

TRAFFIC IMPACT STUDY
13247 & 13233 NUNNVILLE ROAD
TOWN OF CALEDON

PREPARED FOR:
BOLTON MIDTOWN DEVELOPMENTS

PREPARED BY:
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Revision Number	Date	Comments
Rev.0	July, 2019	Issued for Client Review
Rev.1	August 2019	Issued for Submission
Rev. 2	January 2020	Issued for Second Submission-Revised Section 1, 6, 9, 10, 11

1.0 Executive Summary

Crozier Consulting Engineers was retained by Bolton Midtown Developments to prepare a Traffic Impact Study in support of concurrent Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) applications for the properties located at 13247 & 13233 Nunnville Road in the Town of Caledon.

The latest Site Plan prepared by WSP, proposes 29 single detached dwellings, a municipal road, and associated landscaped areas. The analysis herein is based on Draft Plan of Subdivision drawings dated August 1, 2019 (WSP) which proposed 35 units. Since the current analysis is based on a higher number of units, it is considered to be more conservative.

Under 2019 existing the intersection of Albion-Vaughan Road at Nunnville Road operates at a Level of Service "D" during the weekday a.m. peak period and "C" during the weekday p.m. peak period, with average delays per vehicle of 6.9 and 7.0 seconds, respectively. The highest volume to capacity ratio of 0.11 is observed at the eastbound leg during the weekday a.m. peak hour. Operational analyses of existing traffic volumes indicate that reserve capacity is available for future traffic volume growth on the boundary road network.

Under 2024 future background conditions, the intersection of Albion-Vaughan Road at Nunnville Road is projected to operate at a Level of Service "E" during the weekday a.m. peak hour and at a Level of Service "D" during the weekday p.m. peak. Given the low volumes on Nunnville Road, signalization of the intersection is not warranted.

No geometric improvements are recommended under the future background conditions.

The proposed development is expected to generate 30 two-way (8 inbound and 22 outbound) trips during the weekday a.m. peak hour and 37 two-way (23 inbound and 14 outbound) trips during the weekday p.m. peak hour.

The proposed development is expected to have a negligible impact on the surrounding road network as intersection operations are expected to improve with future total traffic volumes in horizon year 2024.

Based on the AutoTURN analysis, trucks can maneuver through the site with no constraints.

Sufficient sightlines are available on Nunnville Road and Albion Vaughan Road, as determined through the site visit conducted on December 11, 2019.

The Zoning By-Law Amendment (ZBA) and Official Plan Amendment (OPA) can be supported from a traffic operations perspective as the boundary road system can accommodate the increase in traffic volumes attributable to the proposed development.

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2.0 Introduction

Crozier Consulting Engineers (Crozier) was retained by Bolton Midtown Developments to prepare a Traffic Impact Study in support of concurrent Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) applications for the properties located at 13247 & 13233 Nunnville Road in the Town of Caledon.

This report demonstrates how the traffic generated from the proposed development will integrate with the area's existing traffic and if any mitigation measures are warranted.

The study has been completed in accordance with the procedures set out in the Town of Caledon's Transportation Impact Studies Terms of Reference and Guidelines with the associated analysis and findings outlined herein. A scope of work was sent to Town of Caledon Staff on June 11, 2019 and comments were received on June 24, 2019 (Provided in Appendix A).

3.0 Existing Conditions

3.1 Development Lands

The subject lands cover an area of approximately 3.3 ha with a developable area of approximately 2.2 ha. The property, located in residential area, is bounded by A TRCA Regulated Environmental Policy Area (EPA) to the north, Albion-Vaughan Road to the east and existing residential properties to the south and west. The subject lands are zoned by the Town of Caledon Zoning By-Law 2006-50. The site is currently zoned "Estate Residential-13 (RE-13)" which permits accessory apartments, day cares within private homes, and detached dwellings. Relevant zoning map excerpts have been included in the Appendix A.

The proposed development covers an area of approximately 3.3 ha with a developable area of approximately 2.2 ha. The latest Site Plan prepared by WSP (See Figure 1), proposes to include 35 single detached dwellings, a municipal road, and associated landscaped areas.

3.2 Existing Road Network

The boundary road network is summarized below.

Albion-Vaughan Road is a north-south roadway with a two-lane cross-section. Albion-Vaughan Road is under the jurisdiction of the Town of Caledon and is defined as a major road. The roadway does not have sidewalks on either sides and has a posted speed limit of 60 km/h throughout the study area.

Nunnville Road is a north-south roadway with a two-lane cross-section. Nunnville Road intersects with Albion-Vaughan Road in an east-west direction and operates as a three-way stop-controlled intersection. The roadway has sidewalks available on the east side and has a posted speed limit of 40 km/h throughout the study area.

3.3 Existing Transit Network

Transit services are provided by GO Transit. Bus services that operate within the vicinity of the site are described below:

GO Route 38A (Bolton/Malton) has its first stop in Caledon at Queen Street East and Columbia Way and travels south to connect to Malton GO station in the morning hours. The bus route travels north from Malton GO Station to Caledon at Queen Street East and Columbia Way during the afternoon hours. This route is a temporary route from Metrolinx that is expected to continue until January 2020. This route enables transit users to be able to go from Caledon and Brampton to the Malton GO station, where they can pick up the Toronto-bound Kitchener line.

Existing transit routes are provided in Appendix B.

3.4 Traffic Data

Turning movement counts at the intersection of Albion-Vaughan Road at Nunnville Road were conducted by Spectrum Traffic Data Inc. on Thursday, June 13, 2019, between the weekday a.m. peak hours of 7:00 a.m. and 9:00 a.m. and during the weekday p.m. peak hours of 4:00 p.m. and 6:00 p.m. Traffic data contained in Appendix B provides a summary of the turning movement counts. Refer to Figure 2 for the existing traffic volumes.

3.5 Traffic Modelling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual, 2010" using Synchro 10 modeling software. Intersections are assessed using a Level of Service metric, with ranges of delay assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be measured in the commuter peak hours when greater vehicle volumes cause longer travel times. The Level of Service (LOS) definitions for stop control intersections is included in Appendix C.

4.0 Existing Traffic Assessment

4.1 Intersection Operations

Existing Traffic Analysis Traffic operations conditions at study intersections were analyzed using Synchro Version 10.0, which incorporates the methodology outlined in the Highway Capacity Manual (HCM 2010). Analysis parameters and assumptions have been adopted in accordance to the Town's Guidelines. This includes the following assumptions:

- Default peak hour factors for all movements on all approaches
- Ideal saturation flow rate based on Synchro default value of 1,900 vphpl for all movements

The intersection operations are reported in two ways:

- The volume to capacity (v/c) ratio which is represented numerically for the study intersection
- The level of service (LOS) which is indicated by a letter and is based on the average control delay per vehicle. The Level of Service (LOS) definitions for stop control intersections is included in Appendix C

4.2 Critical Movement Classifications

Per Town of Caledon's Transportation Impact Studies Terms of Reference and Guidelines the following movements are defined as critical movements for unsignalized intersections:

- Level of service (LOS), based on average delay per vehicle, on individual movements; greater than LOS "E"
- The estimated maximum queue length for an individual movement exceeds the available queue storage

4.3 Intersection Capacity Analysis

The traffic operations at the intersection Albion-Vaughan Road at Nunnville Road were assessed using Synchro 10.0 software. Results from the intersection capacity analysis, based on the existing road network configuration and existing traffic volumes, are summarized in Table 1. Critical movements, if any, are bolded. Detailed intersection capacity and queuing analysis reports under the existing conditions are provided in Appendix D.

Table 1: 2019 Existing Levels of Service

Intersection	Control Type	Peak Hour	Level of Service	Average Delay per Vehicle(s)	Maximum V/C & V/C Ratio(s) > 0.85 (Approach)
Albion-Vaughan Road at Nunnville Road	Stop Controlled	Weekday A.M.	D	31.3 s	0.11 (EB)
		Weekday P.M.	C	22.7 s	0.05 (EB)

Note: The Level of Service of a Stop-Controlled intersection is based on the delay associated with the minor approach.

As indicated in Table 2, the intersection of Albion-Vaughan Road at Nunnville Road operates at a Level of Service "D" during the weekday a.m. peak period and "C" during the weekday p.m. peak period, with average delays per vehicle of 31.3 and 22.7 seconds, respectively. The highest volume to capacity ratio of 0.11 is observed at the minor leg during the weekday a.m. peak hour.

Operational analyses of existing traffic volumes indicate that reserve capacity is available for future traffic volume growth on the boundary road network.

5.0 Future Background Conditions

5.1 Study Horizons

Per direction from Town of Caledon Staff and per the Transportation Impact Study Guidelines, horizon year corresponding to five years from the study was considered for the analysis. A study horizon year of 2024 was selected to assess the full operations of the development on the boundary road network.

5.2 Traffic Growth Rates and Background Developments

Per discussions with Town of Caledon Staff, a 2.0% growth rate per annum was applied to all movements on Nunnville Road and Albion Vaughan Road.

As confirmed by the Town staff, there are no major developments in the area that are to be expected to add traffic in the study area. The 2024 background traffic volumes are illustrated in Figure 3.

5.3 Intersection Capacity Analysis

The traffic operations at the intersection Albion-Vaughan Road at Nunnville Road were assessed using Synchro 10.0 software. Results from the intersection capacity analysis, based on the existing road network configuration and 2024 future background traffic volumes, are summarized in Table 2. Critical movements, if any, are bolded. Detailed intersection capacity analysis reports under the future background conditions are provided in Appendix D.

Table 2: 2024 Future Background Levels of Service

Intersection	Control Type	Peak Hour	Level of Service	Average Delay per Vehicle(s)	Maximum V/C & V/C Ratio(s) > 0.85 (Approach)
Albion-Vaughan Road at Nunnville Road	Stop Controlled	Weekday A.M.	E	39.0 s	0.14 (EB)
		Weekday P.M.	D	25.4 s	0.06 (EB)

Note: The Level of Service of a Stop-Controlled intersection is based on the delay associated with the minor approach.

As indicated in Table 2, the intersection of Albion-Vaughan Road at Nunnville Road is projected to operate at a Level of Service "E" during the weekday a.m. peak hour, with an average delay per vehicle of 39.0 seconds, an increase of 7.7 seconds when compared to existing conditions. The minor roadway is projected to operate at a Level of Service "D" during the weekday p.m. peak hour, with an average delay per vehicle of 25.4 seconds, an increase of 2.7 seconds when compared to existing conditions.

Signal warrant analysis, as outlined in the Ontario Traffic Manual (OTM), Book 12, was carried out for the intersection of Albion-Vaughan Road at Nunnville Road under the future (2024) background traffic conditions. The analysis shows 5% and 11% compliance with warrant 1 and warrant 2 respectively. According to the OTM, if any of the warrants is satisfied by 100%, the installation of a signal is considered to be justified. Therefore, signals are not warranted for this intersection. The detailed analysis is provided in Appendix E. No geometric improvements are recommended under the future background conditions.

6.0 Development Proposal

The subject property is part of an established residential area in Bolton. The property combines 13247 & 13233 Nunnville Road lots. Each lot has an existing detached residential building. The proposed development covers an area of approximately 3.3 ha with a developable area of approximately 2.2 ha. The latest Site Plan prepared by WSP, proposes 29 single detached dwellings, a municipal road, and associated landscaped areas. The analysis herein is based on Draft Plan of Subdivision drawings dated August 1, 2019 (WSP) which proposed 35 units. Since the current analysis is based on a higher number of units, it is considered to be more conservative.

The subject property is bounded by a TRCA Regulated Environmental Policy Area (EPA) to the north, Albion-Vaughan Road to the east and existing residential properties to the south and west.

7.0 Site Generated Traffic

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

7.1 ITE Trip Generation

Site generated traffic for the proposed development was calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, using Land Use Category (LUC) 210 "Single Family Detached Housing". The fitted curve equation was used for the peak period calculations for a conservative analysis. No adjustments for internal capture or pass-by trips were made. The site generated trips from the proposed development are tabulated in Table 5.

