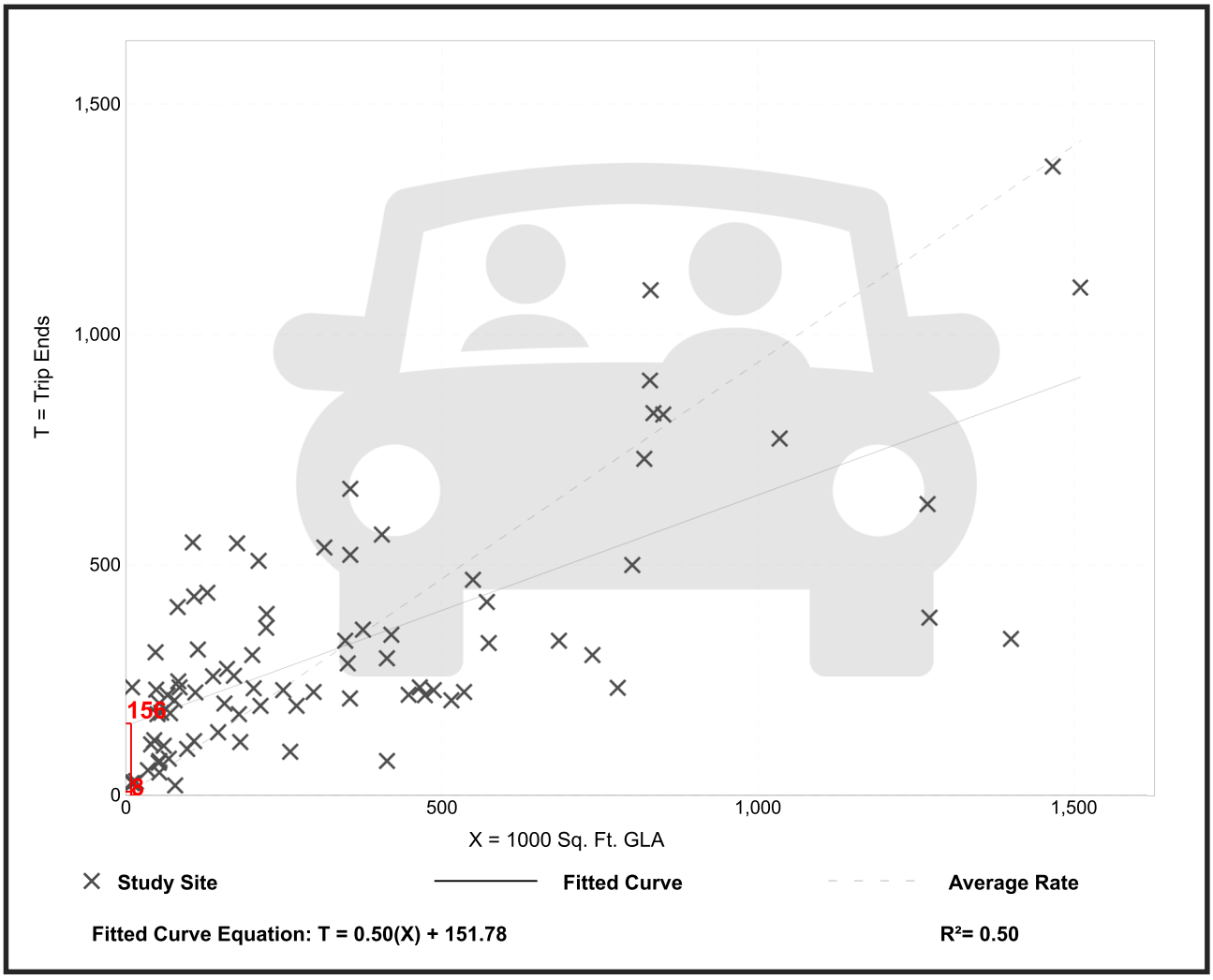
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
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: 84
Avg. 1000 Sq. Ft. GLA: 351
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.94	0.18 - 23.74	0.87

Data Plot and Equation



Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
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: 261
Avg. 1000 Sq. Ft. GLA: 327
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.81	0.74 - 18.69	2.04

Data Plot and Equation

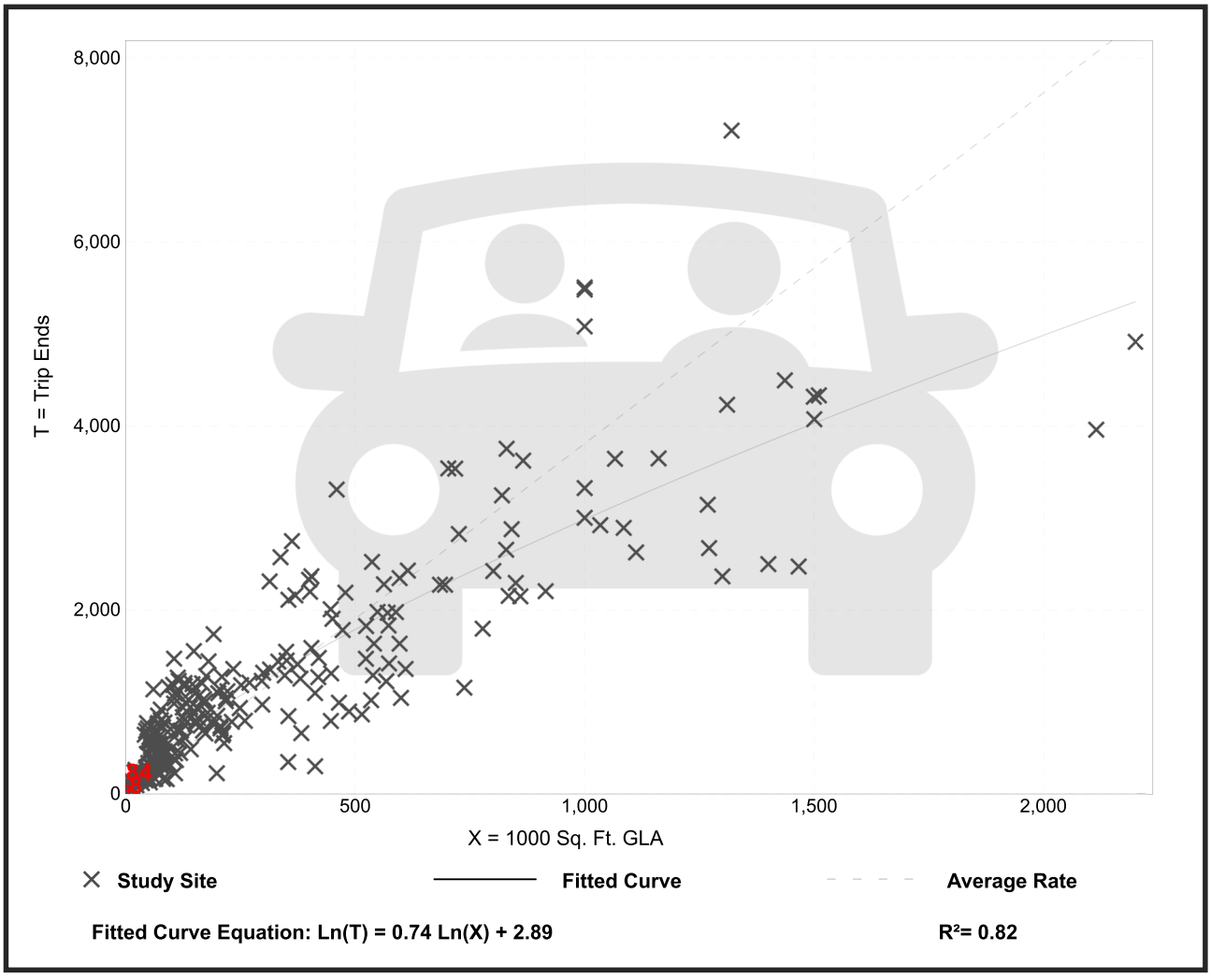


Table E.9 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 820—Shopping Center

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
53	Port Orange, FL	1993	162	2:00–6:00 p.m.	59	—	—	41	—	—	TPD Inc.
9	Kissimmee, FL	1994	107	2:00–6:00 p.m.	66	20	14	34	—	—	TPD Inc.
77	Edgewater, FL	1992	365	2:00–6:00 p.m.	46	—	—	54	—	—	TPD Inc.
82	Deltona, FL	1992	336	2:00–6:00 p.m.	34	—	—	66	—	—	TPD Inc.
78	Orlando, FL	1991	702	2:00–6:00 p.m.	55	23	22	45	—	—	TPD Inc.
45	Orlando, FL	1992	844	2:00–6:00 p.m.	56	24	20	44	—	—	TPD Inc.
50	Orlando, FL	1992	555	2:00–6:00 p.m.	41	41	18	59	—	—	TPD Inc.
52	Orlando, FL	1995	665	2:00–6:00 p.m.	42	33	25	58	—	—	TPD Inc.
17	Orlando, FL	1994	196	2:00–6:00 p.m.	66	—	—	34	—	—	TPD Inc.
60	Orlando, FL	1995	1,583	3:00–7:00 p.m.	40	38	22	60	—	—	TPD Inc.
158	Crestwood, KY	June 1993	129	4:00–6:00 p.m.	36	39	25	64	759	—	Barton-Aschman Assoc.
118	Louisville area, KY	June 1993	133	4:00–6:00 p.m.	22	51	27	78	3,555	—	Barton-Aschman Assoc.
74	Louisville, KY	June 1993	187	4:00–6:00 p.m.	30	43	27	70	922	—	Barton-Aschman Assoc.
59	Louisville area, KY	June 1993	247	4:00–6:00 p.m.	31	52	17	69	2,659	—	Barton-Aschman Assoc.
145	Louisville area, KY	June 1993	210	4:00–6:00 p.m.	53	30	17	47	2,636	—	Barton-Aschman Assoc.
104	Louisville area, KY	June 1993	281	4:00–6:00 p.m.	28	50	22	72	2,111	—	Barton-Aschman Assoc.
235	Louisville, KY	June 1993	211	4:00–6:00 p.m.	35	29	36	65	2,593	—	Barton-Aschman Assoc.
71	Louisville, KY	June 1993	109	4:00–6:00 p.m.	25	42	33	75	1,559	—	Barton-Aschman Assoc.
350	Worcester, MA	Apr. 1994	224	4:00–6:00 p.m.	18	45	37	82	2,112	—	ICSC
738	East Brunswick, NJ	Apr. 1994	283	4:00–6:00 p.m.	14	79	7	86	8,059	—	ICSC
294	Philadelphia, PA	Apr. 1994	213	4:00–6:00 p.m.	25	51	24	75	4,055	—	ICSC
256	Hamden, CT	Apr. 1994	208	4:00–6:00 p.m.	27	51	22	73	3,422	—	ICSC
418	Glen Burnie, MD	Apr. 1994	281	4:00–6:00 p.m.	20	51	29	80	5,610	—	ICSC
560	Harrisonburg, VA	Apr. 1994	437	4:00–6:00 p.m.	19	49	32	81	3,051	—	ICSC

Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 820—Shopping Center

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
361	Glen Allen, VA	Apr. 1994	315	4:00–6:00 p.m.	17	54	29	83	2,034	—	ICSC
375	Shelby, NC	May 1994	214	4:00–6:00 p.m.	30	48	22	70	3,053	—	ICSC
413	Texas City, TX	May 1994	228	4:00–6:00 p.m.	28	52	20	72	589	—	ICSC
488	Texas City, TX	May 1994	257	4:00–6:00 p.m.	12	75	13	88	1,094	—	ICSC
293	Berwyn, IL	May 1994	282	4:00–6:00 p.m.	24	70	6	76	4,606	—	ICSC
667	Bourbonais, IL	May 1994	200	4:00–6:00 p.m.	16	53	31	84	2,770	—	ICSC
225	Bellevue, IL	May 1994	264	4:00–6:00 p.m.	35	32	33	65	1,970	—	ICSC
255	Bettendorf, IA	May 1994	222	4:00–6:00 p.m.	24	37	39	76	3,706	—	ICSC
808	Laguna Hills, CA	June 1994	240	4:00–6:00 p.m.	13	73	14	87	4,035	—	ICSC
450	Hanford, CA	May 1994	321	4:00–6:00 p.m.	23	49	28	77	2,787	—	ICSC
800	San Jose, CA	May 1994	205	4:00–6:00 p.m.	21	51	28	79	7,474	—	ICSC
598	Greeley, CO	May 1994	205	4:00–6:00 p.m.	17	55	28	83	3,840	—	ICSC
581	Pueblo, CO	May 1994	296	4:00–6:00 p.m.	18	53	29	82	2,939	—	ICSC
476	Bellevue, WA	May 1994	234	4:00–6:00 p.m.	26	54	20	74	3,427	—	ICSC
720	Framingham, MA	Dec. 1982	92	3:30–7:00 p.m.	23	39	38	77	—	73,628	Raymond Keyes Assoc.
890	Newark, DE	July 1984	179	3:00–8:00 p.m.	12	49	39	88	—	—	Raymond Keyes Assoc.
402	Manassas, VA	June 1984	87	4:00–6:00 p.m.	48	25	27	52	—	—	Raymond Keyes Assoc.
462	Ross, PA	June 1980	175	5:30–7:00 p.m.	36	—	—	64	—	27,200	Raymond Keyes Assoc.
234	Huntington LI, NY	Nov. 1985	181	4:00–7:00 p.m.	46	21	33	54	—	34,630	Raymond Keyes Assoc.
658	Wayne, NJ	Sept. 1984	243	3:00–6:00 p.m.	27	61	12	73	—	85,600	Raymond Keyes Assoc.
1,200	Washington, DC	1980	364	4:00–6:00 p.m.	25	35	40	75	—	—	Gorove-Slade
800	Southern CA	—	1,000	4:00–6:00 p.m.	12	45	43	88	—	—	Frischer
451	Portland, OR	—	—	5:00–6:00 p.m.	25	—	—	75	—	—	Buttke
113	Portland, OR	—	—	5:00–6:00 p.m.	17	—	—	83	—	—	Buttke

Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 820—Shopping Center

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
622	Ramsey, MN	Nov. 1985	46	4:00–9:00 p.m.	44	26	30	56	—	36,370	Raymond Keyes Assoc.
736	Pensacola, FL	Oct. 1985	383	3:00–7:00 p.m.	26	35	39	74	—	—	Raymond Keyes Assoc.
84	Dover, DE	July 1985	218	3:30–7:00 p.m.	50	6	44	50	—	—	Raymond Keyes Assoc.
500	Meriden, CT	Apr. 1985	—	4:00–6:00 p.m.	8	—	—	92	—	—	Connecticut DOT
660	Enfield, CT	Apr. 1985	—	4:00–6:00 p.m.	22	—	—	78	—	—	Connecticut DOT
845	Waterford, CT	Apr. 1985	—	4:00–6:00 p.m.	14	—	—	86	—	—	Connecticut DOT
1,060	West Hartford, CT	Apr. 1985	—	4:00–6:00 p.m.	17	—	—	83	—	—	Connecticut DOT
131	Pr. Georges Co., MD	1982/83	88	4:00–6:00 p.m.	74	—	—	26	—	—	JHK
181	Pr. Georges Co., MD	1982/83	105	4:00–6:00 p.m.	36	—	—	64	—	—	JHK
100	Pr. Georges Co., MD	1982/83	93	4:00–6:00 p.m.	36	—	—	64	—	—	JHK
475	Pr. Georges Co., MD	1982/83	130	4:00–6:00 p.m.	20	—	—	80	—	—	JHK
60	Pr. Georges Co., MD	1982/83	72	4:00–6:00 p.m.	72	—	—	28	—	—	JHK
90	Pr. Georges Co., MD	1982/83	91	4:00–6:00 p.m.	58	—	—	42	—	—	JHK
78	Pr. Georges Co., MD	1982/83	113	4:00–6:00 p.m.	59	—	—	41	—	—	JHK
44	Pr. Georges Co., MD	1982/83	97	4:00–6:00 p.m.	51	—	—	49	—	—	JHK
467	Pr. Georges Co., MD	1982/83	99	4:00–6:00 p.m.	56	—	—	44	—	—	JHK
352	W. Orange, NJ	Mar. 1986	149	4:00–6:00 p.m.	38	19	43	62	—	21,520	Raymond Keyes Assoc.
176	Tarpon Springs, FL	May 1986	124	3:00–7:00 p.m.	37	28	35	63	—	34,080	Raymond Keyes Assoc.
762	Orlando, FL	Fall 1985	182	4:00–6:00 p.m.	25	52	23	75	—	—	Kimley-Horn and Assoc. Inc.
166	Orlando, FL	Fall 1985	124	4:00–6:00 p.m.	27	48	25	73	—	—	Kimley-Horn and Assoc. Inc.
129	Orlando, FL	Fall 1985	116	4:00–6:00 p.m.	28	50	22	72	—	—	Kimley-Horn and Assoc. Inc.
71	Orlando, FL	Fall 1985	81	4:00–6:00 p.m.	50	44	6	50	—	—	Kimley-Horn and Assoc. Inc.

Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 820—Shopping Center

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
921	Albany, NY	July & Aug. 1985	196	4:00–6:00 p.m.	23	42	35	77	—	60,950	Raymond Keyes Assoc.
108	Overland Park, KS	July 1988	111	4:30–5:30 p.m.	26	61	13	74	—	34,000	—
118	Overland Park, KS	Aug. 1988	123	4:30–5:30 p.m.	25	55	20	75	—	—	—
256	Greece, NY	June 1988	120	4:00–6:00 p.m.	38	62	—	62	—	23,410	Sear Brown
160	Greece, NY	June 1988	78	4:00–6:00 p.m.	29	71	—	71	—	57,306	Sear Brown
550	Greece, NY	June 1988	117	4:00–6:00 p.m.	48	52	—	52	—	40,763	Sear Brown
51	Boca Raton, FL	Dec. 1987	110	4:00–6:00 p.m.	33	34	33	67	—	42,225	Kimley-Horn and Assoc. Inc.
1,090	Ross Twp, PA	July 1988	411	2:00–8:00 p.m.	34	56	10	66	—	51,500	Wilbur Smith and Assoc.
97	Upper Dublin Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	41	—	—	59	—	34,000	McMahon Associates
118	Tredyffrin Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	24	—	—	76	—	10,000	Booz Allen & Hamilton
122	Lawnside, NJ	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	20,000	Pennoni Associates
126	Boca Raton, FL	Winter 1988/89	—	4:00–6:00 p.m.	43	—	—	57	—	40,000	McMahon Associates
150	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	39	—	—	61	—	26,000	Booz Allen & Hamilton
153	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	50	—	—	50	—	85,000	McMahon Associates
153	Arden, DE	Winter 1988/89	—	4:00–6:00 p.m.	30	—	—	70	—	26,000	Orth-Rodgers & Assoc. Inc.
154	Doylestown, PA	Winter 1988/89	—	4:00–6:00 p.m.	32	—	—	68	—	29,000	Orth-Rodgers & Assoc. Inc.
164	Middletown Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	25,000	Booz Allen & Hamilton
166	Haddon Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	20	—	—	80	—	6,000	Pennoni Associates
205	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	55	—	—	45	—	62,000	McMahon Associates

Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 820—Shopping Center

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
237	W. Windsor Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	48	—	—	52	—	46,000	Booz Allen & Hamilton
242	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	26,000	McMahon Associates
297	Whitehall, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	26,000	Orth-Rodgers & Assoc. Inc.
360	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	44	—	—	56	—	73,000	McMahon Associates
370	Pittsburgh, PA	Winter 1988/89	—	4:00–6:00 p.m.	19	—	—	81	—	33,000	Wilbur Smith
150	Portland, OR	—	519	4:00–6:00 p.m.	68	6	26	32	—	25,000	Kittelson and Associates
150	Portland, OR	—	655	4:00–6:00 p.m.	65	7	28	35	—	30,000	Kittelson and Associates
760	Calgary, Alberta	Oct.-Dec. 1987	15,436	4:00–6:00 p.m.	20	39	41	80	—	—	City of Calgary DOT
178	Bordentown, NJ	Apr. 1989	154	2:00–6:00 p.m.	35	—	—	65	—	37,980	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	176	3:30–6:15 p.m.	32	44	24	68	—	69,347	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	4:45–5:45 p.m.	33	26	41	67	—	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 34

"—" means no data were provided

APPENDIX H

OTM Book 12 Signal Justification #7 Worksheet

Major Road:	Highway 26	Condition:	Free Flow	Date:	22-Jul-21
Minor Road:	Site Access	Major Rd. Lanes:	1	Project No.:	1930-5664
Horizon Year:	2033	Intersection Type:	Proposed	Analyst:	M.Ferguson

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE		COMPLIANCE		
						Sectional		Entire Percentage
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	720	1080	900	1350	495	69%	45%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	180	255	180	255	81	45%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	720	1080	900	1350	414	58%	58%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	75	113	180	255	49	65%	

Note:
Existing Intersection Requires 120 % Justification
Proposed Intersection Requires 150 % Justication

Signal Justification 7 Met: [ ] **Yes** [X] **No**

APPENDIX I
MTO Design Supplement for TAC GDGCR Excerpts

MTO Design Supplement

For
TAC Geometric Design Guide for
Canadian Roads

Appendix 9 for Chapter 9

Intersections

April 2020

Section 9.17.2.2 – Safety Warrants

- This Section is Applicable including the following additional Guidance:

  The warrant graphs provided in Appendix 9A, based on vehicles operating at the design speed indicated, show the conditions when left turn storage lanes should be added or where traffic signals are to be considered.

  Exhibit 9-Q illustrates the upstream functional area of an intersection in relation to the components of deceleration lane length, which consist of the perception-reaction distance, the lane change and deceleration distance, and the storage length.

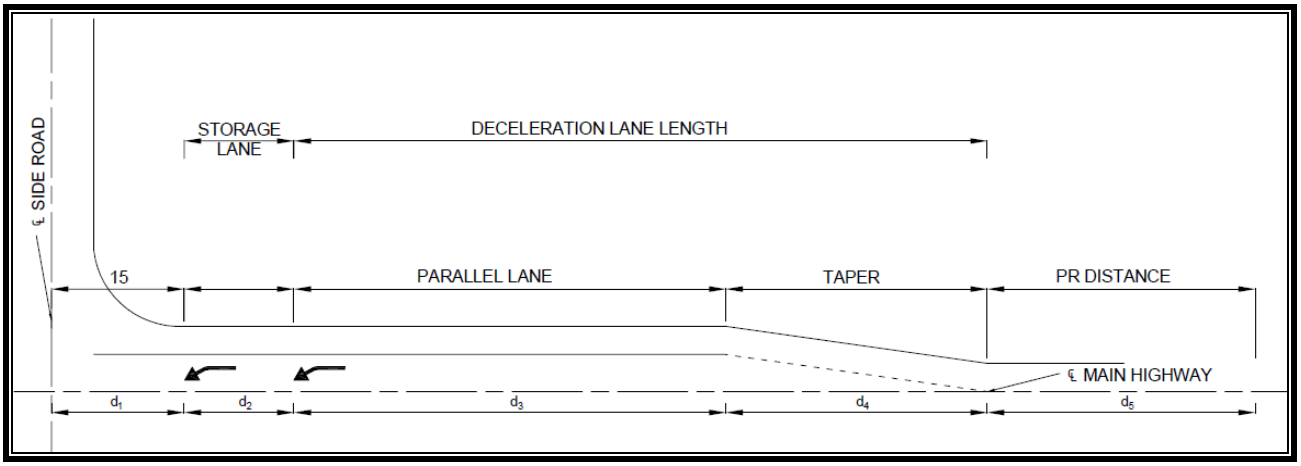
  It may not be practical to provide the full length of the turn lane for deceleration due to constraints such as restricted right-of-way, distance available between adjacent intersections and storage needs. However, research has demonstrated that providing a left- and right-turn lane on any intersection approach has a substantial crash reduction benefits[1]. Therefore, turn lanes should be installed where warranted, even where the distances of **Exhibit 9-R** cannot be achieved.

Figure 9.17.1 – Left-Turn Lane, Pictorial Description of Terms

- This Figure is Not Applicable and is replaced with **Exhibit 9-Q.**

Exhibit 9-Q

LEFT-TURN LANE, COMPONENETS OF DECELERATION LANE LENGTH



Notes:

- d_1 = 15 m is the assumed distance from minor roadway centerlines to auxiliary lane.

- d_2 = storage length for stopped vehicles waiting to turn.
- d_3 = distance travelled during deceleration after lane change
- d_4 = distance travelled while decelerating and changing lanes from through-lane into turn-lane.
- d_5 = percetion and reaction distance travelled while driver recognizes upcoming turn lane and prepares for the left maneuver.

Section 9.17.3 – Approach and Departure Tapers

- This Section is Applicable including the following additional guidance:

  Taper Length

  Long tapers approximate the path drivers follow when entering an auxiliary lane from a high-speed through lane. However, with exceptionally long tapers some through drivers may tend to drift into the deceleration lane especially when the taper is on a horizontal curve. In addition, long tapers may constrain the lateral movement of a driver desiring to enter the auxiliary lanes.