Table 5: Site Generated Trips

ITE Category	Units	Roadway Peak Hour	Rate/Equation Used	Number of Trips		
				Inbound	Outbound	Total
Single Family Detached Housing (LUC 210)	35	Weekday a.m.	$T = 0.71(X) + 4.80$	8	22	30
		Weekday p.m.	$\ln(T) = 0.96 \ln(X) + 0.20$	23	14	37
New Trips		Weekday a.m.		8	22	30
		Weekday p.m.		23	14	37

The proposed development is expected to generate 30 two-way (8 inbound and 22 outbound) trips during the weekday a.m. peak hour and 37 two-way (23 inbound and 14 outbound) trips during the weekday p.m. peak hour.

7.2 Trip Distribution and Assignment

The trip distribution for the proposed development is based on traffic patterns extracted from the 2016 Transportation Tomorrow Survey (TTS). The trip distribution calculations based on the TTS data are summarized in Table 6. Detailed calculations are provided in Appendix F. The primary trip assignment is illustrated in Figure 4.

Table 6: Trip Distribution

Direction	A.M. Peak Hour	P.M. Peak Hour
	In (Out)	In (Out)
North	20% (10%)	10% (15%)
South	10% (25%)	30% (20%)
East	15% (20%)	25% (15%)
West	55% (45%)	35% (50%)

8.0 Total Traffic Conditions

The future total traffic volumes for the horizon year consists of the following components:

- Future Background traffic volumes
- Proposed development site generated traffic volumes

The resulting future total volumes in horizon year 2024 are presented in Figure 5.

8.1 Intersection Capacity Analysis

The traffic operations at the intersection Albion-Vaughan Road at Nunnville Road were assessed using Synchro 10.0 software. Results from the intersection capacity analysis, based on the existing road network configuration and 2024 future total traffic volumes, are summarized in Table 7. Critical movements, if any, are bolded. Detailed intersection capacity analysis reports under the future total conditions are provided in Appendix D.

Table 7: 2024 Future Total Levels of Service

Intersection	Control Type	Peak Hour	Level of Service	Average Delay per Vehicle(s)	Maximum V/C & V/C Ratio(s) > 0.85 (Approach)
Albion-Vaughan Road at Nunnville Road	Stop Controlled	Weekday A.M.	E	36.7 s	0.27 (EB)
		Weekday P.M.	C	24.4 s	0.12 (EB)
Nunnville Road at Site Access	Stop Controlled	Weekday A.M.	A	8.7 s	0.02 (WB)
		Weekday P.M.	A	8.7 s	0.02 (WB)

Note: The Level of Service of a Stop-Controlled intersection is based on the delay associated with the minor approach.

As indicated in Table 7, the intersection of Albion-Vaughan Road at Nunnville Road is projected to operate at a Level of Service "E" during the weekday a.m. peak hour, with an average delay per vehicle of 36.7 seconds, a decrease of 2.3 seconds when compared to future background conditions. The minor roadway is projected to operate at a Level of Service "C" during the weekday p.m. peak hour, with an average delay per vehicle of 24.4 seconds, a decrease of 1.0 seconds when compared to existing conditions. Under future total conditions right turning volumes at the minor leg increase during both peak periods, which typically have lower delays than left turning volumes, thus reducing overall delay on the minor leg.

Signal warrant analysis, as outlined in the Ontario Traffic Manual (OTM), Book 12, was carried out for the intersection of Albion-Vaughan Road at Nunnville Road under the future (2024) background traffic conditions. The analysis shows 12% and 16% compliance with warrant 1 and warrant 2 respectively. According to the OTM, if any of the warrants is satisfied by 100%, the installation of a signal is considered to be justified. Therefore, signals are not warranted for this intersection. The detailed analysis is provided in Appendix E. No geometric improvements are recommended under the future background conditions.

The results outlined above are conservative since the minor leg at the intersection was modelled as a single-lane shared movement, even though the pavement width is wide enough to allow simultaneous left-turns and right-turns (which would further reduce delays at the minor leg).

The unsignalized intersection of Nunnville Road at Site Access is anticipated to operate with level of service "A" during the weekday a.m. and p.m. peak periods, with a maximum delay of 8.7 seconds during both peak periods. No individual movements are expected to operate with a volume to capacity ratio above 0.85.

9.0 Site Distance Review

9.1 Sight Distance Criteria

Sight distance is a linear metric associated with vehicular speed. It represents the distance travelled by a vehicle during the time it takes a driver to recognize, and then stop or maneuver around a roadway obstacle. The obstacle can be wildlife, debris, another vehicle, or any object that would impede travel. The main sight distance measures of concern are Stopping Sight Distance and Intersection Sight Distance.

Stopping Sight Distance refers to the sum of the distance travelled during the perception and reaction time and braking distance.

Intersection Sight Distance is defined as the sight distance available from a point where vehicles are required to stop on the intersection road, while drivers are looking left and right along the major roadway, before entering the intersection.

9.2 Sight Distance Requirements

Sightlines and available sight distances were reviewed based on the TAC Guidelines, dated June 2017. Chapter 9, Section 9.9 was reviewed to identify the appropriate cases applicable for the proposed site. Case 'B', which refers to intersections with stop control on the minor road was reviewed. Table 9.9.4 along with Table 9.9.6, which cover stopping and intersection sight distances for left and right turns were also reviewed.

9.2.1 Sight Distance Requirements on Nunnville Road

Based on a design speed of 60 km/hr along Nunnville Road at the proposed site access (40 km/h posted speed limit), the minimum required stopping sight distance for left and right turns is 85 metres. Similarly, the intersection sight distance for left and right turning movements is 130 metres and 110 metres, respectively.

9.2.2 Sight Distance Requirements on Albion Vaughan Road

Albion Vaughan Road has a posted speed of 60km/h along the site frontage, which corresponds to a design speed of 80 km/h.). The minimum required stopping sight distance for left and right turns is 130 metres. The Intersection Sight Distance for left turns from a stop controlled minor street with a design speed of 80 km/h is 170 metres. The intersection sight distance for right turns from a stop controlled minor street with an 80 km/h design speed is 145 metres.

9.3 Sight Distance Analysis

The proposed plans provided by WSP. were used to determine if sufficient sightlines are available. Passenger vehicles designed to TAC manual (2 metres wide and 5.6 metres long) were then placed within the roadway and sightlines were created from a driver's perspective.

9.3.1 Sight Distance Analysis on Nunnville Road

It was determined that a sight distance measurement of greater than 200 metres is available south of the access on Nunnville Road, thus satisfying the minimum requirement of 105 metres.

With a sight distance measurement greater than 100 metres to the north of the access, the sight distance requirement of 95 metres is also met. Therefore, it is concluded that the sight distance to the north and south on Nunnville Road is sufficient. Figure 6 shows the available sight distances from the site access on Nunnville Road.

9.3.2 Sight Distance Analysis on Albion Vaughan Road

A review of the existing sightlines was conducted at the intersection of Nunnville Road and Albion-Vaughan Road through a site visit. On December 11, 2019, the weather conditions during the site visit were clear and sunny. As seen Figure 7, a 0.70-meter pylon was placed in lane 1 in the southbound direction at 170 meters from the intersection. The photo is taken from the stop bar located at Nunnville Road and shows a typical drivers' sightlines.

Sight distances on Albion Vaughan Road were measured using the following assumptions:

- A standard driver eye height of 1.08 metres for a passenger vehicle
- A standard vehicle height of 1.30 meters for a passenger vehicle
- A 5.4 meter setback from the through edge of Albion Vaughan Road to represent a vehicle waiting to exit Nunnville Road
- A design speed of 80 km/h along Albion Vaughan Road

Since the pylon has lower height than a vehicle, and is still visible at the given distance, it is confirmed that sufficient sightlines are available for vehicles making a left turn onto Albion Vaughan Road from Nunnville Road. Figure 7 shows the available sightlines to the north wherein the pylon is placed at a measured distance of 170 metres.

10.0 On-Site Circulation Review

Vehicle access routes for a passenger vehicle and emergency vehicle was assessed using AutoTurn analysis depicting the swept path of the vehicle in relation to the proposed cul-de-sac roadway.

Figure 8 shows the assessment for the internal circulation of the site using a typical passenger vehicle. As illustrated in the figure, the vehicle can maneuver through the site with no constraints. Figure 9 shows emergency vehicle access to the site.

11.0 Conclusion

The findings and conclusions of our analysis are represented as follows:

- The study area intersections are operating under capacity with low delays in the existing traffic conditions during both the a.m. and p.m. peak hours.
- During the a.m. and p.m. peak hours in the future background traffic conditions for horizon year 2024, movements are expected to continue to operate under capacity and no geometric improvements are recommended. The intersection of Albion-Vaughan Road at Nunnville Road is projected to operate with Level of Service 'E' during the a.m. peak period, however signals are not warranted.
- The proposed development is expected to generate 30 two-way (8 inbound and 22 outbound) trips during the weekday a.m. peak hour and 37 two-way (23 inbound and 14 outbound) trips during the weekday p.m. peak hour.
- The proposed development is expected to add additional traffic to the surrounding road network, but the study intersections are expected to work under capacity with acceptable delays.
- Sufficient sightlines are available on Nunnville Road and Albion Vaughan Road, as determined through the site visit conducted on December 11, 2019.
- The proposed full-movement access on Nunnville Road is anticipated to function at acceptable level of service and well below-capacity.
- Based on the AutoTURN analysis, passenger vehicles can maneuver through the site with no constraints.
- The analysis undertaken herein was prepared using the most recent Site Plan. Any minor changes to the plan will not materially affect the conclusions contained in this report.

We trust that this review satisfies any transportation concerns associated with the Site Plan for this development. Please feel free to contact the undersigned for any further information required.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.



Kavleen Sachdeva, E.I.T.
Transportation

C.F. CROZIER & ASSOCIATES INC.



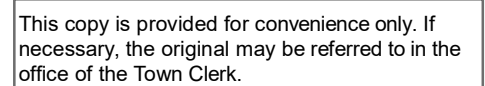
Aaron Wignall
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APPENDIX A

Relevant Zoning Excerpts Discussions with Town of Caledon

CON. 8 (ALB)



The base data on this map is provided for convenience only. The Town of Caledon is not responsible for any deficiency or inaccuracy in the base data, and will not accept any liability whatsoever therefor. The reproduction of the base data, in whole or in part, by any means is prohibited without the prior written permission of the Town of Caledon.

SECTION 6

RESIDENTIAL ZONES

6.1 GENERAL PROHIBITION

No *person* shall, within any **Residential Zone**, use any land, or erect, *alter*, enlarge, use or maintain any *building* or *structure* for any *use* other than as permitted in **Table 6.1** of Subsection 6.2 and in accordance with the standards contained in **Table 6.2** of Subsection 6.3, the General Provisions contained in Section 4 and the Parking, Loading & Delivery Standards contained in Section 5.

6.2 PERMITTED USES

Uses permitted in a **Residential Zone** are noted by the symbol '✓' in the column applicable to that *Zone* and corresponding with the row for a specific permitted *use* in **Table 6.1**. A number(s) following the symbol '✓', *zone* heading, or identified permitted *use*, indicates that one or more conditions apply to the *use* noted or, in some cases, to the entire *Zone*. Conditions are listed below the Permitted Use Table, **Table 6.1**.