  The width of left turn lanes should be one increment (0.25 m) less than the through lane with a minimum of 3.25 m and separated from through lanes by a solid painted line and indicated by painted arrow according to the *OTM Book 11 – Pavement, Hazard and Delineation Markings.*

  For grades greater than 2%, the length of deceleration lane should be corrected according to the factors shown in **Exhibit 9-K**. The correction is attained by multiplying the deceleration length and added to taper; it will comprise the total deceleration length. The length of taper, parallel, horizontal curve to smooth taper, and corresponding design speeds are provided in **Exhibit 9-R.**

Table 9.17.1 – Approach and Departure Taper Ratios and Lengths for Left Turns at Intersections

- This Table is Not Applicable and is replaced with **Exhibit 9-R.**

Exhibit 9-R

DECELERATION LENGTH FOR LEFT-TURN LANES, 2-LANES AND 4-LANE HIGHWAYS FLAT GRADE 2% OR LESS

Design Speed (km/h)	Deceleration Length		Horizontal Curve to Smooth Taper R (m)
	Taper (m)	Parallel (m)	
50	85	20	500
60	100	30	750
70	115	40	1000
80	130	50	1200
90	145	60	1500
100	160	70	2000
110	170	80	2500

Section 9.17.4.2 – Deceleration Requirements

- This Section is Applicable including the following additional guidance:

  The designer may have to determine which distance would be appropriate for the driver to brake comfortably. The designer should choose amongst the worlds of desirable, acceptable and minimum based on site specific conditions. For parallel lane length only, it is desirable to include perception-reaction time but in acceptable practice perception-reaction time may not be feasible and not cost effective. It is assumed that when driver enters a left-turn lane (taper) they should be expecting to brake. In most cases the driver would be expected to already transition their speed as they go through the taper using perception-reaction time. According to Section 9.17.3 decision sight distance should be considered in taper length to accommodate perception-reaction distance. Using minimums all the way around in the process should be avoided. The minimum desirable length of the taper and parallel length combined should not be less than the stopping sight distance provided in *Table 2.5.2* of *Chapter 2.*

Section 9.17.4.5 – Left-Turn Lanes on Both Approaches

- This Section is Applicable including the following additional guidance:

  Positive Offset for Left-Turn Lanes

  A potential for conflict exists when vehicles in opposing left-turn lanes on the major

MTO Design Supplement

For
TAC Geometric Design Guide for
Canadian Roads

Appendix 9A for Section 9.17.2.1 Volume Warrants for Left-Turn Lanes

Chapter 9 - Intersections

April 2020

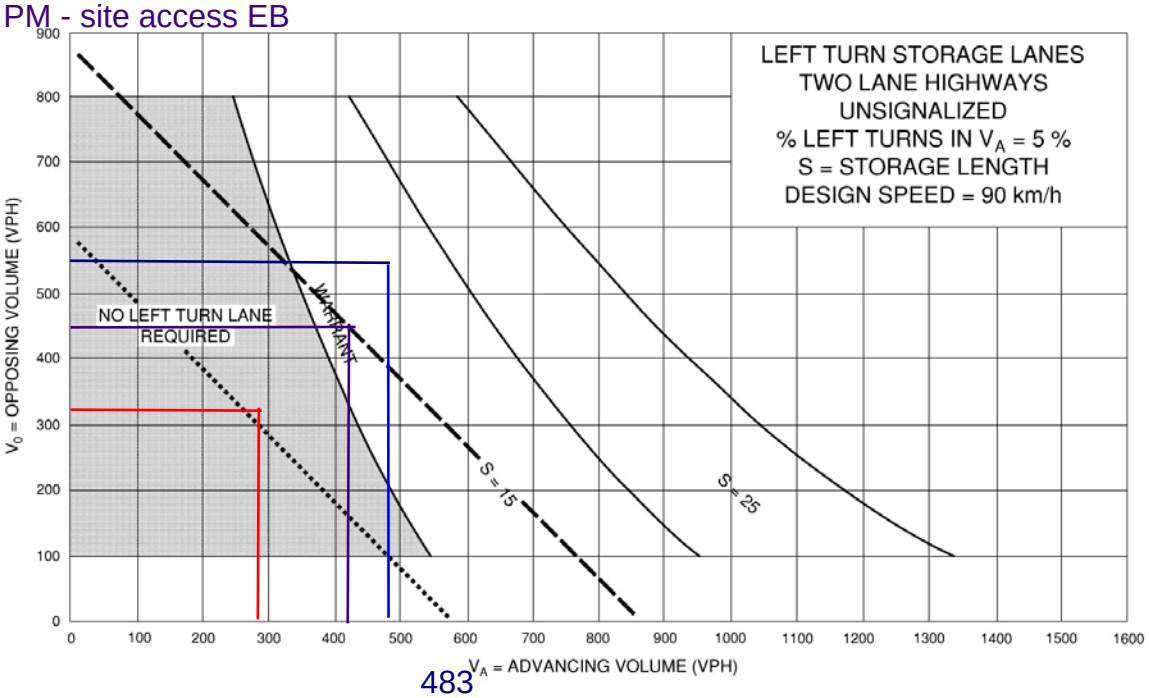
2033 FT - PM - site access EB

2023 FB - PM - site access EB

Exhibit 9A-19

2033 FT - AM - site access EB

550



483

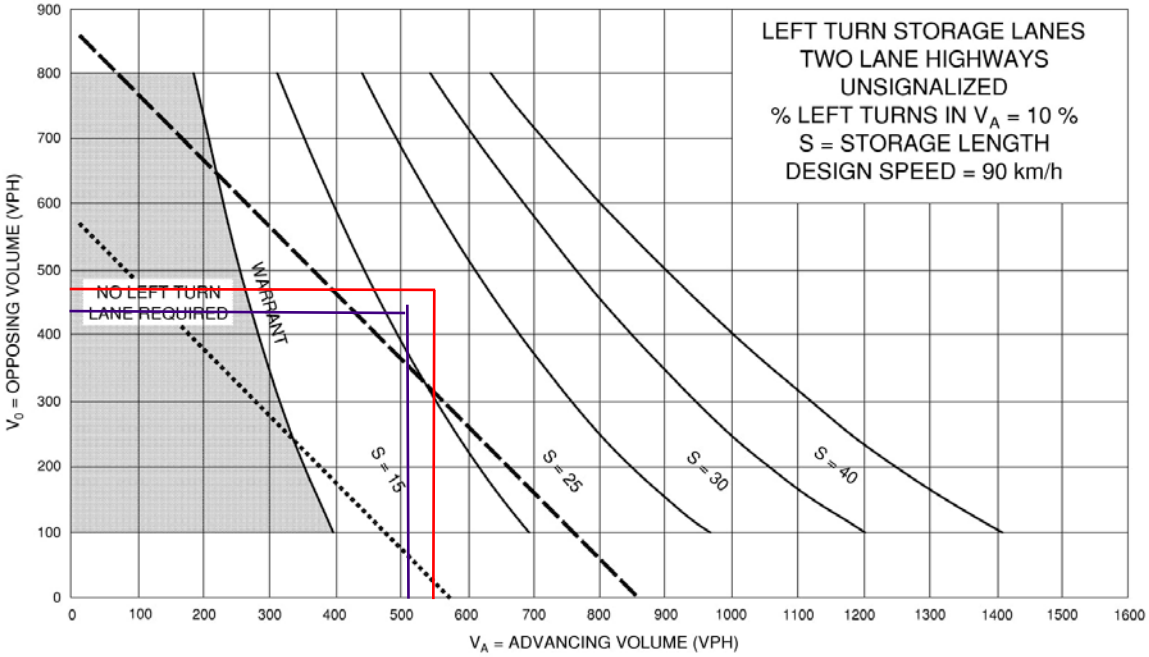
TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

2033 FT - PM - site access WB

2023 FT - PM - site access WB

483



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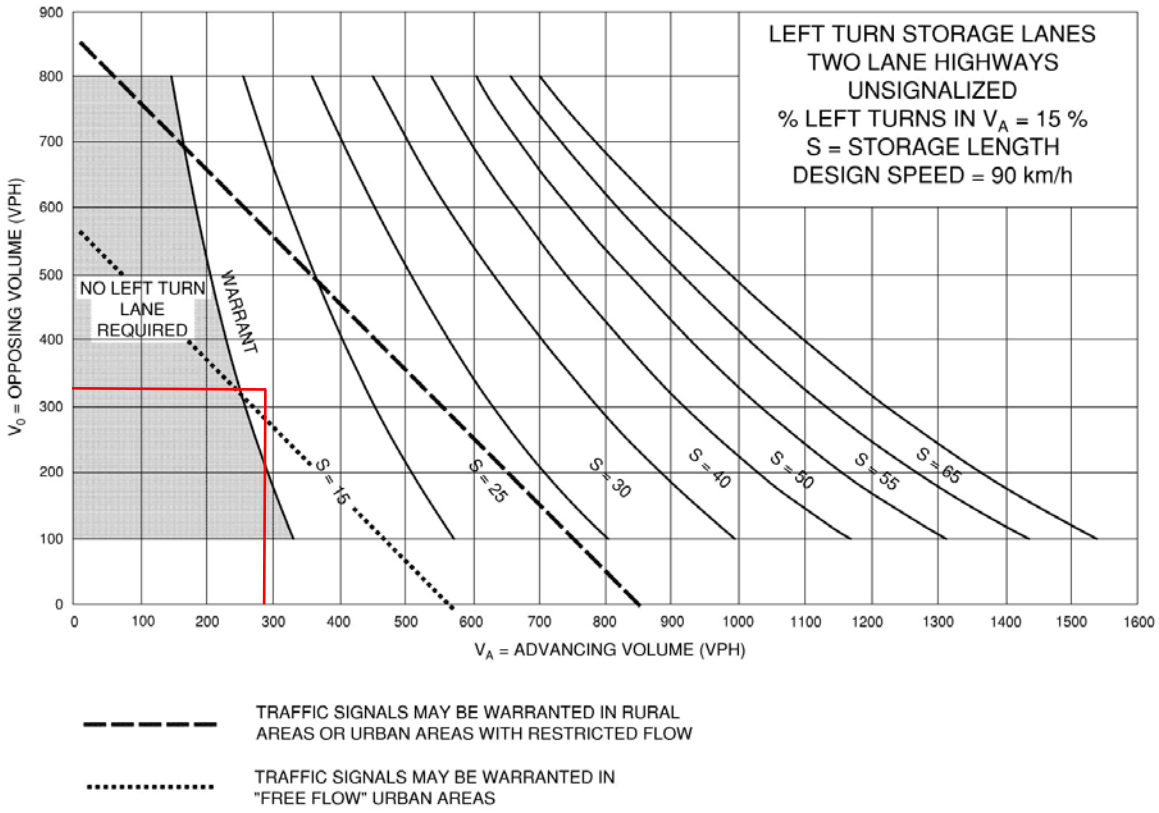
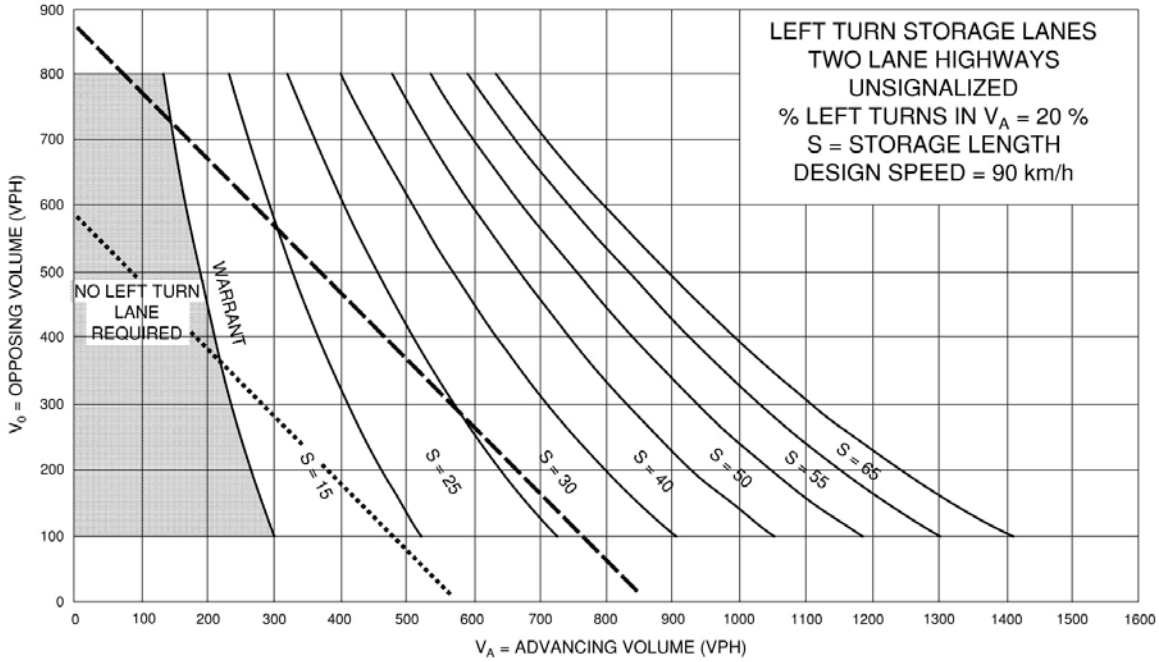
2033 FT - AM - site access WB

Exhibit 9A-20





APPENDIX J
TAC GDGCR EXCERPTS

- The frequency of collisions occurring as a result of vehicles striking objects less than 0.15 m in height has been shown to be very low.[52]
- As discussed above, a driver's ability to discern small objects at a distance is limited.
- In general, a driver must see at least the top 0.15 m of an object in order to detect its presence.
- If such an object is of limited lateral size (e.g., a rock) a driver may well be able to take evasive action rather than stop, particularly on a roadway with low traffic volumes.
- Evasion might not be possible if the object were a fallen tree, but in many parts of the country this is an unlikely hazard since trees are not present or because local jurisdictions do not allow trees to remain close to the roadway. In areas where logging trucks are present, the designer should consider the possibility of a log falling onto the roadway from a truck.

The designer should adopt an object height based on the probability of a particular object occurring on the roadway, as shown on **Table 2.5.1**. If fallen trees or rocks are a real risk, an object height of 0.15 m is recommended. Otherwise, for stopping sight distance, a tail light height of 0.60 m is recommended. For passing sight distance, an object height of 1.30 m will allow the driver to discern the top of an oncoming typical car. A zero object height is recommended where road washouts are a serious risk, for example on approaches to bridges and culverts in mountainous areas. It is only recommended for pavement markings in critical situations such as at intersections or interchanges, as the driver's ability to discern the markings cannot be relied upon, and traffic signs should be used instead.

2.5.2.2 Deceleration Rate

Approximately 90 percent of all drivers decelerate at rates greater than 3.4 m/s^2. Such deceleration is within a driver's capability to stay within their lane and maintain steering control during the braking maneuver on wet surfaces. Therefore 3.4 m/s^2 is a comfortable deceleration for most drivers and is recommended as the deceleration threshold for determining stopping sight distance.[53]

Most vehicle braking systems and the tire-pavement friction levels of most roadways are capable of providing a deceleration rate of at least 3.4 m/s^2. Also, the friction available on most wet pavement surfaces and the capabilities of most vehicle braking systems can provide braking friction that exceeds this deceleration rate.