The **Residential Zones** established by the By-law are as follows:

RE	Estate Residential
RR	Rural Residential
R1	Residential One
R2	Residential Two
RT	Townhouse Residential
RMD	Mixed Density Residential
RM	Multiple Residential

TABLE 6.1

USE	ZONES						
	RE	RR	R1	R2	RT	RMD	RM
<i>Apartment, Accessory</i>	✓	✓	✓	✓			
<i>Building, Apartment</i>							✓
<i>Day Care, Private Home</i>	✓	✓	✓	✓	✓	✓	✓
<i>Dwelling, Detached</i>	✓	✓	✓			✓	
<i>Dwelling, Duplex</i>				✓			
<i>Dwelling, Linked</i>				✓			
<i>Dwelling, Semi Detached</i>				✓		✓	
<i>Dwelling, Townhouse</i>					✓	✓	
<i>Home Occupation</i>	✓(1)	✓(1)	✓(1)	✓(1)		✓ (1)(2)	

Footnotes for Table 6.1

- (1) No more than 6 students are permitted in any one lesson for a *home occupation* involving the instruction of a craft or skill.
- (2) Permitted in a *detached* or *semi-detached dwelling* only.

6.3 ZONE STANDARDS

No person shall within any **Residential Zone** use any *lot* or erect, *alter*, use any *building* or *structure* except in accordance with the following *zone* standards. A number(s) following the *zone* standard, *zone* heading or description of the standard, indicates an additional *Zone* requirement. These additional standards are listed at the end of **Table 6.2**.

TABLE 6.2

STANDARD	ZONES						
	RE	RR	R1	R2	RT	RMD	RM
Lot Areas (Minima):	0.8 ha		650 m ²			(12)	925 m ² (5)
Per Dwelling Unit					220 m ² (13)		
Unserviced Lot		2,000 m ² (8)					
Partially Serviced Lot		1,390 m ² (8)					
Duplex dwelling				600 m ²			
Linked or semi-detached dwelling				650 m ² (7)			
Lot Frontages (Minima):	45 m					(12)	30 m
Unserviced Lot		30 m (8)					
Partially Serviced Lot		21 m (8)					
Corner Lot			18 m				
Other Lots			15 m				
Townhouse dwelling on corner lot					6 m (3)		
Townhouse dwelling on interior lot or through lot					6 m per dwelling unit		
Duplexed dwelling on corner lot				21 m			
Linked dwelling or semi-detached on corner lot				27 m (7)			
Duplex dwelling on interior lot or through lot				18 m			
Linked dwelling or semi-detached dwelling on interior lot or through lot				21 m (7)			
Building Area (Maximum)	8%	25%	25%	35% (7)	30%	(12)	20%
Backyard Amenity Area (Minima)	56m ²	56m ²	56m ²	46m ²	37m ²	(12)	
Yards:						(12)	
Front Yard (Minima)	18 m	9 m	9 m				9 m
Front wall of attached private garage				7.5 m	6 m		
Front wall of main building				9 m	7.5 m		

STANDARD	ZONES						
	RE	RR	R1	R2	RT	RMD	RM
Exterior Side Yard (Minimum)	18 m	9 m	6 m	6 m	6 m		9 m
Rear Yard (Minimum)	15 m	9 m	7.5 m	7.5 m	7.5 m		
<i>Apartment building</i>							7.5 m
Interior Side Yards (Minima)	7.5 m						
<i>Main building with attached private garage or attached carport.</i>			1.5 m (1)				
<i>Main building</i>					4.5 m (4)(11)		
<i>Main building on driveway side</i>		3 m					
<i>Main building on other side</i>		1.5 m					
<i>Duplex dwelling</i>				(2)			
<i>Linked dwelling or semi-detached dwelling with attached private garage or attached carport</i>				1.5 m (7)(11)			
<i>Linked dwelling or semi-detached dwelling without attached private garage or attached carport</i>				3 m (7)			
<i>Apartment building</i>							7.5 m
Building Heights (Maxima)	10.5 m	10.5 m	10.5 m	10.5 m	10.5 m	(12)	
<i>Apartment building of 7 or more dwelling units</i>							12.2 m
<i>Apartment building of 6 or fewer dwelling units</i>							10.5 m
Landscape Area (Minimum)	50%	40%	30%	30%	30%	(12)	45%
Privacy Yard (Minimum)							(6)
Privacy Yard Depth (Minimum)							5 m
Play Facility (Minimum)							(9)
Play Facility Area (Minimum)							4%
Play Facility Location							(10)
Driveway Setbacks (Minima)	4.5m	0.5m	0.5m				0.5m
<i>From lot line bisecting dual private garage</i>				Nil	Nil		
<i>From other lot lines</i>				0.5m	0.5m		
Parking Space Setback	10m						
<i>From any street line</i>							6m

Footnotes For Table 6.2

- (1) **R1 Zone** – Minimum *interior side yard* for other *main building* shall be 3m on *driveway side*, 1.5m on other side.
- (2) **R2 Zone** – Minimum *interior side yard* for a *duplex dwelling* shall be 3m on *driveway side*; 1.5m on other side.
- (3) **RT Zone** – Minimum *lot frontage* for a *townhouse dwelling* on *corner lot* shall be 6m plus 6m per *dwelling unit*.

- (4) **RT Zone** – Minimum interior side setback for *main building* shall be 4.5m except that, where the *lot* abuts a *lot* containing a *townhouse dwelling*, the minimum interior side *building setback* shall be 1.8m.
- (5) **RM Zone** – Minimum *lot area* shall be 925m² plus an additional 120m² for each *dwelling unit* in excess of 6.
- (6) **RM Zone** – Minimum *privacy yards* shall be 1 for each *habitable room* window any portion of which is less than 2.5 metres above *finished grade*.
- (7) **R2 Zone** – Standards pertain to a *lot* prior to application and approval of the removal of part lot control.
- (8) **RR Zone** – Where an **RR** *lot* is fully serviced, the provisions of the **R1 Zone** identified with this footnote shall apply.
- (9) **RM Zone** – Minimum *play facilities* shall be 1 for each *lot* with more than 10 *dwelling units*.
- (10) **RM Zone** – *Play facilities* shall only be permitted in a *rear yard* or *interior side yard* but not in any portion of a *privacy yard*.
- (11) Where a common vertical wall separates two *dwelling units*, no *interior side yard* shall be required.
- (12) **RMD Zone** – Minimum or maximum standards as the context requires, shall be in accordance with the following:
 - (i) For a *detached dwelling* – **R1 Zone** Standards
 - (ii) For a *semi detached dwelling* – **R2 Zone** Standards
 - (iii) For a *townhouse dwelling* – **RT Zone** Standards
 - (iv) For all *accessory buildings* and *structures* – **R1 Zone** Standards
- (13) **RT Zone** – Maximum number of *dwelling units* per *townhouse dwelling* shall be 12.

Kavleen Sachdeva

From: Arash Olia <Arash.Olia@caledon.ca>
Sent: Monday, June 24, 2019 4:04 PM
To: Kavleen Sachdeva
Cc: Leilani Lee-Yates; Melissa Mohr; Eric Chan; Nicole Segal; Aaron Wignall
Subject: RE: Nunnville Transportation Contact (CFCA File No.: 649-5291)

Follow Up Flag: Follow up
Flag Status: Completed

Hi Kavleen,

Please see my comment on the proposed TOR in red below.

Thank you,
Arash

Arash Olia, Ph.D., P.Eng.
Transportation Development Coordinator
Finance & Infrastructure Services

Office: 905.584.2272 x.4073
Email: arash.olia@caledon.ca

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From: Kavleen Sachdeva <ksachdeva@cfcrozier.ca>
Sent: Tuesday, June 11, 2019 9:22 AM
To: Arash Olia <Arash.Olia@caledon.ca>
Cc: Leilani Lee-Yates <Leilani.Lee-Yates@caledon.ca>; Melissa Mohr <Melissa.Mohr@caledon.ca>; Eric Chan <Eric.Chan@caledon.ca>; Nicole Segal <nsegal@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: RE: Nunnville Transportation Contact (CFCA File No.: 649-5291)

Good Morning Arash,

We have been retained to complete a Traffic Impact Study to support of proposed residential development located at 13233 & 13247 Nunnville Road in Bolton, Town of Caledon, Region of Peel. The development proposes 35 single-detached dwellings fronting a proposed cul-de-sac roadway connecting to Nunnville Road.

We request your feedback regarding our study assumptions.

Study Methodology for the Transportation Impact Study

Study Area and Intersections to Assess

The following intersections will be analyzed:

- Nunnville Road and Albion Vaughan Road
- Site Access and Nunnville Road (please also provide a sightline analysis at the site access)

We will collect the traffic counts at existing intersection on a typical weekday during the morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods.

Analysis Periods and Scenarios

The weekday AM and PM peak hours for 2019 existing conditions, and a 5-year horizon year (2024) will be considered for background and total traffic conditions.

Background Developments

Please provide developments that should be included in our analysis. Also, please provide the associated traffic impact studies for the developments.

There is no background development within the study area

Future Background Traffic Growth Rate

Please provide the growth rate that can be used for Nunnville Road and Albion Vaughan Road. Should this information not be available, an industry standard of two percent will be applied to through movements along the study intersections.

Future background traffic volume will be estimated for the study area to ensure that the analysis includes background traffic growth and growth from other developments in the area.

Please use the industry standard of 2%

Trip Generation

Trip generation for the proposed development will be based on Trip Generation Manual, 10th Edition prepared by the Institute of Transportation Engineers (ITE) for Single Family Detached Housing (land use code 210).

The information contained in the 2016 Transportation Tomorrow Survey (TTS) for zone 3192 and 3194 has been reviewed. Per the TTS information, a 2% modal split is applicable (See attached), however to be on the conservative side, no modal split will be applied to the road network.

Trip distribution, assignments, and the modal splits will be based on the latest 2016 Transportation Tomorrow Survey (TTS)

Roadway/Transit Improvements

Please provide details of any planned roadway/transit improvement in the study area.

At this time there is no roadway improvements. For the transit information, please refer to Caledon Transit Feasibility Study webpage ([Link](#))

Analysis Procedures

Weekday AM and PM peak hours will be analyzed using the Synchro 10.0 analysis package and Highway Capacity Manual (HCM) procedures.

Could you please provide any comments you may have on the above ToR and provide the following information for inclusion in the study:

- Please provide details of any planned roadway/transit improvement in the study area within the horizon years
- Please provide the growth rate that can be used for Nunnville Road and Albion Vaughan Road.
- Please provide us with any further background developments, and the associated traffic impact studies, that are to be included in the analysis

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

Regards,
Kavleen

Kavleen Sachdeva | Engineering Intern
C.F. Crozier & Associates Consulting Engineers
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
cfcrozier.ca | ksachdeva@cfcrozier.ca
tel: 905.875.0026 ext: 359



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From: Arash Olia <Arash.Olia@caledon.ca>

Sent: Tuesday, June 11, 2019 9:16 AM

To: Nicole Segal <nsegal@cfcrozier.ca>

Cc: Kavleen Sachdeva <ksachdeva@cfcrozier.ca>; Leilani Lee-Yates <Leilani.Lee-Yates@caledon.ca>; Melissa Mohr <Melissa.Mohr@caledon.ca>; Eric Chan <Eric.Chan@caledon.ca>

Subject: RE: Nunnville Transportation Contact (CFCA File No.: 649-5291)

Hi Nicole,

Please send your terms of reference. I will review and provide my feedback.

Thank you,
Arash

Arash Olia, Ph.D., P.Eng.
Transportation Development Coordinator
Finance & Infrastructure Services

Office: 905.584.2272 x.4073
Email: arash.olia@caledon.ca

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From: Melissa Mohr <Melissa.Mohr@caledon.ca>
Sent: Tuesday, June 11, 2019 8:32 AM
To: Nicole Segal <nsegal@cfcrozier.ca>; Leilani Lee-Yates <Leilani.Lee-Yates@caledon.ca>
Cc: Kavleen Sachdeva <ksachdeva@cfcrozier.ca>; Arash Olia <Arash.Olia@caledon.ca>
Subject: RE: Nunnville Transportation Contact (CFCA File No.: 649-5291)

Good Morning Nicole,

Arash Olia is our Coordinator for Transportation Development. He can be reached at: arash.olia@caledon.ca In addition, I have cc'd Arash on this email as an introduction.

Arash: Nicole is working with Sam Morra on the Nunnville Subdivision proposal and would like to work with you on developing a Terms of Reference for the Traffic Impact Study that is required as part of the complete application. Can you assist?

Kind Regards,

Melissa

Melissa Mohr, MCIP, RPP
Community Planner, Development
Community Services

Office: 905.584.2272 x.4024
Email: melissa.mohr@caledon.ca

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From: Nicole Segal <nsegal@cfcrozier.ca>
Sent: Monday, June 10, 2019 4:30 PM
To: Melissa Mohr <Melissa.Mohr@caledon.ca>; Leilani Lee-Yates <Leilani.Lee-Yates@caledon.ca>
Cc: Kavleen Sachdeva <ksachdeva@cfcrozier.ca>
Subject: Nunnville Transportation Contact (CFCA File No.: 649-5291)

Hi Melissa and Leilani,

Hope you're doing well. Can you please provide me the email for Arash (sp?) so we can send our traffic Terms of Reference for the Nunnville Project?

Thanks,
Nicole

Nicole Segal M.M.Sc., EIT | Engineering Intern
C.F. Crozier & Associates Consulting Engineers
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
cfcrozier.ca | nsegal@cfcrozier.ca
tel: 905.875.0026 ext: 329



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APPENDIX B

Existing Data



Turning Movement Count (1 . NUNNVILLE RD & ALBION VAUGHAN RD)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach NUNNVILLE RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	0	206	0	0	206	85	0	0	0	85	1	3	0	0	4	295	
07:15:00	1	190	0	0	191	83	0	0	0	83	0	0	0	0	0	274	
07:30:00	1	227	0	0	228	89	0	0	0	89	0	1	0	0	1	318	
07:45:00	1	232	0	0	233	114	0	0	0	114	0	2	0	0	2	349	1236
08:00:00	1	215	0	0	216	108	0	0	0	108	1	2	0	0	3	327	1268
08:15:00	1	266	0	0	267	104	1	0	0	105	1	2	0	0	3	375	1369
08:30:00	2	255	0	0	257	97	2	0	0	99	2	5	0	0	7	363	1414
08:45:00	1	212	0	0	213	71	1	0	0	72	0	2	0	0	2	287	1352
BREAK																	
16:00:00	0	105	0	0	105	231	2	0	0	233	3	3	0	0	6	344	
16:15:00	0	138	0	0	138	215	2	0	0	217	2	1	0	0	3	358	
16:30:00	0	124	0	0	124	233	0	1	0	234	3	0	0	0	3	361	
16:45:00	1	137	0	0	138	212	0	0	0	212	0	1	0	0	1	351	1414
17:00:00	3	120	0	0	123	241	3	0	0	244	2	1	0	0	3	370	1440
17:15:00	1	134	0	0	135	237	2	0	0	239	0	2	0	0	2	376	1458
17:30:00	0	112	0	0	112	227	1	0	0	228	1	0	0	0	1	341	1438
17:45:00	1	119	0	0	120	231	1	0	0	232	1	1	0	0	2	354	1441
Grand Total	14	2792	0	0	2806	2578	15	1	0	2594	17	26	0	0	43	5443	-
Approach%	0.5%	99.5%	0%		-	99.4%	0.6%	0%		-	39.5%	60.5%	0%		-	-	-
Totals %	0.3%	51.3%	0%		51.6%	47.4%	0.3%	0%		47.7%	0.3%	0.5%	0%		0.8%	-	-
Heavy	0	66	0		-	47	0	0		-	0	0	0		-	-	-
Heavy %	0%	2.4%	0%		-	1.8%	0%	0%		-	0%	0%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Light Rain (13.83 °C)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach NUNNVILLE RD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
07:45:00	1	232	0	0	233	114	0	0	0	114	0	2	0	0	2	349
08:00:00	1	215	0	0	216	108	0	0	0	108	1	2	0	0	3	327
08:15:00	1	266	0	0	267	104	1	0	0	105	1	2	0	0	3	375
08:30:00	2	255	0	0	257	97	2	0	0	99	2	5	0	0	7	363
Grand Total	5	968	0	0	973	423	3	0	0	426	4	11	0	0	15	1414
Approach%	0.5%	99.5%	0%		-	99.3%	0.7%	0%		-	26.7%	73.3%	0%		-	-
Totals %	0.4%	68.5%	0%		68.8%	29.9%	0.2%	0%		30.1%	0.3%	0.8%	0%		1.1%	-
PHF	0.63	0.91	0		0.91	0.93	0.38	0		0.93	0.5	0.55	0		0.54	-
Heavy	0	14	0		14	22	0	0		22	0	0	0		0	-
Heavy %	0%	1.4%	0%		1.4%	5.2%	0%	0%		5.2%	0%	0%	0%		0%	-
Lights	5	932	0		937	377	3	0		380	4	11	0		15	-
Lights %	100%	96.3%	0%		96.3%	89.1%	100%	0%		89.2%	100%	100%	0%		100%	-
Mediums	0	22	0		22	24	0	0		24	0	0	0		0	-
Mediums %	0%	2.3%	0%		2.3%	5.7%	0%	0%		5.6%	0%	0%	0%		0%	-
Articulated Trucks	0	14	0		14	22	0	0		22	0	0	0		0	-
Articulated Trucks %	0%	1.4%	0%		1.4%	5.2%	0%	0%		5.2%	0%	0%	0%		0%	-



Peak Hour: 04:30 PM - 05:30 PM Weather: Thunderstorm (14.77 °C)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach NUNNVILLE RD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
16:30:00	0	124	0	0	124	233	0	1	0	234	3	0	0	0	3	361
16:45:00	1	137	0	0	138	212	0	0	0	212	0	1	0	0	1	351
17:00:00	3	120	0	0	123	241	3	0	0	244	2	1	0	0	3	370
17:15:00	1	134	0	0	135	237	2	0	0	239	0	2	0	0	2	376
Grand Total	5	515	0	0	520	923	5	1	0	929	5	4	0	0	9	1458
Approach%	1%	99%	0%		-	99.4%	0.5%	0.1%		-	55.6%	44.4%	0%		-	-
Totals %	0.3%	35.3%	0%		35.7%	63.3%	0.3%	0.1%		63.7%	0.3%	0.3%	0%		0.6%	-
PHF	0.42	0.94	0		0.94	0.96	0.42	0.25		0.95	0.42	0.5	0		0.75	-
Heavy	0	14	0		14	6	0	0		6	0	0	0		0	-
Heavy %	0%	2.7%	0%		2.7%	0.7%	0%	0%		0.6%	0%	0%	0%		0%	-
Lights	5	489	0		494	903	5	1		909	5	4	0		9	-
Lights %	100%	95%	0%		95%	97.8%	100%	100%		97.8%	100%	100%	0%		100%	-
Mediums	0	12	0		12	14	0	0		14	0	0	0		0	-
Mediums %	0%	2.3%	0%		2.3%	1.5%	0%	0%		1.5%	0%	0%	0%		0%	-
Articulated Trucks	0	14	0		14	6	0	0		6	0	0	0		0	-
Articulated Trucks %	0%	2.7%	0%		2.7%	0.7%	0%	0%		0.6%	0%	0%	0%		0%	-

APPENDIX C

Level of Service Definitions

Level of Service Definitions






Two-Way Stop Controlled Intersections






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

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX D

Detailed Capacity Analysis

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	4	3	423	968	5
Future Vol, veh/h	11	4	3	423	968	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	5	1	0
Mvmt Flow	12	4	3	460	1052	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1518	1052	1057	0	-	0
Stage 1	1052	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	132	278	667	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	131	278	667	-	-	-
Mov Cap-2 Maneuver	131	-	-	-	-	-
Stage 1	338	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	31.3	0.1		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	667	-	153	-	-	
HCM Lane V/C Ratio	0.005	-	0.107	-	-	
HCM Control Delay (s)	10.4	-	31.3	-	-	
HCM Lane LOS	B	-	D	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	5	5	923	515	5
Future Vol, veh/h	4	5	5	923	515	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	3	0
Mvmt Flow	4	5	5	1003	560	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1573	560	565	0	-	0
Stage 1	560	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	123	532	1017	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	122	532	1017	-	-	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.7	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1017	-	213	-	-	
HCM Lane V/C Ratio	0.005	-	0.046	-	-	
HCM Control Delay (s)	8.6	-	22.7	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	0	4	0	0	4
Future Vol, veh/h	0	0	4	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	4	0	0	4

Major/Minor	Major1	Minor2
Conflicting Flow All	0	4
Stage 1	-	0
Stage 2	-	4
Critical Hdwy	-	6.42
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	-	5.42
Follow-up Hdwy	-	3.518
Pot Cap-1 Maneuver	-	1018
Stage 1	-	-
Stage 2	-	1019
Platoon blocked, %	-	-
Mov Cap-1 Maneuver	-	1018
Mov Cap-2 Maneuver	-	1018
Stage 1	-	-
Stage 2	-	1019

Approach	NB	SB
HCM Control Delay, s	0	
HCM LOS		-






Minor Lane/Major Mvmt	NBT	NBR	SBLn1
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	0	3	0	0	6
Future Vol, veh/h	0	0	3	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3	0	0	7






Major/Minor	Major1	Minor2
Conflicting Flow All	0	3
Stage 1	-	0
Stage 2	-	3
Critical Hdwy	-	6.42
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	-	5.42
Follow-up Hdwy	-	3.518
Pot Cap-1 Maneuver	-	1019
Stage 1	-	-
Stage 2	-	1020
Platoon blocked, %	-	-
Mov Cap-1 Maneuver	-	1019
Mov Cap-2 Maneuver	-	1019
Stage 1	-	-
Stage 2	-	1020

Approach	NB	SB
HCM Control Delay, s	0	
HCM LOS		-

Minor Lane/Major Mvmt	NBT	NBR	SBLn1
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	4	3	465	1065	6
Future Vol, veh/h	12	4	3	465	1065	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	5	1	0
Mvmt Flow	13	4	3	505	1158	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1669	1158	1165	0	-	0
Stage 1	1158	-	-	-	-	-
Stage 2	511	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	107	241	607	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	106	241	607	-	-	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	300	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	39	0.1		0		
HCM LOS	E					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	607	-	123	-	-	
HCM Lane V/C Ratio	0.005	-	0.141	-	-	
HCM Control Delay (s)	11	-	39	-	-	
HCM Lane LOS	B	-	E	-	-	
HCM 95th %tile Q(veh)	0	-	0.5	-	-	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↑	↑	↔
Traffic Vol, veh/h	4	6	6	1015	567	6
Future Vol, veh/h	4	6	6	1015	567	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	3	0
Mvmt Flow	4	7	7	1103	616	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1733	616	623	0	-	0
Stage 1	616	-	-	-	-	-
Stage 2	1117	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	98	494	968	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	97	494	968	-	-	-
Mov Cap-2 Maneuver	97	-	-	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	25.4	0.1		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	968	-	187	-	-	
HCM Lane V/C Ratio	0.007	-	0.058	-	-	
HCM Control Delay (s)	8.7	-	25.4	-	-	
HCM Lane LOS	A	-	D	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	






Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	22	9	465	1065	8
Future Vol, veh/h	16	22	9	465	1065	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	5	1	0
Mvmt Flow	17	24	10	505	1158	9

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1683	1158	1167	0	-	0
Stage 1	1158	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	105	241	606	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	103	241	606	-	-	-
Mov Cap-2 Maneuver	103	-	-	-	-	-
Stage 1	297	-	-	-	-	-
Stage 2	598	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	36.7	0.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	606	-	154	-	-
HCM Lane V/C Ratio	0.016	-	0.268	-	-
HCM Control Delay (s)	11	-	36.7	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0	-	1	-	-