2.5.3 STOPPING SIGHT DISTANCE

Braking distance is the distance that it takes to stop a vehicle once the brakes have been applied. On a level roadway this distance can be determined using the following formula:

$$d_b = 0.039 \frac{V^2}{a} \qquad (2.5.1)$$

Where:

d_b = Braking distance (m)
V = Design speed (km/h)
a = Deceleration rate (m/s^2)

Stopping sight distance is the sum of the distance travelled during the perception and reaction time and the braking distance.

$$SSD = 0.278Vt + 0.039 \frac{V^2}{a} \quad (2.5.2)$$

Where:

SSD = Stopping sight distance (m)
t = Brake reaction time, 2.5 s
V = Design speed (km/h)
a = Deceleration rate (m/s^2)

Table 2.5.2 gives the minimum stopping sight distances on level grade, on wet pavement, for a range of design speeds. These values are used for vertical curve design, intersection geometry and the placement of traffic control devices. The stopping sight distances quoted in **Table 2.5.2** may need to be increased for a variety of reasons related to grade and vehicle type as noted below.

Table 2.5.2: Stopping Sight Distance on level roadways for Automobiles[54]

Design speed (km/h)	Brake reaction distance (m)	Braking distance on level (m)	Stopping sight distance	
			Calculated (m)	Design (m)
20	13.9	4.6	18.5	20
30	20.9	10.3	31.2	35
40	27.8	18.4	46.2	50
50	34.8	28.7	63.5	65
60	41.7	41.3	83.0	85
70	48.7	56.2	104.9	105
80	55.6	73.4	129.0	130
90	62.6	92.9	155.5	160
100	69.5	114.7	184.2	185
110	76.5	138.8	215.3	220
120	83.4	165.2	248.6	250
130	90.4	193.8	284.2	285

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s^2 used to determine calculated sight distance.

The Effect of Grade

Braking distances will increase on downgrades and decrease on upgrades. When the roadway is on a grade, formula 2.5.1 for braking distance is modified as follows:

$$d_b = \frac{V^2}{254\,[(a/9.81) + G]} \quad (2.5.3)$$

Where:

d_b = Braking distance (m)
V = Design speed (km/h)
a = Deceleration rate (m/s^2)
G = Grade (m/m) (G is positive if vehicles uphill and negative if downhill)

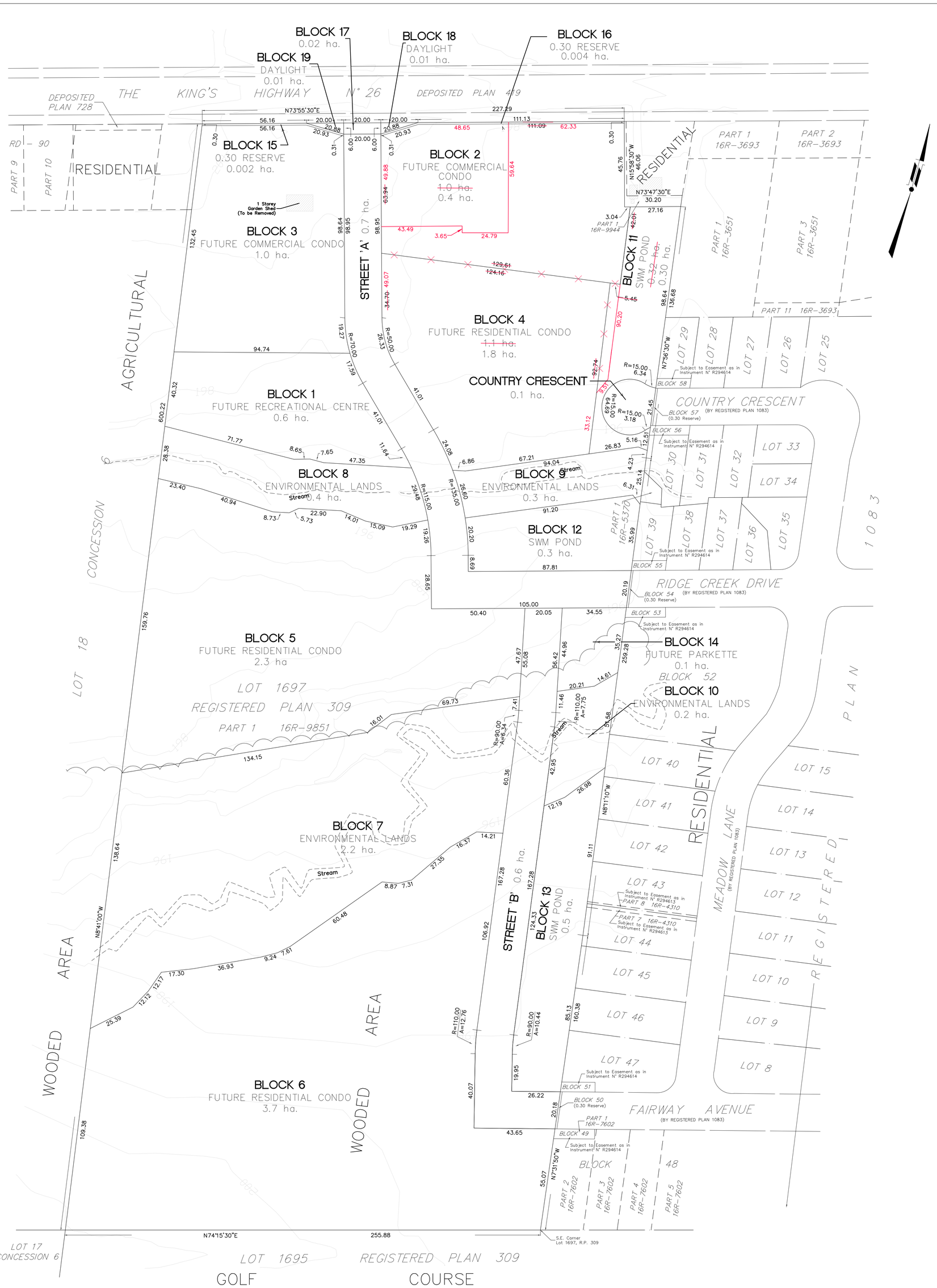
Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

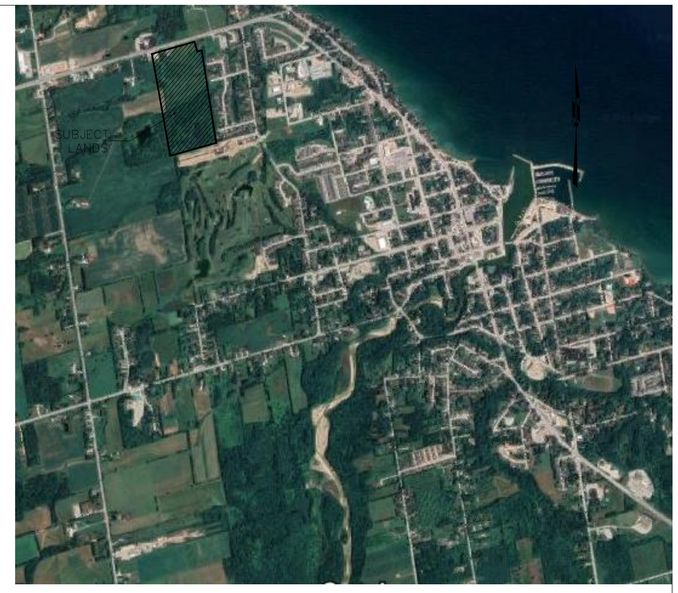
Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of case B3.

List of Figures





DRAFT PLAN OF SUBDIVISION
PART OF LOT 1697
REGISTERED PLAN 309
(FORMERLY TOWN OF MEAFORD)
MUNICIPALITY OF MEAFORD
COUNTY OF GREY

LLOYD & PURCELL LTD. SCALE 1:1000

20 10 0 20 40 60 Metres

LAND USE STATISTICS	AREA
STREET 'A'	0.7 ha.
STREET 'B'	0.6 ha.
FUTURE RECREATIONAL CENTRE (Block 1)	0.6 ha.
FUTURE COMMERCIAL CONDOMINIUMS (Blocks 2 & 3)	~~2.0 ha.~~ 1.4 ha.
FUTURE RESIDENTIAL CONDOMINIUMS (Blocks 4–6)	~~7.1 ha.~~ 7.8 ha.
ENVIRONMENTAL LANDS (Blocks 7–10)	3.1 ha
STORM WATER MANAGEMENT PONDS (Blocks 11–13)	1.1 ha.
FUTURE PARKETTE (Block 14)	0.1 ha.
0.30 RESERVES (15–16)	0.06 ha.
DAYLIGHT (Block 17)	0.01 ha.
DAYLIGHT (Blocks 18 & 19)	0.02 ha.
STREET (Country Crescent)	0.05 ha.
TOTAL	15.44 ha.

PLANNING ACT, SECTION 51(17)

(a) AS SHOWN ON DRAFT PLAN
(b) AS SHOWN ON DRAFT PLAN
(c) AS SHOWN ON DRAFT PLAN
(d) SEE SCHEDULE OF LAND USE
(e) AS SHOWN ON DRAFT PLAN
(f) AS SHOWN ON DRAFT PLAN
(g) AS SHOWN ON DRAFT PLAN
(h) DOMESTIC WATER SUPPLY AVAILABLE
(i) IMPERFECTLY DRAINED SANDY SILT
(j) AS SHOWN ON DRAFT PLAN
(k) MUNICIPAL SERVICES AVAILABLE
(l) NO RESTRICTIONS AFFECTING THE LAND PROPOSED TO BE SUBDIVIDED

SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT THE BOUNDARIES OF LAND TO BE SUBDIVIDED ARE CORRECTLY SHOWN IN ACCORDANCE WITH PLAN 16R-9851 AND PLAN 16R-9944.

. . . . DAY OF . . . . . 2012.

. . . . . .
T. M. PURCELL O.L.S.
LLOYD & PURCELL LTD.

DESIGNER'S CERTIFICATE:

PLAN DESIGNED AND PREPARED BY HENSEL DESIGN GROUP INC.

. . . . DAY OF . . . . . 2012.

. . . . . .
MIKE HENSEL, O.A.L.A., C.S.L.A.
HENSEL DESIGN GROUP INC.

OWNER'S CERTIFICATE:

WE THE UNDERSIGNED BEING THE REGISTERED OWNERS OF THE SUBJECT LANDS HEREBY AUTHORIZE LLOYD & PURCELL LTD. AND HENSEL DESIGN GROUP INC. TO PREPARE THIS DRAFT PLAN OF SUBDIVISION.

. . . . DAY OF . . . . . 2012.

. . . . . .
I HAVE AUTHORITY TO BIND THE CORPORATION
SPARHAVEN FARMS LTD.

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.
0.30 RESERVES AND 0.30 WIDE PARTS HAVE BEEN EXAGGERATED FOR CLARITY.

CROZIER
CONSULTING ENGINEERS
40 HURON STREET, SUITE 301, COLLINGWOOD, ONTARIO, L9Y 4R3
(705) 446-3510

CAD: RLS	JOB: 12-171
CHK'D: TMP	FILE: 309 (GREY) 12

J:\1900\1930-Warren D. Sinclair Construction\5664_Haven Development_External\DP\5664_Redlined Draft Plan.dwg, 2021-12-03 10:29:53 AM, DWG To PDF.pc3

CLIENT: W.D.S.C.	PROJECT NAME: MEAFORD MUNICIPALITY OF MEAFORD	IBI GROUP Suite 101 - 410 Albert Street Waterloo ON N2L 3V3 Canada tel 519 585 2255 ibigroup.com	
	SCALE: 1 : 2,000 / DATE: 2021-04-14 PROJECT MGR: D.G. / DRAWN BY: E.T. CHECKED BY: D.G. / APPROVED BY: PROJECT NO: 133266	FIGURE NAME: CONCEPT 4 TOTAL UNITS: 318 (APARTMENT: 110 TOWNS: 206) COMMERCIAL UNITS: 4	FIGURE NO.: C04 REVISION: 1

File Location: J:\133266_WDSC_Meaford\7.0_Production\7.03_Design\17_Planning\Sheets\133266_C.dwg Last Saved: April 14, 2021, by emma.tillery Plotted: Wednesday, April 14, 2021 4:54:08 PM by Emma Tillery