Intersection						
Int Delay, s/veh	4.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	22	0	3	8	0	7
Future Vol, veh/h	22	0	3	8	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	0	3	9	0	8
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	16	8	0	0	12	0
Stage 1	8	-	-	-	-	-
Stage 2	8	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1002	1074	-	-	1607	-
Stage 1	1015	-	-	-	-	-
Stage 2	1015	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1002	1074	-	-	1607	-
Mov Cap-2 Maneuver	1002	-	-	-	-	-
Stage 1	1015	-	-	-	-	-
Stage 2	1015	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.7	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 1002		1607	-	
HCM Lane V/C Ratio	-	- 0.024		-	-	
HCM Control Delay (s)	-	- 8.7		0	-	
HCM Lane LOS	-	- A		A	-	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	17	25	1015	567	10
Future Vol, veh/h	7	17	25	1015	567	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	650	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	3	0
Mvmt Flow	8	18	27	1103	616	11
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1773	616	627	0	-	0
Stage 1	616	-	-	-	-	-
Stage 2	1157	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	92	494	965	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	89	494	965	-	-	-
Mov Cap-2 Maneuver	89	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	24.4	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	965	-	212	-	-	
HCM Lane V/C Ratio	0.028	-	0.123	-	-	
HCM Control Delay (s)	8.8	-	24.4	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-	

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	14	0	4	23	0	4
Future Vol, veh/h	14	0	4	23	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	0	4	25	0	4
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	21	17	0	0	29	0
Stage 1	17	-	-	-	-	-
Stage 2	4	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	996	1062	-	-	1584	-
Stage 1	1006	-	-	-	-	-
Stage 2	1019	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	996	1062	-	-	1584	-
Mov Cap-2 Maneuver	996	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	1019	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	8.7	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	996	1584	-	
HCM Lane V/C Ratio	-	-	0.015	-	-	
HCM Control Delay (s)	-	-	8.7	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

APPENDIX E

Signal Warrant Analysis

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

Intersection: Albion Vaughan Road at Nunnville Road

Count Date: Future Background 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A	Total Volume	100 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B	Crossing Volume	14 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Delay to Cross Traffic	A	Main Road	100 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B	Crossing Road	32 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Combination	A	Justificaton 1	14 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B	Justification 2	32 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. 4-Hr Volume			30 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5. Collision Experience	0 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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6. Pedestrians	A	Volume	Justification met	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B	Delay	Justification not met	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

Intersection: Albion Vaughan Road at Nunnville Road

Count Date: Future Total 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B Crossing Volume	24	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Delay to Cross Traffic	A Main Road	100	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B Crossing Road	38	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Combination	A Justificaton 1	24	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B Justification 2	38	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. 4-Hr Volume		51	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5. Collision Experience	0	%	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-------------------------	---	---	--------------------------	-------------------------------------

6. Pedestrians	A Volume	Justification met	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	B Delay	Justification not met	<input type="checkbox"/>	<input checked="" type="checkbox"/>

APPENDIX F

TTS Analysis

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone of destination - gta06_dest In 3192,3190

and

Start time of trip - start_time In 700-899

and

Primary travel mode of trip - mode_prime In D,

Trip 2016

Table:

,Auto driver

PD 6 of Toronto,37

PD 10 of Toronto,34

King,115

Vaughan,127

Caledon,984

Brampton,127

Mississauga,58

Milton,20

Oakville,12

Guelph/Eramosa,49

Orangeville,11

New Tecumseth,151

Adjala-Tosorontio,23

Mulmur,9

TTS Detailed Distribution - AM Peak IN

		North		South		East		West			
Auto driver		%	#	%	#	%	#	%	#	CHECK	
PD 6 of Toronto	37		0	70%	26	30%	11		0	0	
PD 10 of Toronto	34		0	70%	24	30%	10		0	0	
King	115		0		0	100%	115		0	0	
Vaughan	127		0	30%	38	70%	89		0	0	
Caledon	984	20%	197		0		0	80%	787	0	
Brampton	127		0	50%	64		0	50%	64	-1	
Mississauga	58		0	70%	41		0	30%	17	0	
Milton	20		0	70%	14		0	30%	6	0	
Oakville	12		0	85%	10		0	15%	2	0	
Guelph/Eramosa	49		0		0		0	100%	49	0	
Orangeville	11	100%	11		0		0		0	0	
New Tecumseth	151	100%	151		0		0		0	0	
Adjala-Tosorontio	23	100%	23		0		0		0	0	
Mulmur	9	50%	5		0		0	50%	5	-1	
Total	1757	22%	387	12%	217	13%	225	53%	930	-2	

AS-IS ROUNDED

North	22%	20%
South	12%	10%
East	13%	15%
West	53%	55%
	100%	100%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone of origin - gta06_orig In 3192,3190

and

Start time of trip - start_time In 700-899

and

Primary travel mode of trip - mode_prime In D,

Trip 2016

Table:

,Auto driver

PD 1 of Toronto,41

PD 3 of Toronto,17

PD 7 of Toronto,42

PD 8 of Toronto,126

PD 9 of Toronto,150

PD 10 of Toronto,22

PD 12 of Toronto,15

PD 16 of Toronto,15

Newmarket,30

Aurora,43

Richmond Hill,40

Markham,45

King,44

Vaughan,507

Caledon,1107

Brampton,234

Mississauga,277

Halton Hills,30

Burlington,20

Orangeville,37

Bradford-West Gwillimbury,42

Mono,30

TTS Detailed Distribution - AM Peak OUT

Auto drive	North		South		East		West		# CHECK	
	%	#	%	#	%	#	%	#		
PD 1 of Toronto	41	0	70%	29	30%	12			0	0
PD 3 of Toronto	17	0	70%	12	30%	5			0	0
PD 7 of Toronto	42	0	70%	29	30%	13			0	0
PD 8 of Toronto	126	0	70%	88	30%	38			0	0
PD 9 of Toronto	150	0	70%	105	30%	45			0	0
PD 10 of Toronto	22	0	70%	15	30%	7			0	0
PD 12 of Toronto	15	0	70%	11	30%	5			0	-1
PD 16 of Toronto	15	0	70%	11	30%	5			0	-1
Newmarket	30	50%	15	0	50%	15			0	0
Aurora	43	0		0	100%	43			0	0
Richmond Hill	40	0		0	100%	40			0	0
Markham	45	0	50%	23	50%	23			0	-1
King	44	0		0	100%	44			0	0
Vaughan	507	0	30%	152	70%	355			0	0
Caledon	1107	20%	221	0		0	80%	886	0	0
Brampton	234	0	50%	117		0	50%	117	0	0
Mississauga	277	0	70%	194		0	30%	83	0	0
Halton Hills	30	0		0		0	100%	30	0	0
Burlington	20	0	50%	10		0	50%	10	0	0
Orangeville	37	100%	37	0		0		0	0	0
Bradford-West Gwillimbury	42	100%	42	0		0		0	0	0
Mono	30	50%	15	0		0	50%	15	0	0
Total	2914	11%	330	27%	796	22%	650	39%	1141	-3

AS-IS ROUNDED

North	11%	10%
South	27%	25%
East	22%	20%
West	39%	45%
	100%	100%

Mon Jul 08 2019 14:21:59 GMT-0400 (Eastern Daylight Time) - Run Time: 2099ms

TTS Detailed Distribution - PM Peak IN

Cross Tabulation Query Form - Trip - 2016 v1.1

		Auto drive %	North		South		East		West		CHECK	
			#	%	#	%	#	%	#			
	PD 1 of Toronto	62		0	0.7	43	0.3	19			0	0
Row: Planning district of origin - pd_orig	PD 3 of Toronto	27		0	70%	19	30%	8			0	0
Column: Primary travel mode of trip - mode_prime	PD 4 of Toronto	8		0	70%	6	30%	2			0	0
	PD 5 of Toronto	15		0	70%	11	30%	5			0	-1
	PD 8 of Toronto	124		0	70%	87	30%	37			0	0
Filters:	PD 9 of Toronto	151		0	70%	106	30%	45			0	0
2006 GTA zone of destination - gta06_dest In 3192,3190	PD 10 of Toronto	129		0	70%	90	30%	39			0	0
and	PD 11 of Toronto	30		0	70%	21	30%	9			0	0
Start time of trip - start_time In 1600-1799	PD 12 of Toronto	15		0	70%	11	30%	5			0	-1
and	East Gwillimbury	43	50%	22		0	50%	22			0	-1
Primary travel mode of trip - mode_prime In D,	Aurora	43		0		0	100%	43			0	0
	Richmond Hill	50		0		0	100%	50			0	0
Trip 2016	Markham	23		0	50%	12	50%	12			0	-1
Table:	King	44		0		0	100%	44			0	0
	Vaughan	479		0	30%	144	70%	335			0	0
,Auto driver	Caledon	943	20%	189		0		0	80%	754	0	0
PD 1 of Toronto,62	Brampton	174		0	50%	87		0	50%	87	0	0
PD 3 of Toronto,27	Mississauga	344		0	70%	241		0	30%	103	0	0
PD 4 of Toronto,8	Halton Hills	12		0		0		0	100%	12	0	0
PD 5 of Toronto,15	Barrie	21	100%	21		0		0		0	0	0
PD 8 of Toronto,124	Bradford-West Gwillimbury	42	100%	42		0		0		0	0	0
PD 9 of Toronto,151	Adjala-Tosorontio	22	100%	22		0		0		0	0	0
PD 10 of Toronto,129	Mono	30	50%	15		0		0	50%	15	0	0
PD 11 of Toronto,30		2831	11%	311	31%	878	24%	675	34%	971	-4	
PD 12 of Toronto,15												
East Gwillimbury,43												
Aurora,43												

Richmond Hill,50
 Markham,23
 King,44
 Vaughan,479
 Caledon,943
 Brampton,174
 Mississauga,344
 Halton Hills,12
 Barrie,21
 Bradford-West Gwillimbury,42
 Adjala-Tosorontio,22
 Mono,30

	AS-IS	ROUNDED
North	11%	10%
South	31%	30%
East	24%	25%
West	34%	35%
	100%	100%

Mon Jul 08 2019 14:22:38 GMT-0400 (Eastern Daylight Time) - Run Time: 2229ms

TTS Detailed Distribution - PM Peak OUT

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone of origin - gta06_orig In 3192,3190

and

Start time of trip - start_time In 1600-1799

and

Primary travel mode of trip - mode_prime In D,

Trip 2016

Table:

,Auto driver

PD 1 of Toronto,34

PD 3 of Toronto,13

PD 9 of Toronto,42

PD 10 of Toronto,43

PD 14 of Toronto,8

King,39

Vaughan,235

Caledon,974

Brampton,145

Mississauga,30

Halton Hills,12

Milton,17

Oakville,12

Glanbrook,105

Guelph/Eramosa,49

New Tecumseth,36

Essa,22

East Garafraxa,3

North		South		East		West		#	CHECK
%	#	%	#	%	#	%	#		
	0	70%	24	30%	10		0	0	
	0	70%	9	30%	4		0	0	
	0	70%	29	30%	13		0	0	
	0	70%	30	30%	13		0	0	
	0	70%	6	30%	2		0	0	
	0		0	100%	39		0	0	
	0	30%	71	70%	165		0	-1	
20%	195		0		0	80%	779	0	
	0	50%	73		0	50%	73	-1	
	0	70%	21		0	30%	9	0	
	0		0		0	100%	12	0	
	0	50%	9		0	50%	9	-1	
	0	50%	6		0	50%	6	0	
	0	50%	53		0	50%	53	-1	
	0		0		0	100%	49	0	
100%	36		0		0		0	0	
100%	22		0		0		0	0	
	0		0		0	100%	3	0	
14%	253	18%	331	14%	246	55%	993	-4	

AS-IS ROUNDED

North	14%	15%
South	18%	20%
East	14%	15%
West	55%	50%
	100%	100%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
Column: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of household - gta06_hhld In 3192,3194
and
Start time of trip - start_time In 700-1900
and
Age of person - age In 18-99

Trip 2016
Table:

,Transit excluding GO rail,Auto driver,GO rail only,Auto passenger,Walk
3192,41,7528,64,805,118
3194,69,6066,9,559,49

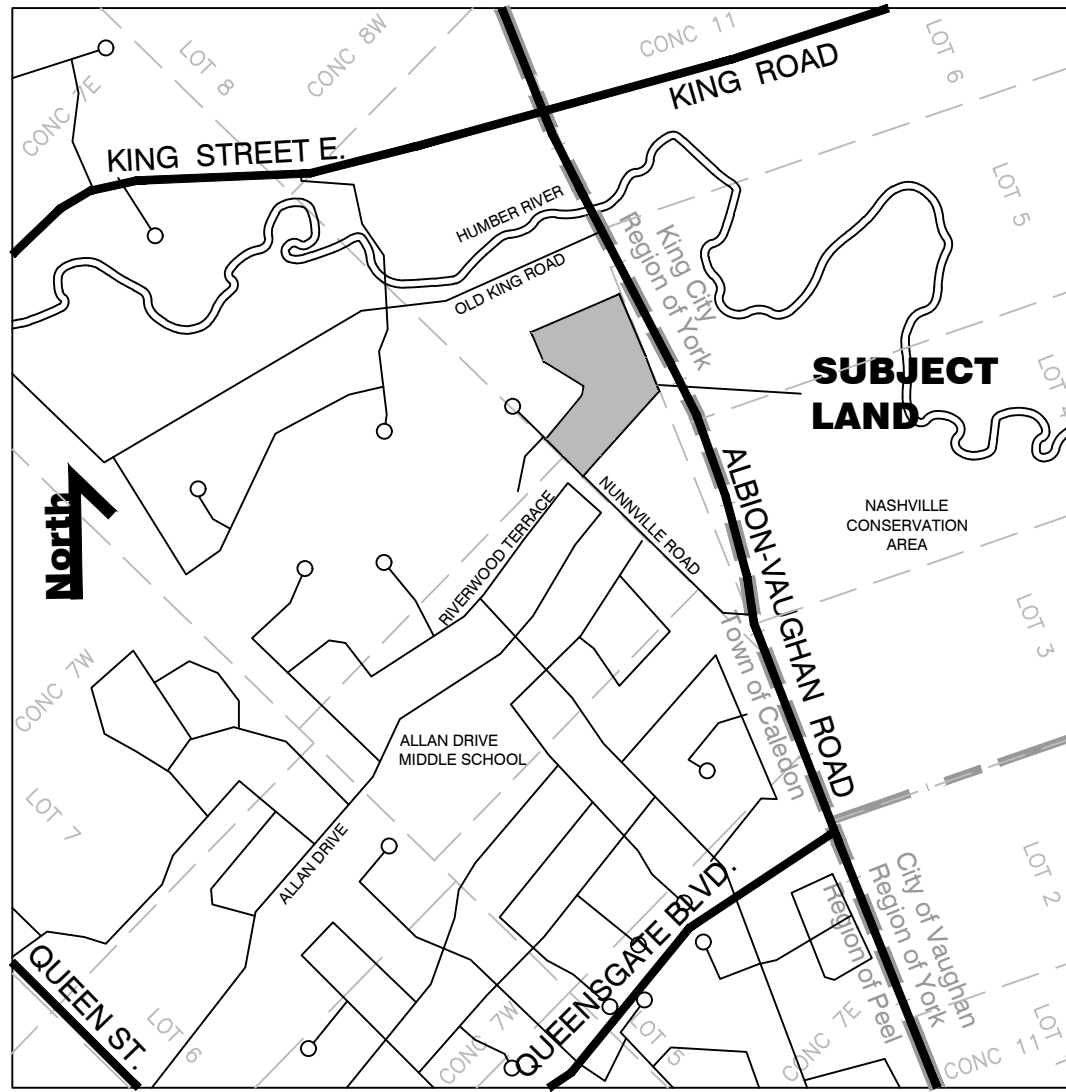
	Transit excluding GO rail	Auto driver	GO rail only	Auto passenger	Walk	
3192	41	7528	64	805	118	8556
3194	69	6066	9	559	49	6752
	110	13594	73	1364	167	15308
	1%	89%	0%	9%	1%	100%
	Modal Split:		2%			

FIGURES

DRAFT PLAN OF SUBDIVISION

PART OF BROKEN LOT 6 AND PART OF LOT 7
CONCESSION 8
GEOGRAPHIC TOWNSHIP OF ALBION
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

January 17, 2020



ADDITIONAL INFORMATION REQUIRED
UNDER SECTION 51 (17) OF THE
PLANNING ACT, R.S.O., 1990

- (a) AS SHOWN ON DRAFT PLAN
- (b) AS SHOWN ON DRAFT AND KEY PLANS
- (c) NO ADJACENT LANDS OWNED BY THE APPLICANT
- (d) THE LAND IS TO BE USED ACCORDING TO THE SCHEDULE OF LAND USE
- (e) AS SHOWN ON DRAFT AND KEY PLANS
- (f) AS SHOWN ON DRAFT PLAN
- (g) AS SHOWN ON DRAFT AND KEY PLANS
- (h) MUNICIPAL WATER SUPPLY TO BE MADE AVAILABLE
- (i) SOIL IS SILTY CLAY TILL
- (j) AS SHOWN ON DRAFT PLAN
- (k) FULL MUNICIPAL SERVICES TO BE MADE AVAILABLE
- (l) SUBJECT TO EASEMENTS AS SHOWN ON THE DRAFT PLAN

SCHEDULE OF LAND USE

LAND USE	Lot/Block Number	Units	Area (ha)	Area (ac)
Detached Res. - Min. 9.1m	24 to 29	6	1.49	3.68
Detached Res. - Min. 13.1m	1 to 23	23		
Overland Flow	Block 30		0.06	0.15
EPA (Buffer)	Block 31		0.21	0.52
Environmental Policy Area	Block 32		1.14	2.82
Road (Length = 229.2m)			0.43	1.06
Total		29	3.33	8.23

OWNER'S AUTHORIZATION

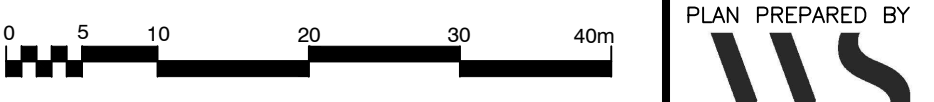
I AUTHORIZE THIS DRAFT PLAN OF SUBDIVISION TO BE SUBMITTED TO THE TOWN OF CALEDON FOR APPROVAL.

Sam Morra, President
Bolton Midtown Development Inc. DATE

SURVEYOR'S CERTIFICATE

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

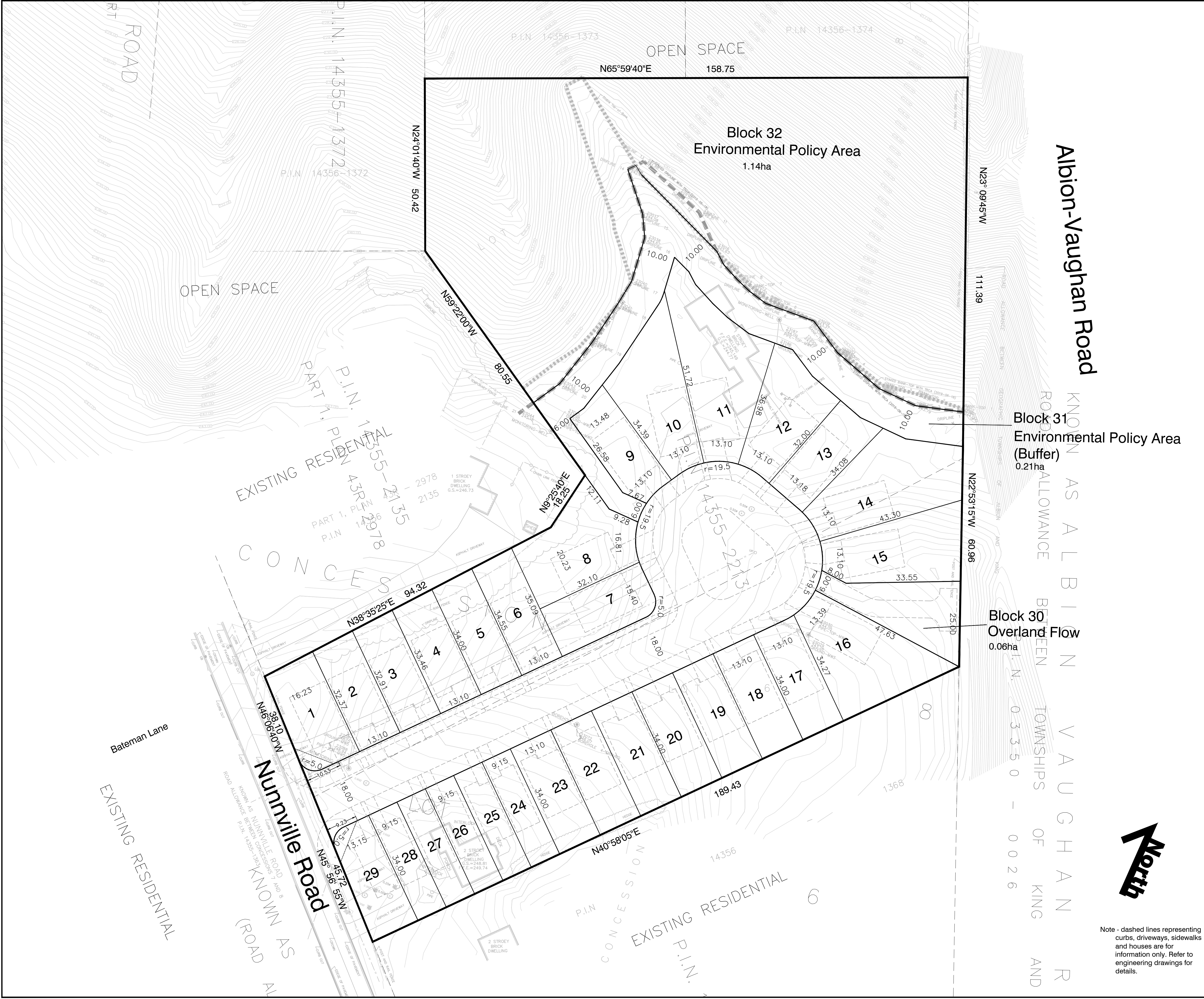
Shan Goonewardena, B.Eng., O.L.S.
R-PE Surveying Ltd. August 1, 2019 DATE



Scale 1 : 500
(24 x 36)



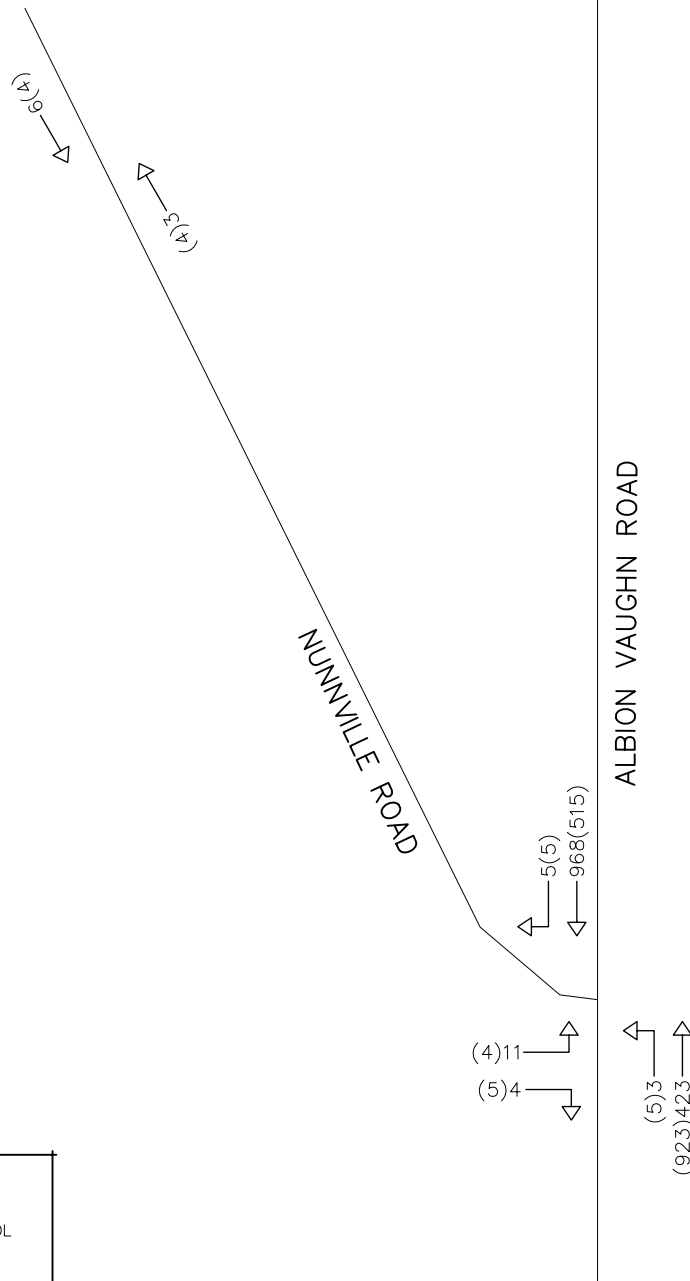
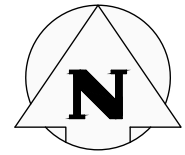
19M-00294-00



Note - dashed lines representing curbs, driveways, sidewalks and houses are for information only. Refer to engineering drawings for details.

NOTE:

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

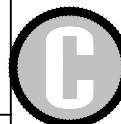


LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
- WEEKDAY AM(PM)
TRIP DISTRIBUTION

13247 & 13233 NUNNVILLE ROAD,
TOWN OF CALEDON

2019 EXISTING TRAFFIC VOLUMES



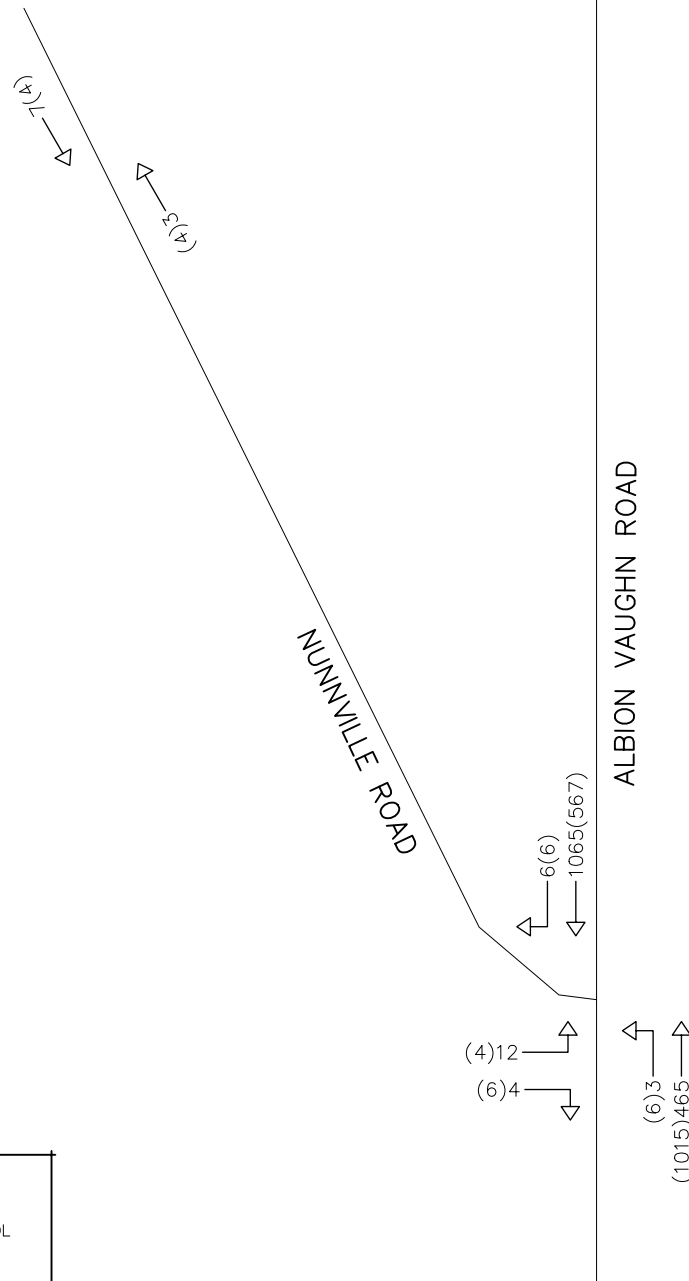
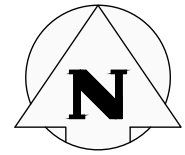
CROZIER
CONSULTING ENGINEERS

2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check		Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 02

NOTE:

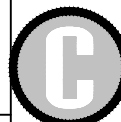
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
- WEEKDAY AM(PM)
TRIP DISTRIBUTION

13247 & 13233 NUNNVILLE ROAD,
TOWN OF CALEDON



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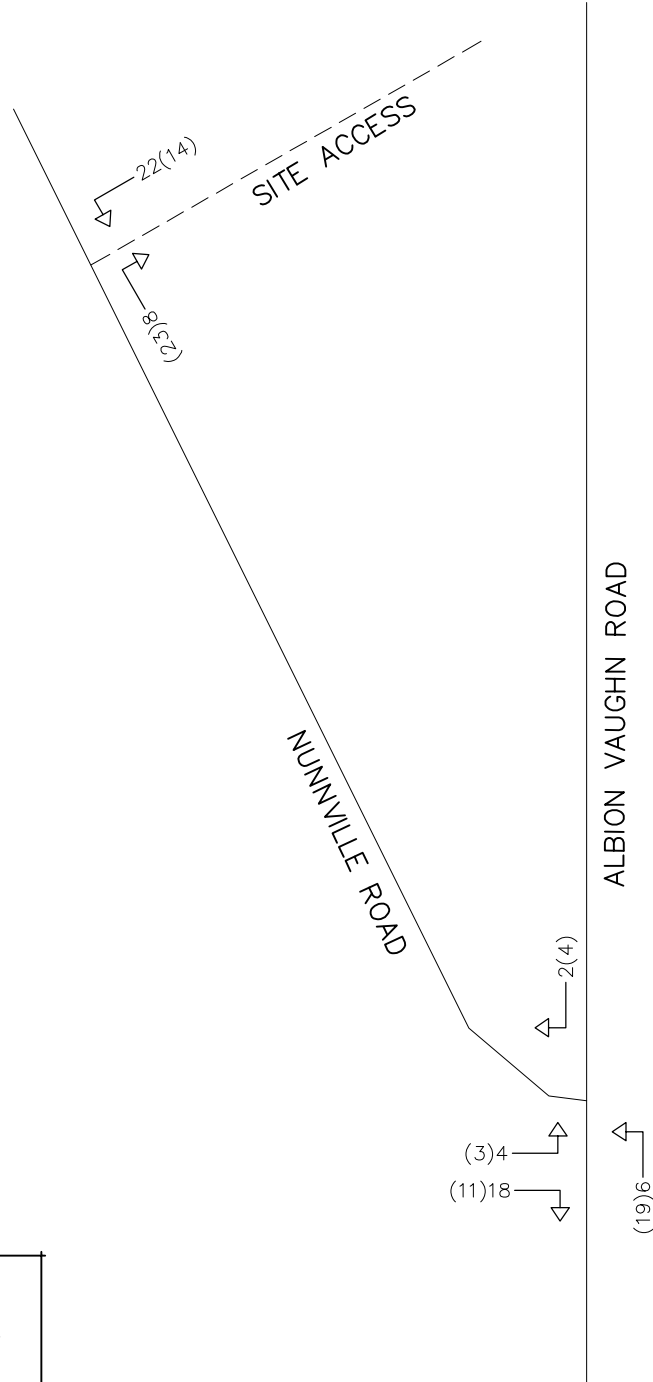
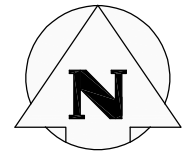
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2024 BACKGROUND TRAFFIC VOLUMES

Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check		Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 03

NOTE:

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

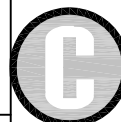


LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

13247 & 13233 NUNNVILLE ROAD,
TOWN OF CALEDON

SITE GENERATED TRIPS



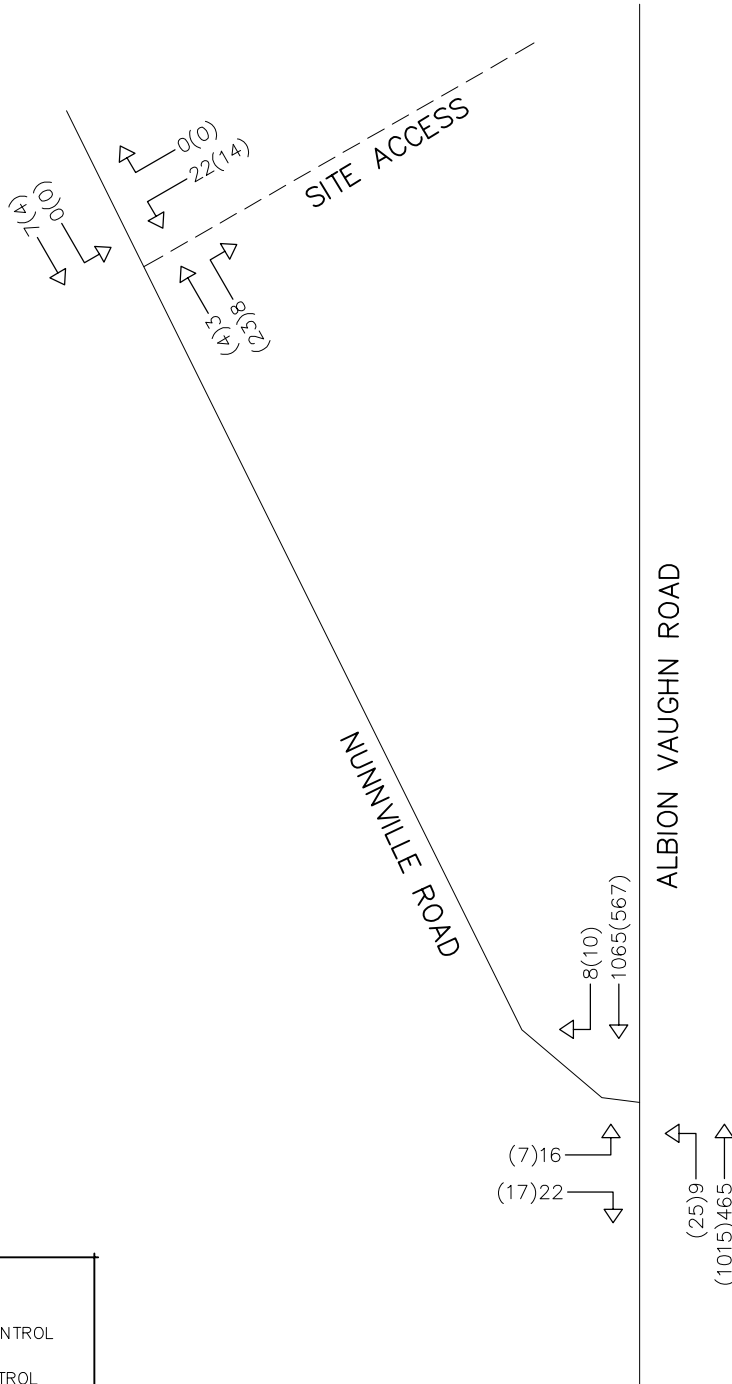
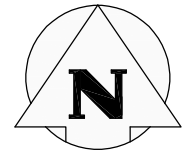
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Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check		Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 04