SCALE CHECK 1 in 10mm

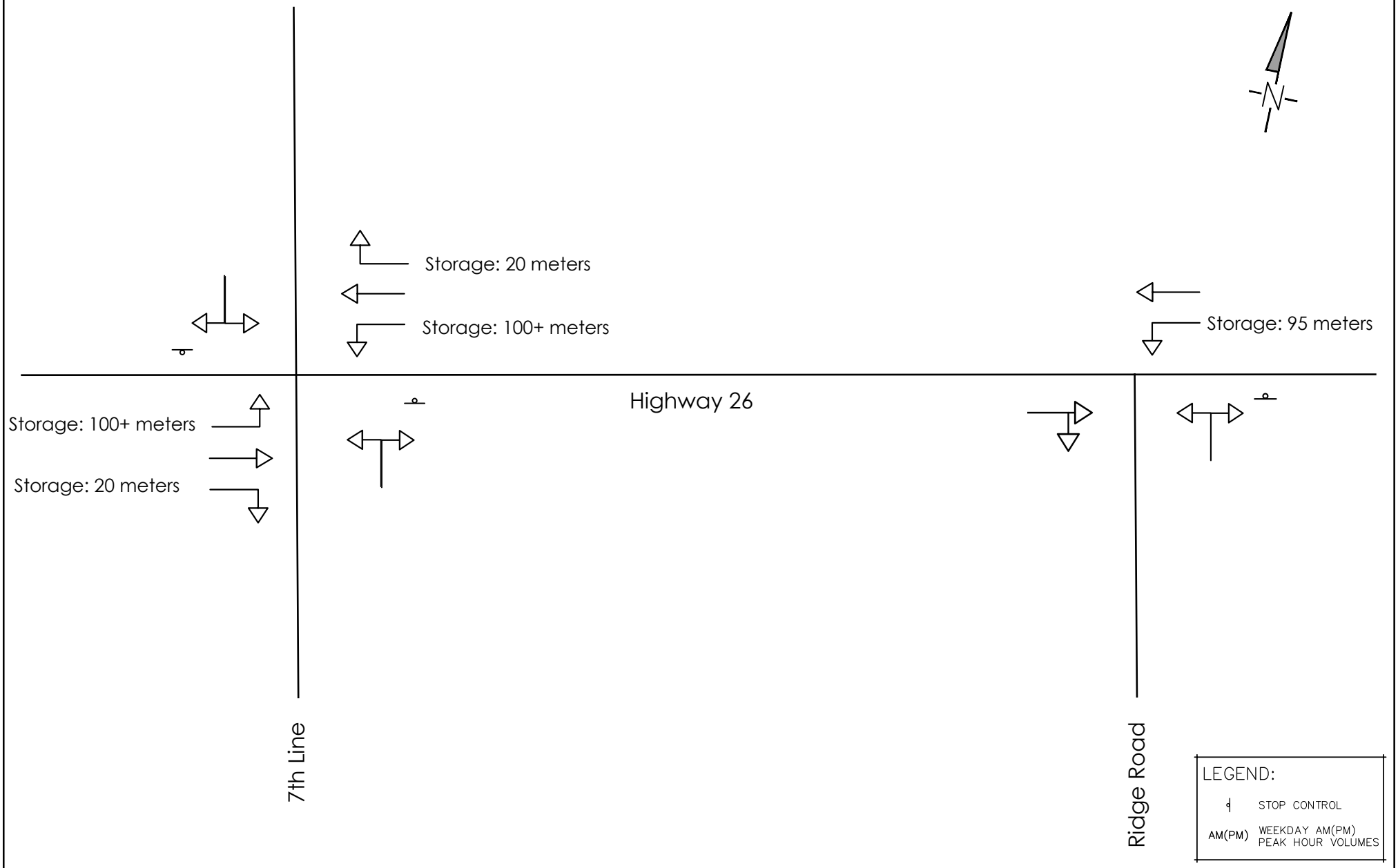
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Meaford Havens
Town of Meaford, Grey County

Site Location Plan

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

Drawn	Design	Project No.	
E.H.	E.H.	1230-5664	
Date	Check	Scale	Dwg.
2021/07/13	M.F.	N.T.S	FIG. 2



Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Existing Traffic Controls

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
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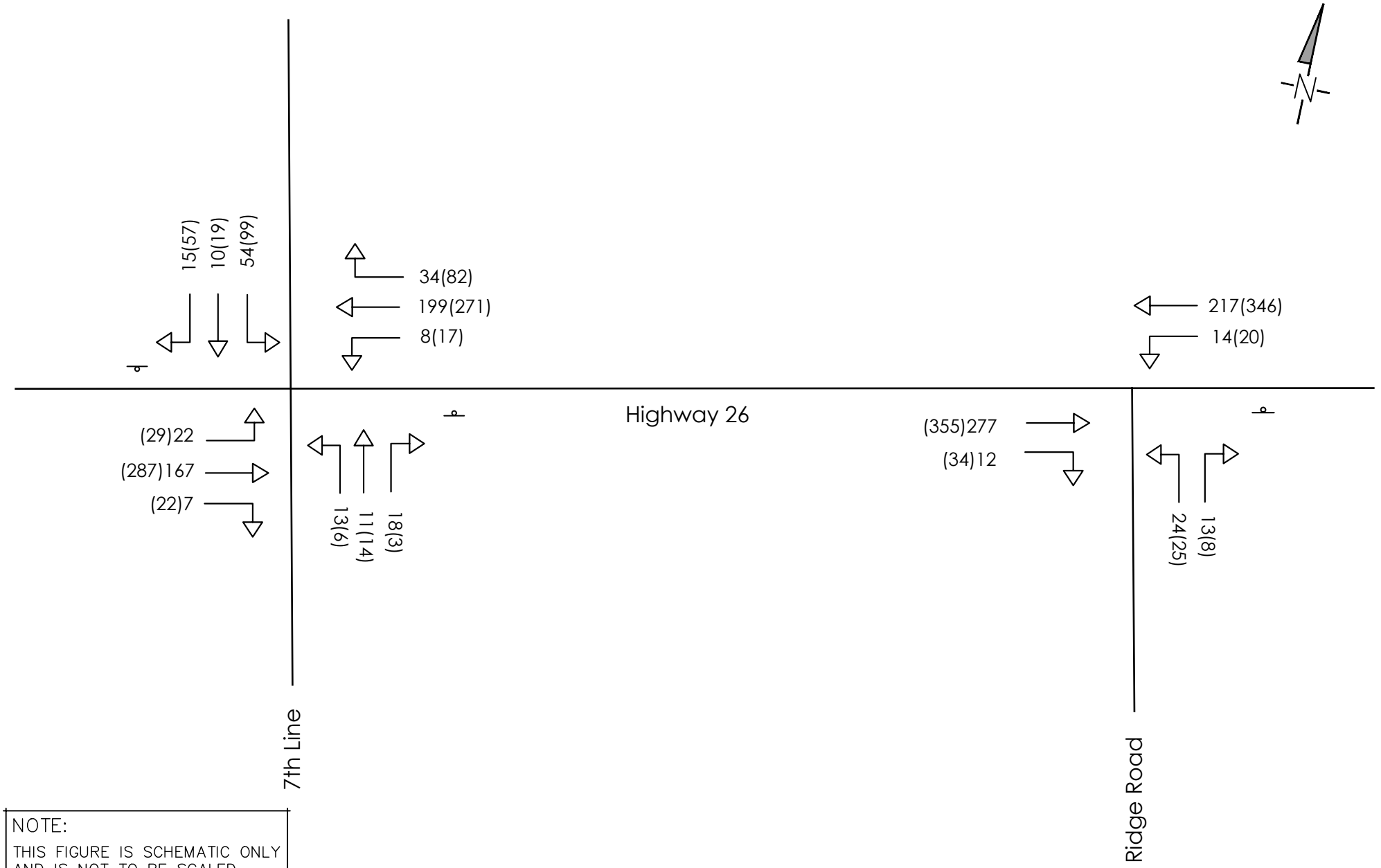
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 3



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

LEGEND:

	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Existing Traffic Volumes (2021)

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
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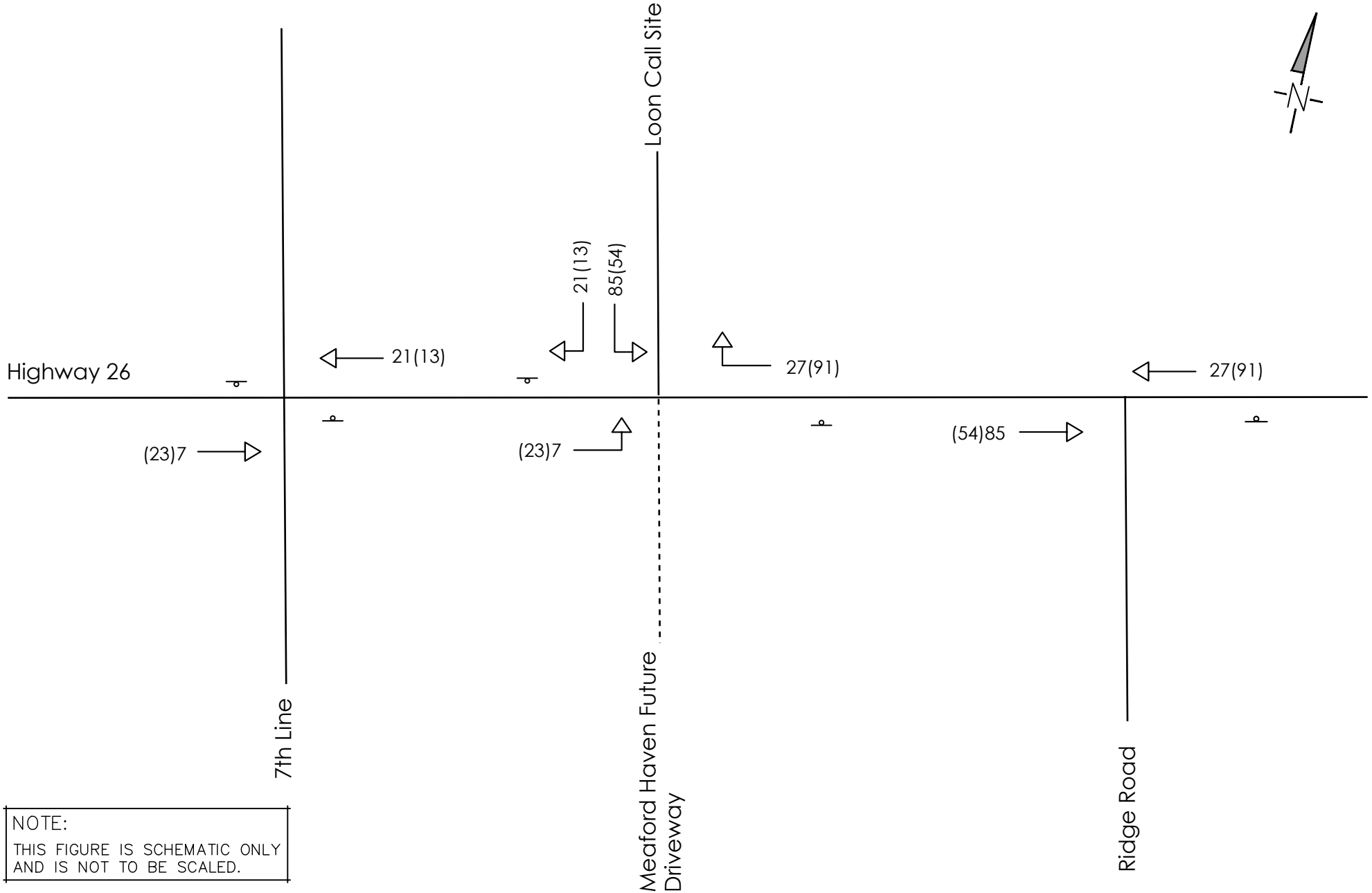
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 4



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

LEGEND:

⊲	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Loon Call Trip Assignment

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
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705 446-3520 F
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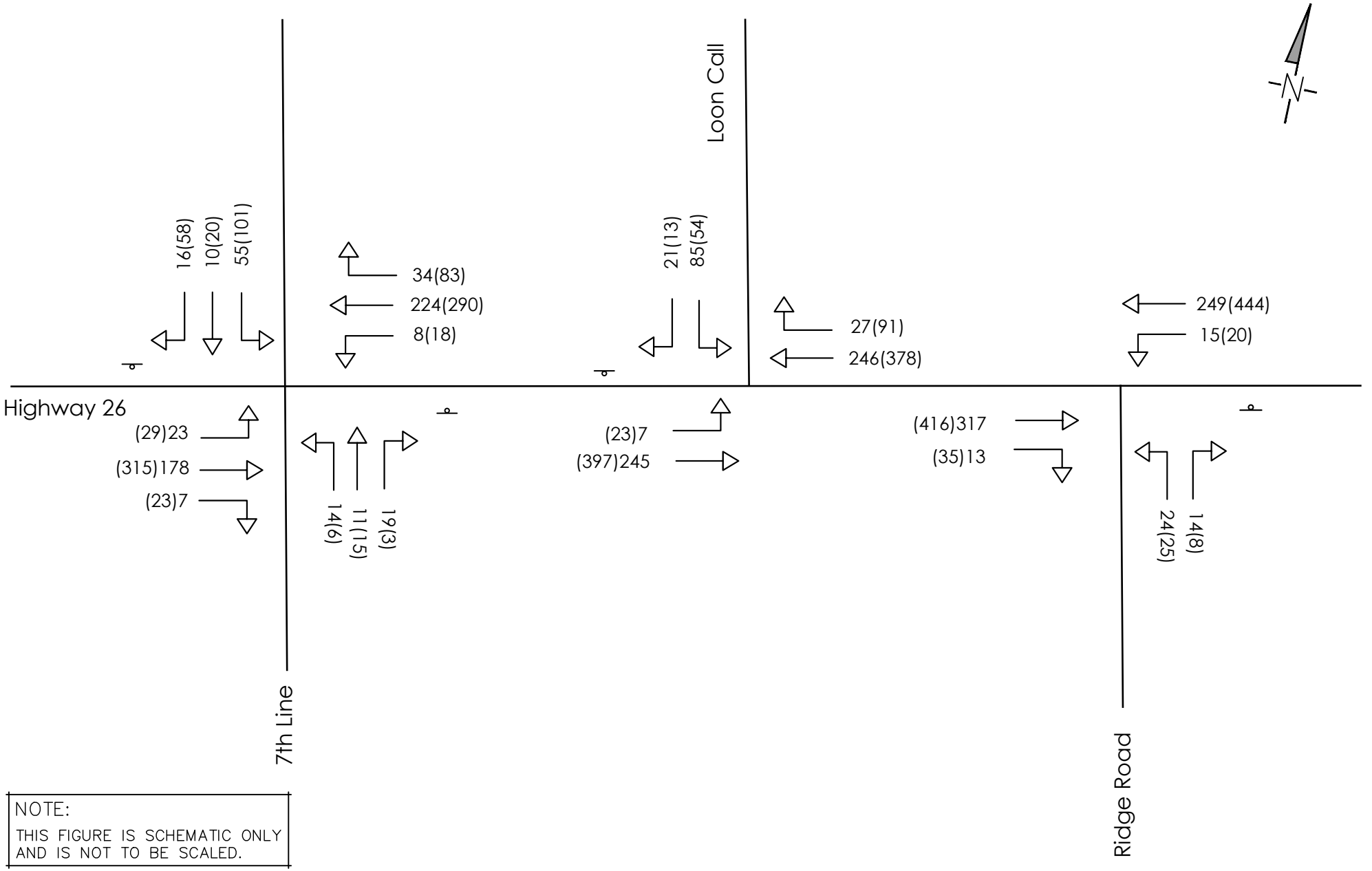
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 5