NOTE:

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

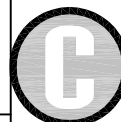


LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRIP DISTRIBUTION

13247 & 13233 NUNNVILLE ROAD,
TOWN OF CALEDON

2024 FUTURE TOTAL TRAFFIC VOLUMES



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Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check		Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 05


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



Project		13247 & 13233 NUNVILLE ROAD, TOWN OF CALEDON		2800 HIGH POINT DRIVE SUITE 100 MILTON, ON L9T 6P4 905.875.0026 T 905.875.4915 F WWW.CFCROZIER.CA	
Drawing		SITE DISTANCE EVALUATION		CROZIER CONSULTING ENGINEERS	
Drawn By	A.K.	Design By	K.S.	Project	988-3941
Scale	N.T.S.	Date	01/30/2019	Check By	K.S.
				Drawing	FIG 06

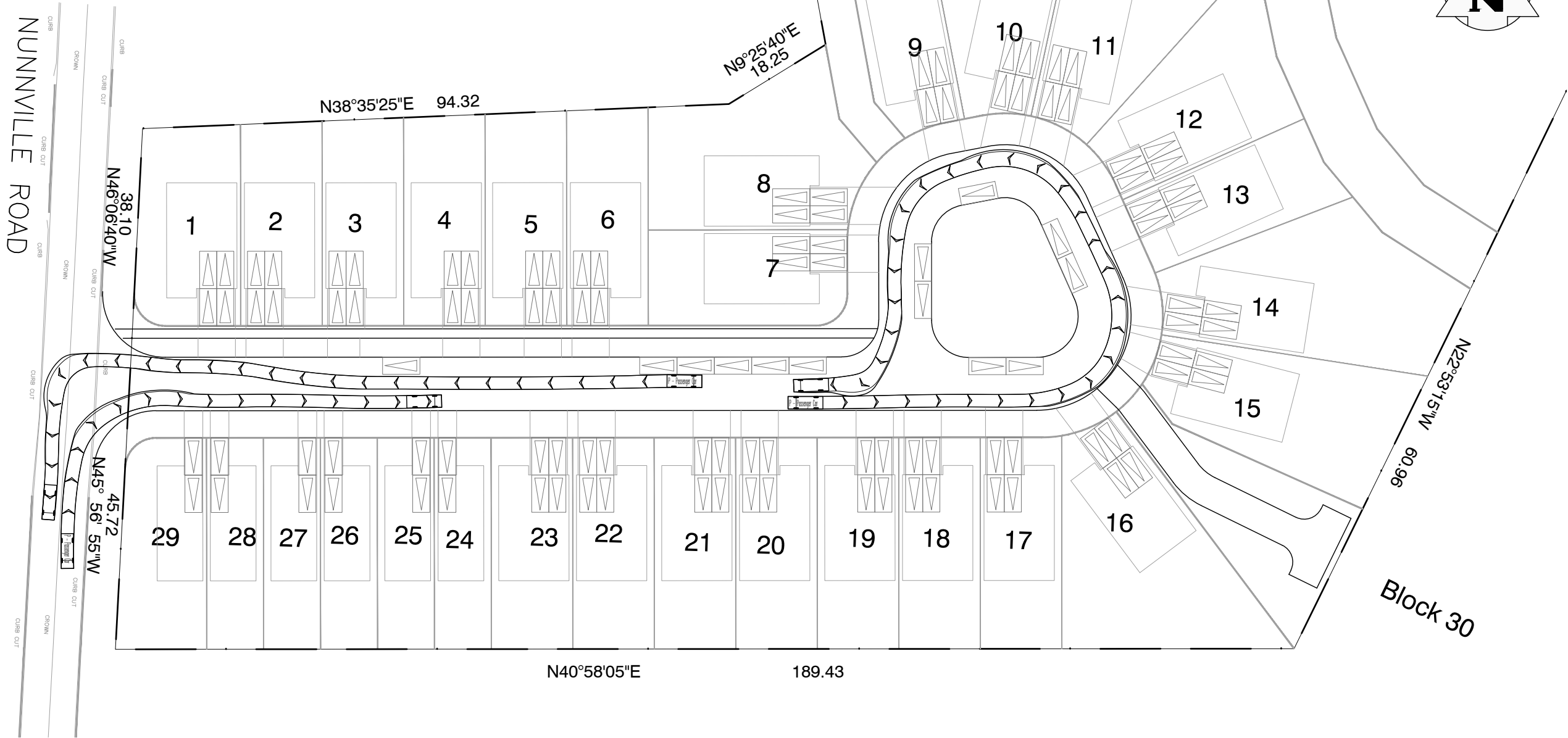
NOTE:
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



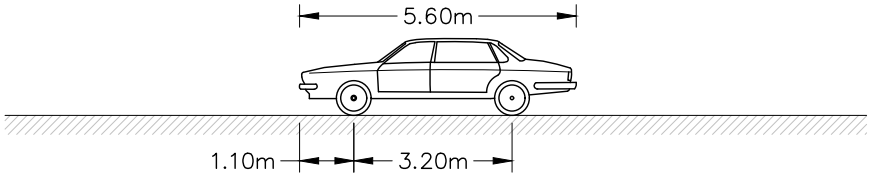
Project		13247 & 13233 NUNVILLE ROAD, TOWN OF CALEDON				 CROZIER CONSULTING ENGINEERS	2800 High Point Drive Suite 100 Milton, ON L9T 6P4 905-875-0028 T 905-875-4915 F www.cfcrozier.ca	
Drawing		SITE DISTANCE EVALUATION					Drawn By A.K. Design By K.S. Project 988-3941	
		Scale N.T.S. Date 01/24/2020 Check By K.S. Drawing FIG 07						

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

EXISTING RESIDENTIAL



PASSENGER VEHICLE
SCALE: N.T.S.



VEHICLE STATISTICS:

OVERALL VEHICLE LENGTH:	5.60 m
OVERALL VEHICLE WIDTH:	1.99 m
OVERALL VEHICLE HEIGHT:	1.55 m
MIN. BODY/GROUND CLEARANCE:	0.34 m
VEHICLE TRACK WIDTH:	2.00 m
LOCK-TO-LOCK TIME:	1.22 sec
CURB TO CURB TURNING RADIUS:	6.30 m

EXISTING RESIDENTIAL

13247 & 13233 NUNNVILLE ROAD
TOWN OF CALEDON

PASSENGER CAR
TURNING MOVEMENT DIAGRAM

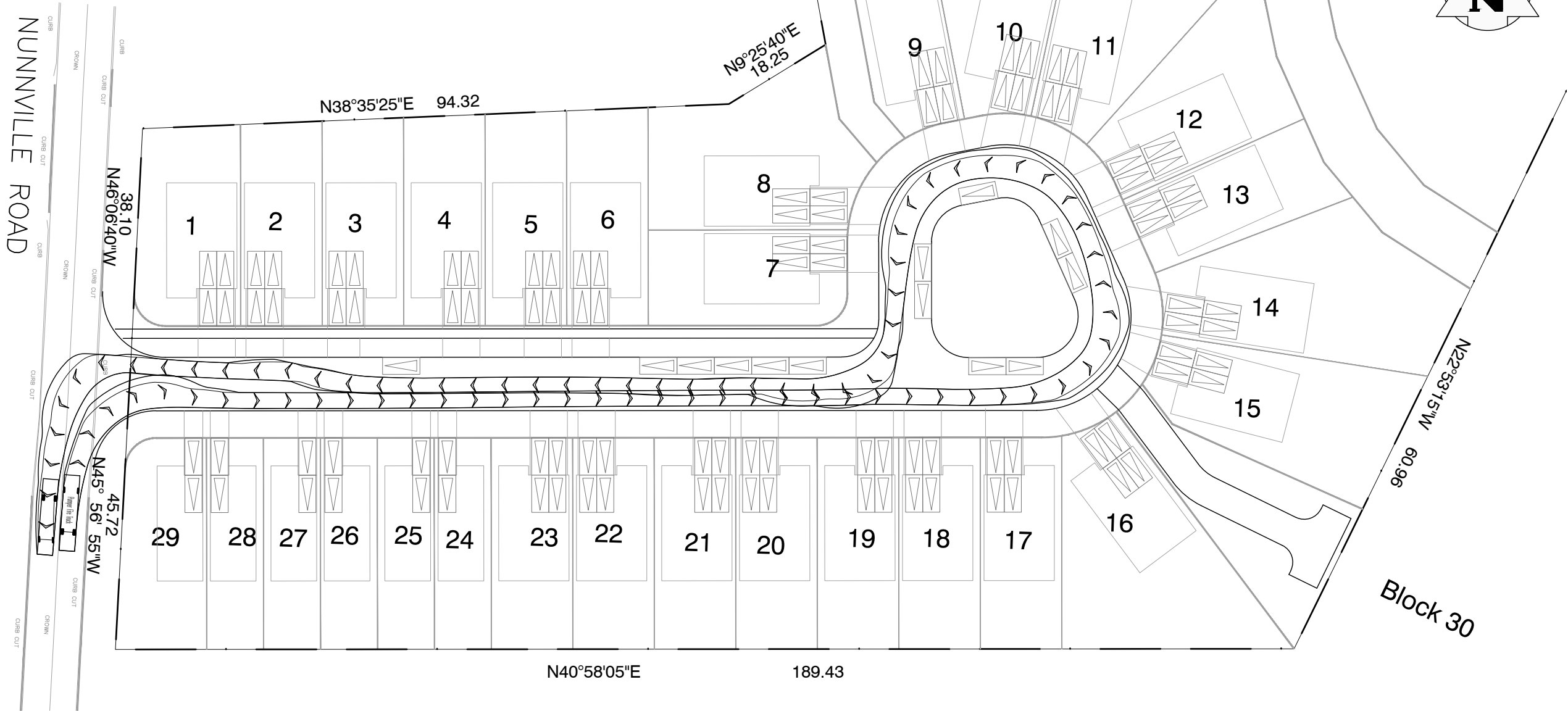


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Milton, ON L9T 6P4
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905 875-4915 F
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Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check	A.W.	Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 08

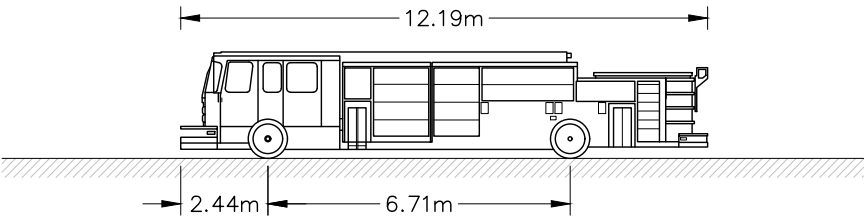
NOTE:
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.

EXISTING RESIDENTIAL



PUMPER FIRE TRUCK

SCALE: N.T.S.



VEHICLE STATISTICS:

OVERALL VEHICLE LENGTH:	12.19 m
OVERALL VEHICLE WIDTH:	2.49 m
OVERALL VEHICLE HEIGHT:	2.36 m
MIN. BODY/GROUND CLEARANCE:	0.20 m
VEHICLE TRACK WIDTH:	2.49 m
LOCK-TO-LOCK TIME:	5.00 sec
MAX. WHEEL ANGLE:	45.00°

EXISTING RESIDENTIAL

13247 & 13233 NUNNVILLE ROAD
TOWN OF CALEDON

PUMPER FIRE TRUCK
TURNING MOVEMENT DIAGRAM



**CROZIER
& ASSOCIATES**
Consulting Engineers

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Drawn	A.K.	Design	K.S.	Project No.	649-5291
Check	A.W.	Check	K.S.	Scale	N.T.S.
				Dwg.	FIG. 09