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

LEGEND:

- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2023 Future Background Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
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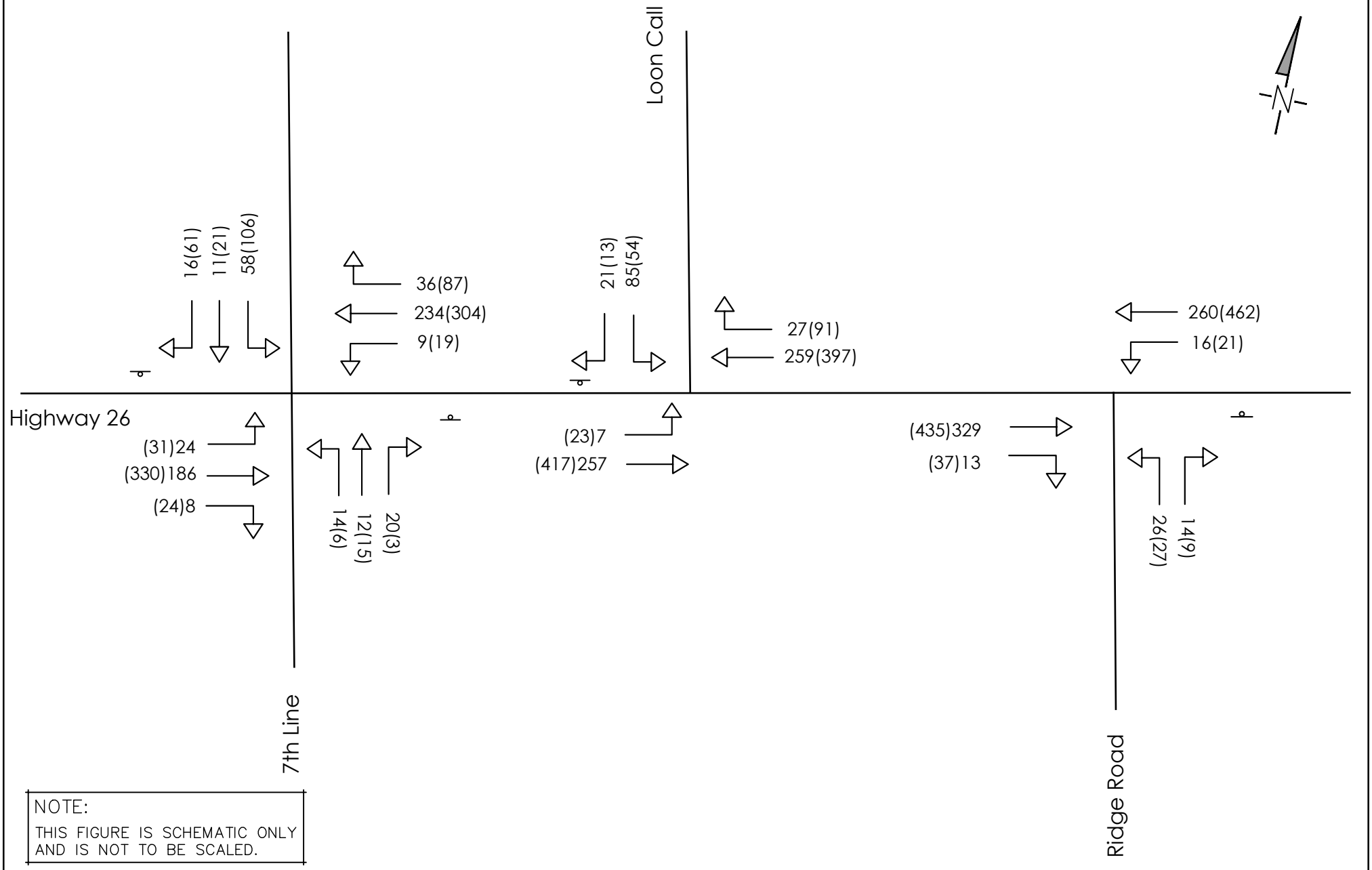
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 6



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

LEGEND:

⊲	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2028 Future Background Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
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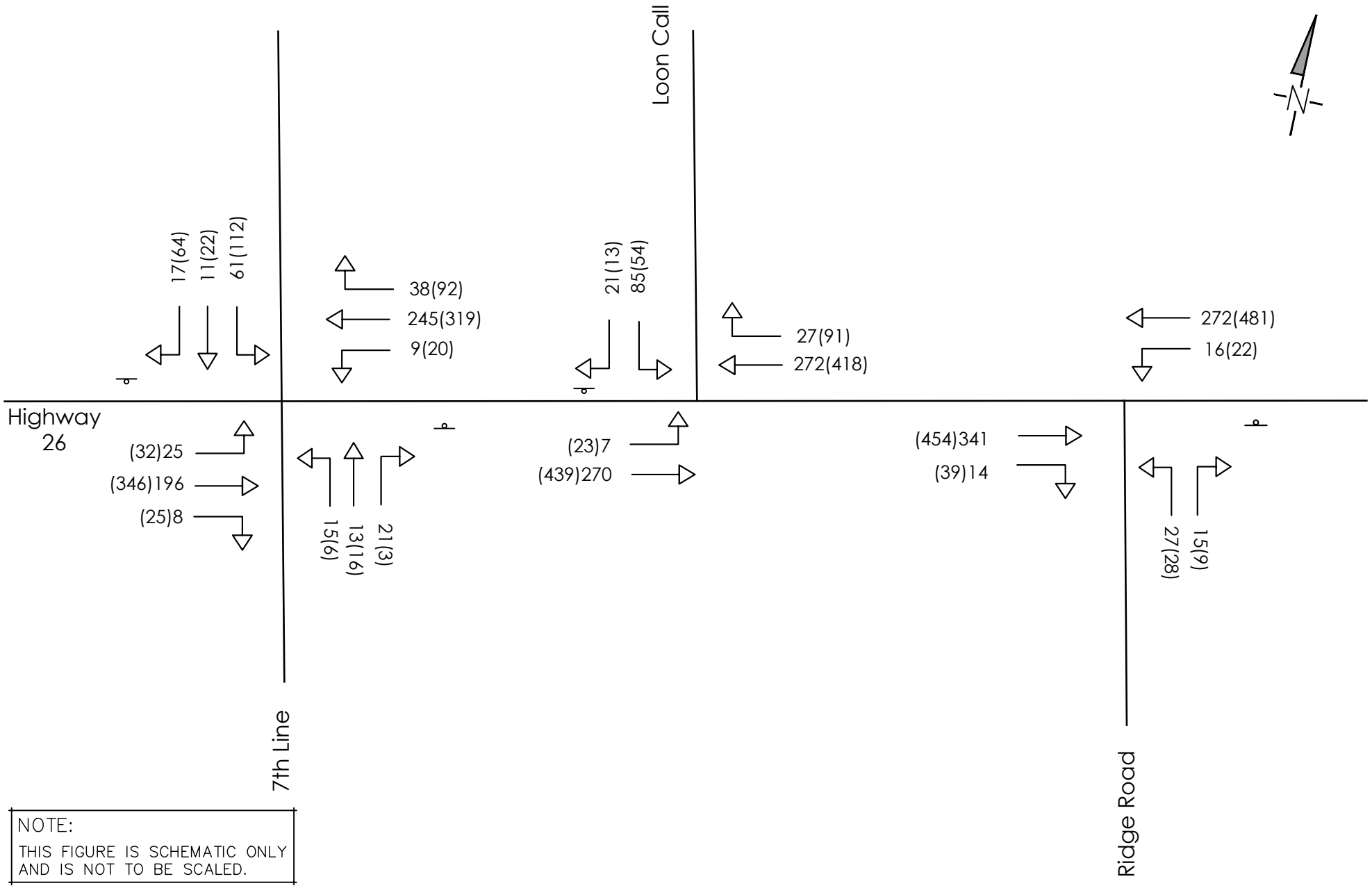
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 7



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

LEGEND:

⊲	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2033 Future Background Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
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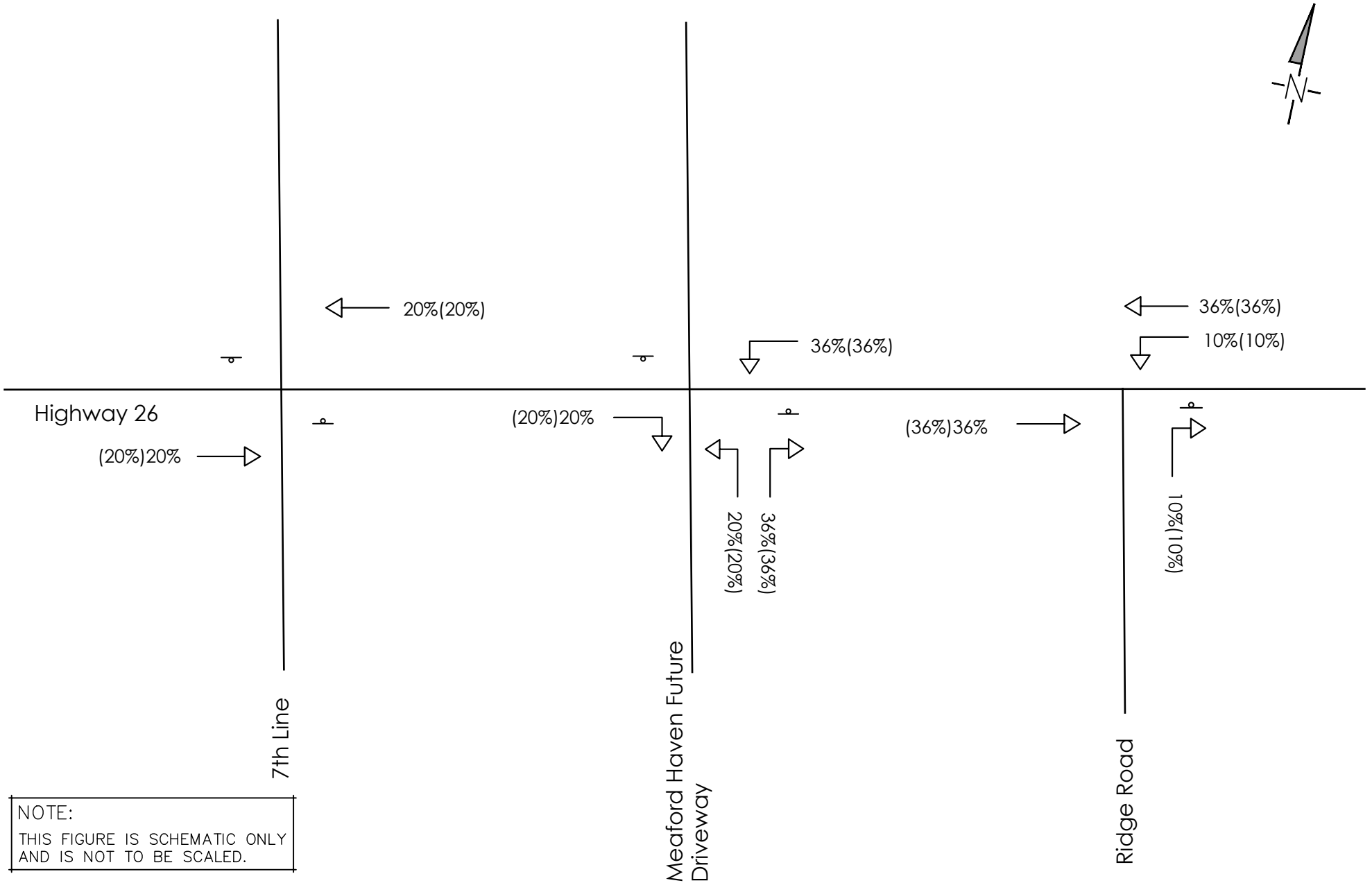
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 8



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

LEGEND:

⊲	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Residential Trip Distribution

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
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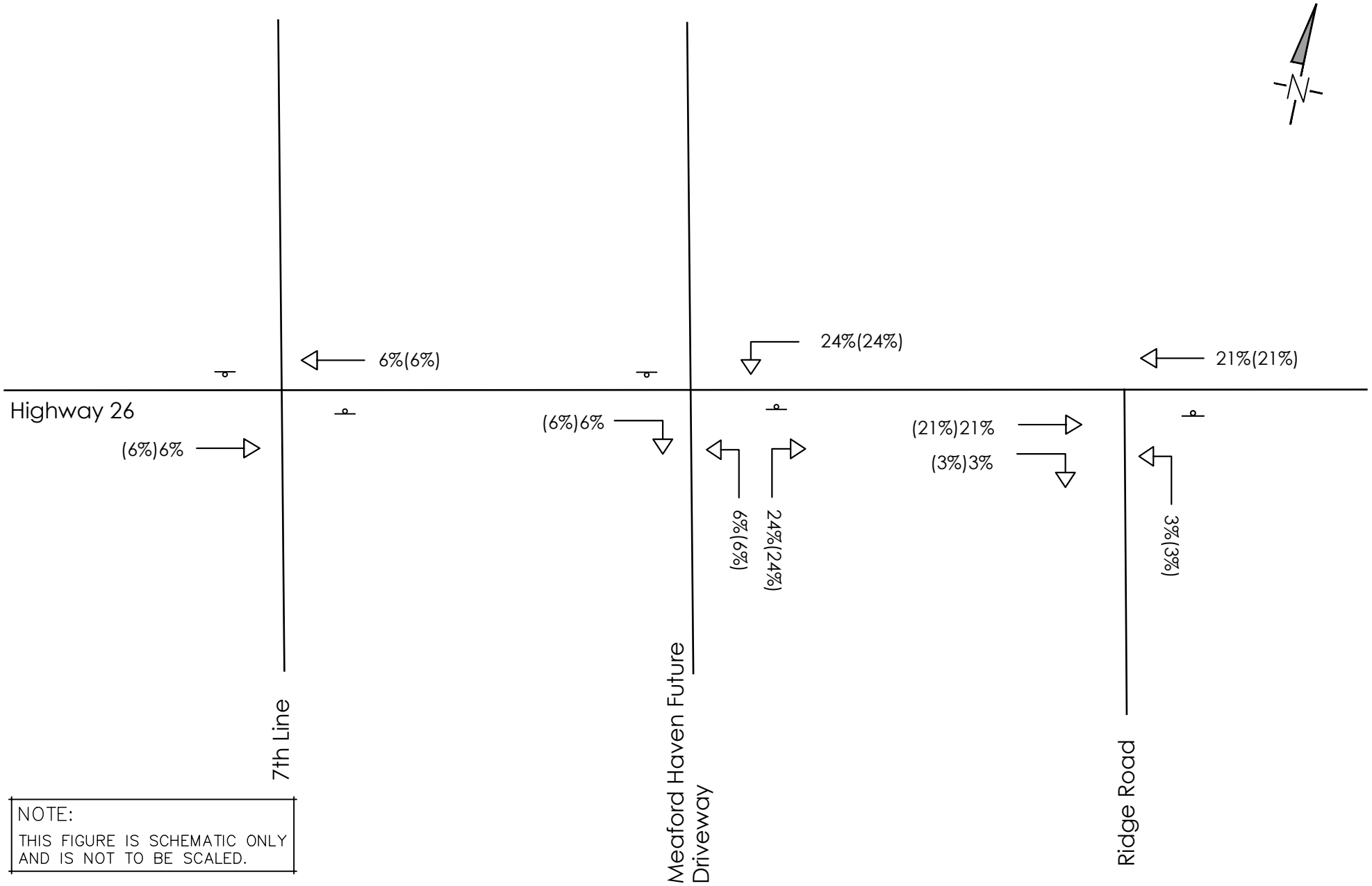
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 9



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

LEGEND:

ϕ	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Commercial Trip Distribution (Primary)

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
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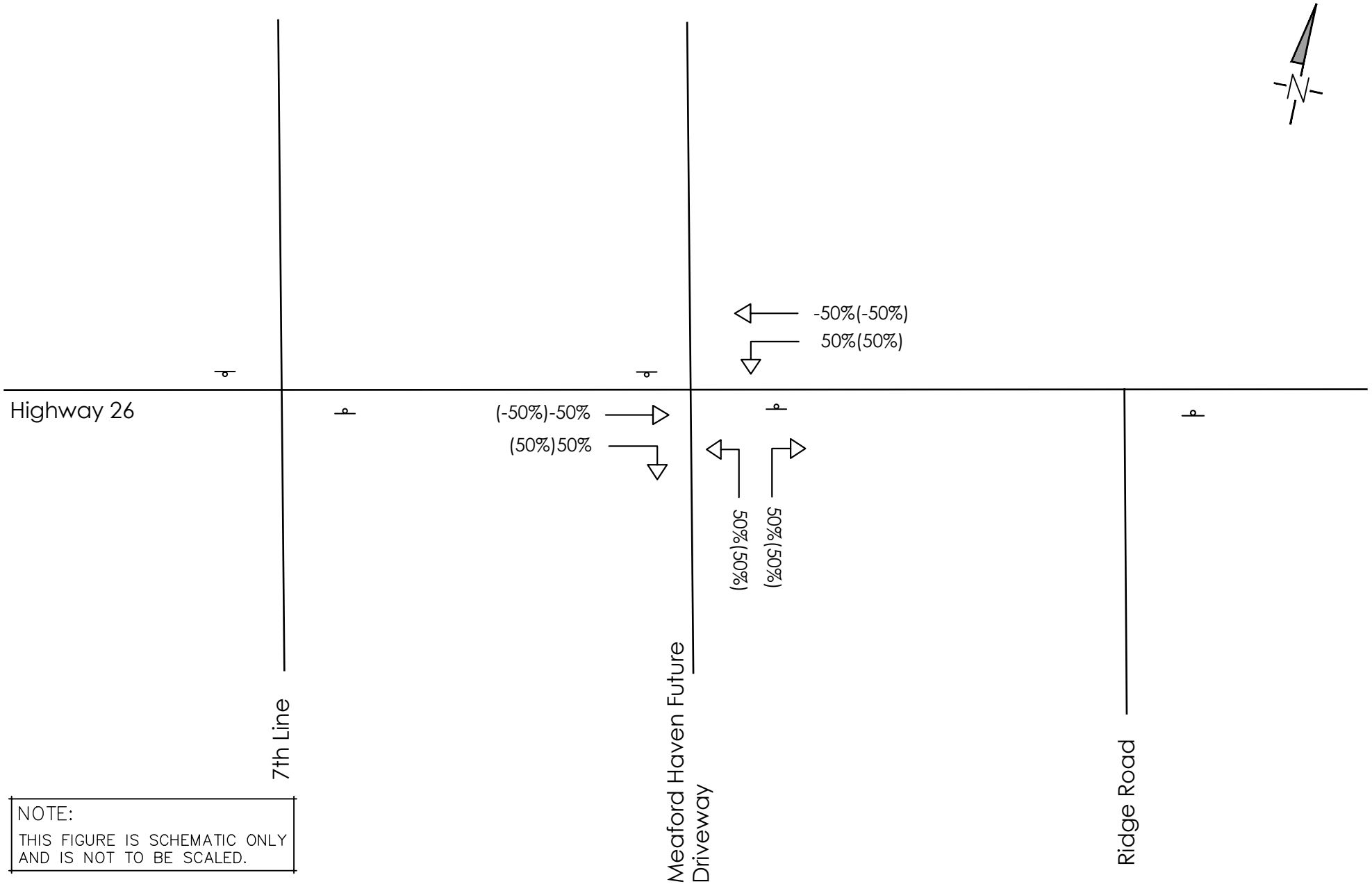
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 10



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

LEGEND:

ϕ	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Commercial Trip Distribution (Pass-By)

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
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705 446-3520 F
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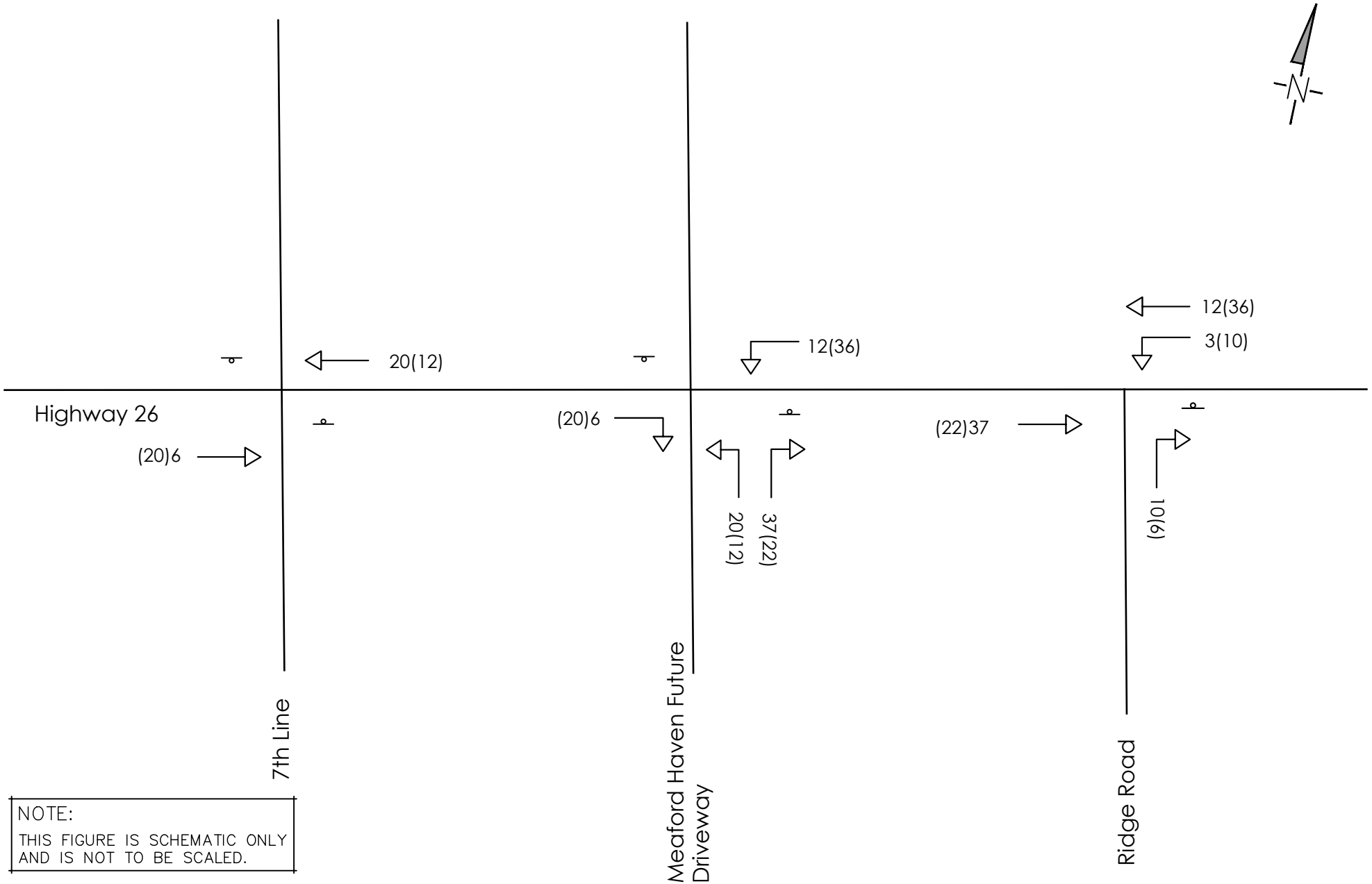
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 11



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

LEGEND:

STOP CONTROL

AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Residential Trip Assignment

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THE HARBOUREDGE BUILDING,
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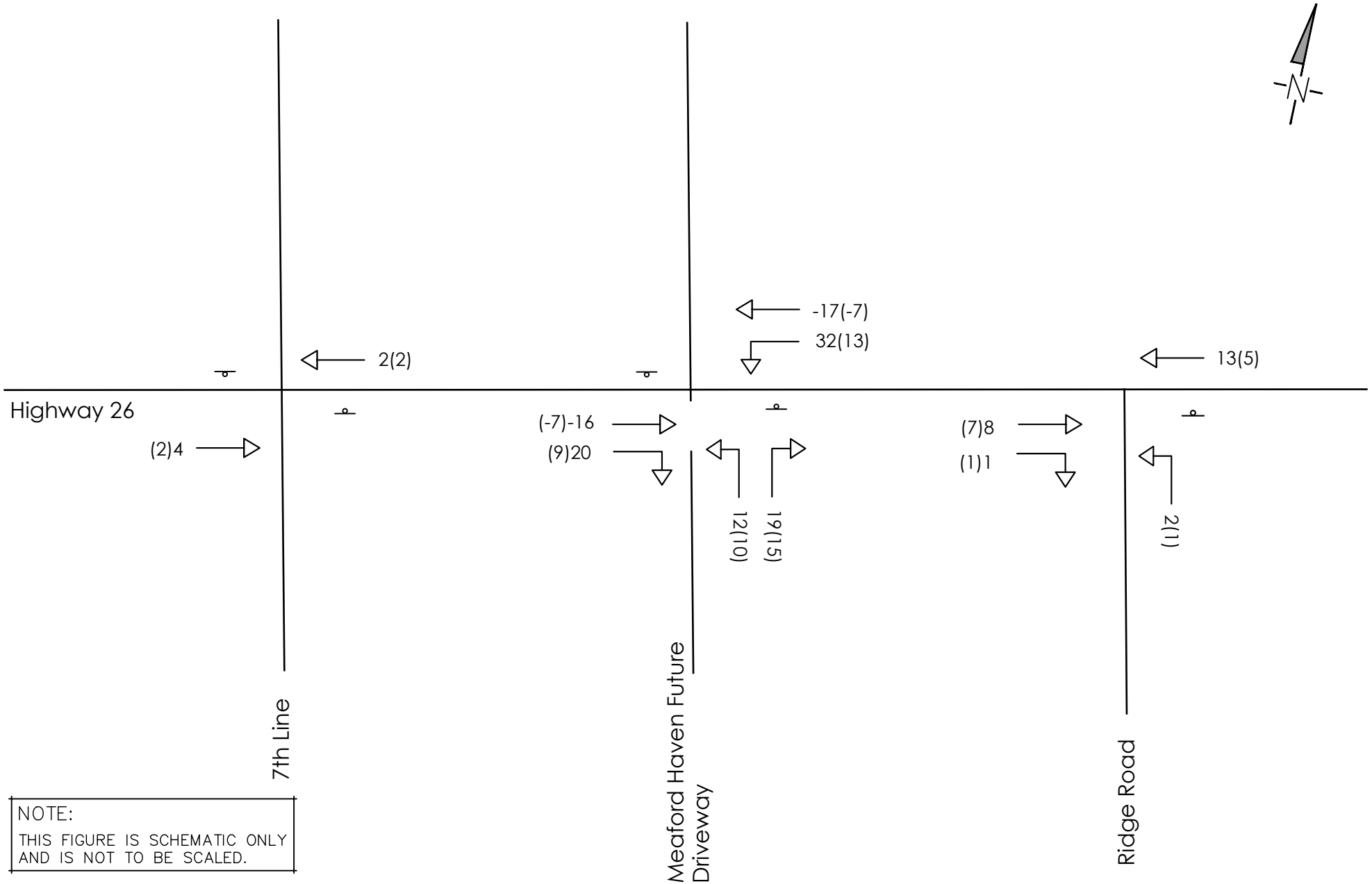
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 12



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

LEGEND:

ϕ	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

Commercial Trip Assignment

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THE HARBOUREDGE BUILDING,
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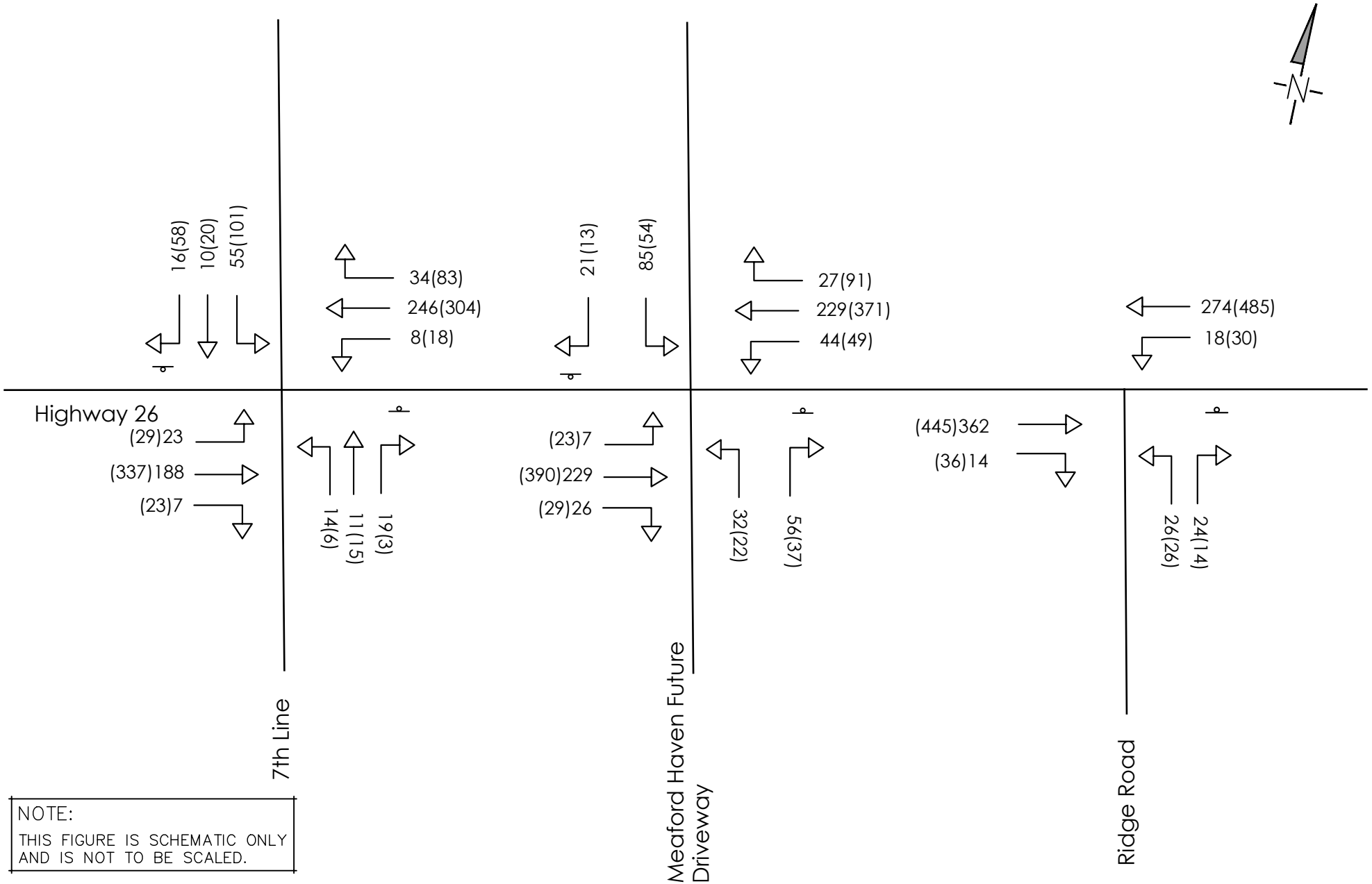
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 13



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

LEGEND:

ϕ	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2023 Future Total Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
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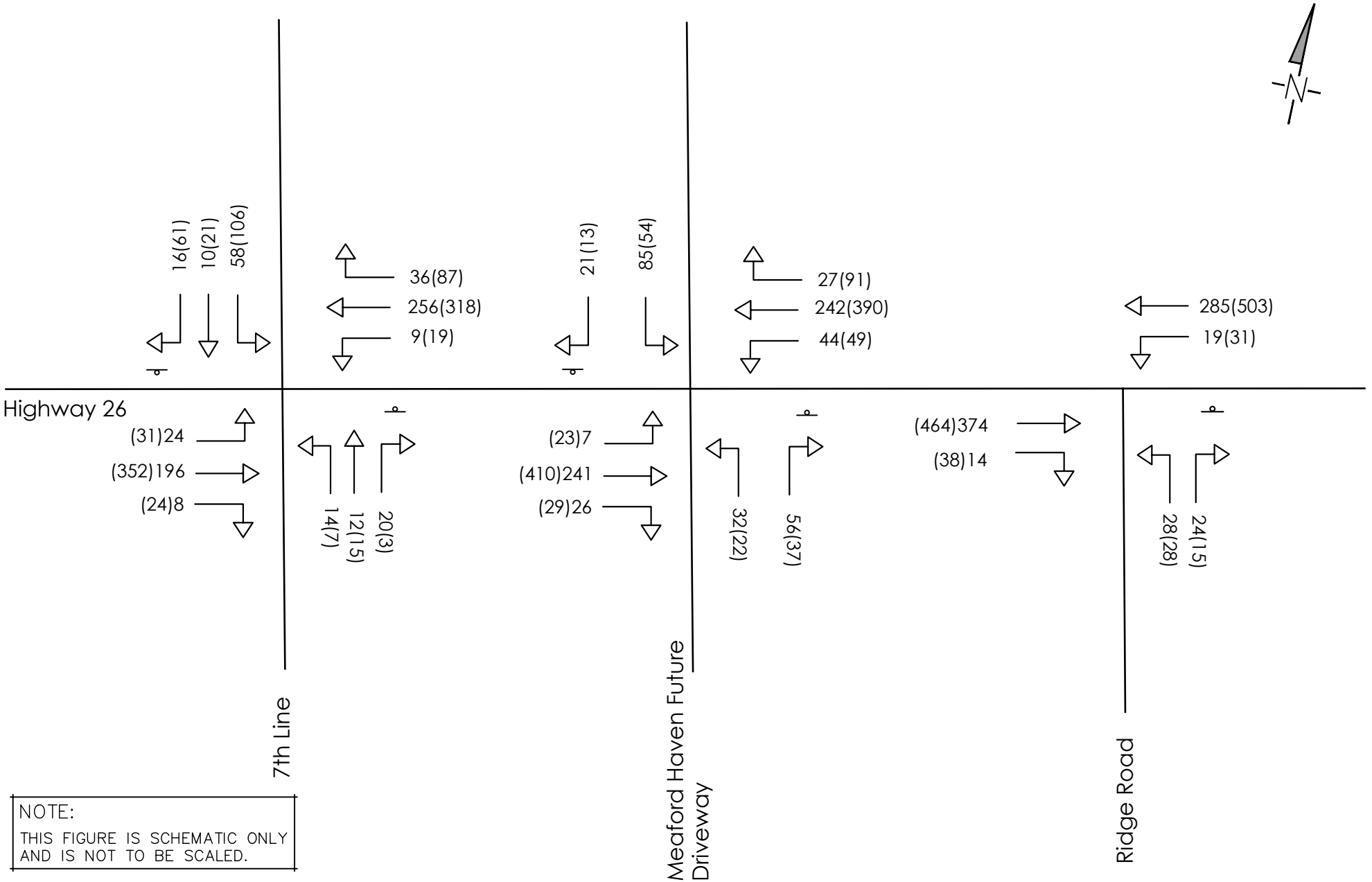
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 14



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

LEGEND:

ϕ	STOP CONTROL
AM(PM)	WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2028 Future Total Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
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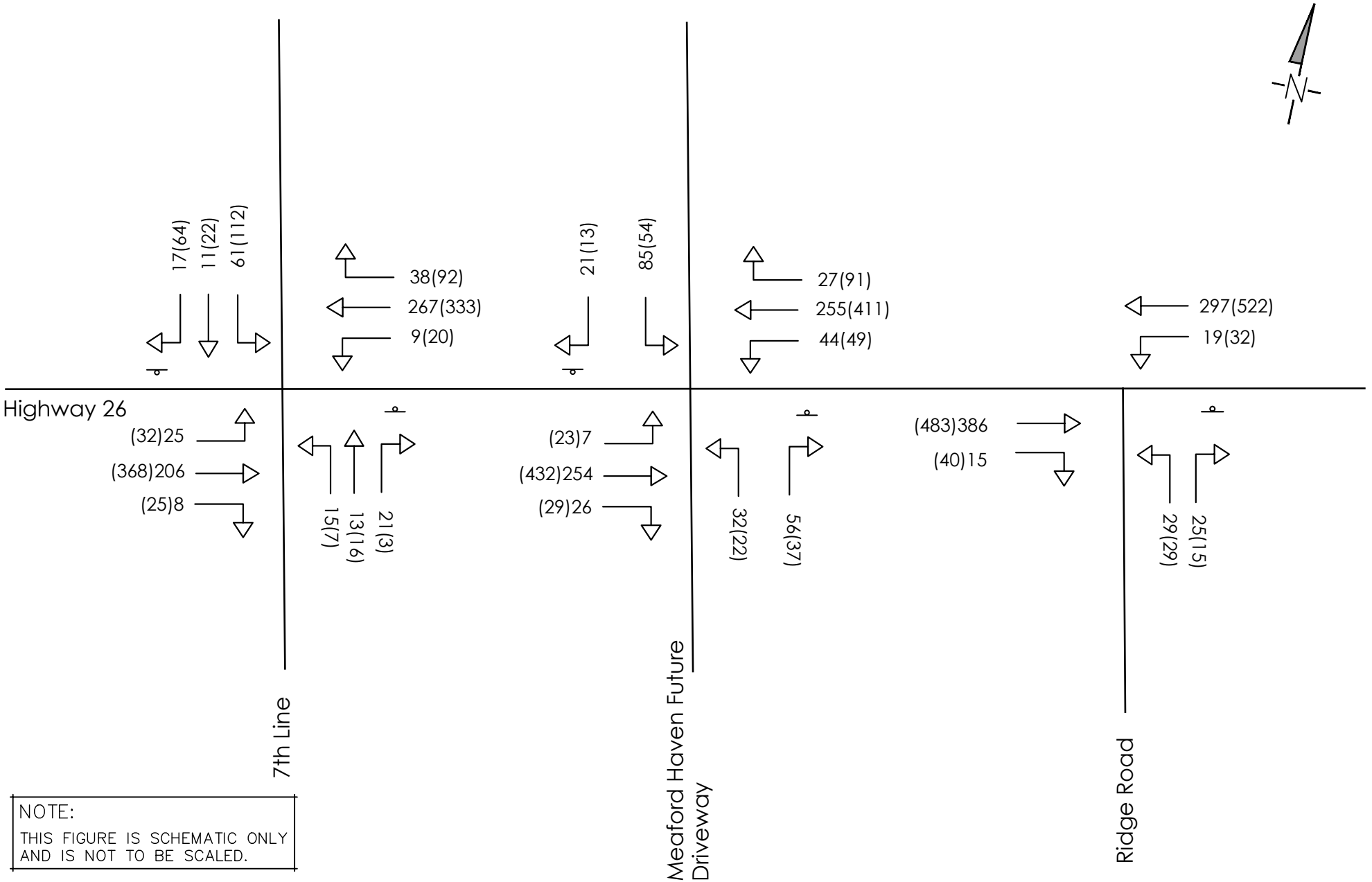
Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 15



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

LEGEND:

STOP CONTROL

AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

Project

Meaford Havens
Town of Meaford, Grey County

Drawing

2033 Future Total Traffic Volumes

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
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Drawn By	Design By	Project
E.H.	E.H.	1230-5664

Scale	Date	Check By	Drawing
N.T.S.	2021/07/13	M.F.	FIG. 16