

2530173 ONTARIO CORPORATION

TRAFFIC IMPACT STUDY

1444-1458 Cawthra Road, City of Mississauga

Project No. 2017-0792



COLE

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MARCH 2019



March 25, 2019
Reference No. 2017-0792

Mr. Ryan Atkinson
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80 Jutland Rd. Suite 500
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Attention: Mr. Ryan Atkinson

**Traffic Impact Study
Proposed Residential Development at 1444-1458 Cawthra Road,
City of Mississauga**

Cole Engineering Group Ltd. (COLE) is pleased to submit this Traffic Impact Study (TIS) report for the above-noted development proposal. This report documents our findings and conclusions regarding the traffic impact assessment in support of Official Plan Amendment (OPA) and Rezoning for the proposed residential development of 12 residential townhouses and 4 detached single family residential units. The subject site is located on the west of Cawthra Road between Arbor Road on the south and South Service Road on the north.

COLE submitted a final TIS report on September 20, 2018, and the City reviewed and provided comments on December 17, 2018, and all the comments related TIS report were addressed in this revised final TIS report.

The results of the traffic analysis show that the study area intersections will operate at acceptable levels of service when incorporating the development with the existing study area traffic, and the existing road network can accommodate the traffic generated by the proposed development and minimal mitigation measures will be required.

Should you have any questions, please do not hesitate to contact the undersigned.

Best Regards,
COLE ENGINEERING GROUP LTD.

Rao N. Marthi, B.Eng., MCIP, RPP
Project Manager
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RM

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PREPARED BY AND CHECKED BY:

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Issues and Revisions Registry

Identification	Date	Description of Issued and/or Revision
Draft Report	April 2018	For Client Review
Draft Report	May 2018	For Submission
Final Report	September 2018	For Submission
Revised Final Report	March 2019	For Submission

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1 Introduction

Cole Engineering Group Ltd. (“COLE”) was retained by 2530173 Ontario Corporation (the “Owner”) to prepare a Traffic Impact Study (TIS) for a proposed residential development in support of Official Plan Amendment (OPA) and Rezoning Application in the City of Mississauga (the “City”). The subject site is located on the west of Cawthra Road between Arbor Road on the south and South Service Road on the north. The subject land is currently occupied by four single detached houses. **Figure 1.1** illustrates the site location.

COLE submitted a final TIS report on September 20, 2018, and the City reviewed and provided comments on December 17, 2018, and all the comments related TIS report were addressed in this revised final TIS report.

As per the revised site plan provided by KFA Architects + Planners Inc. on March 11, 2019, the proposed development is to contain four, detached single-family residential units and 12 townhouses. The vehicular access to the subject site is proposed through a private road and will be connected to Cawthra Road. The subject site also proposes a total of four visitor parking spaces. The proposed site plan is shown in **Figure 1.2**.



Figure 1.1 Site Location

Area Schedule (Gross Building) By...		
RVT Link:	Name	Area

Block A	Garage	23 m²
Block A	Type 2	197 m²
Block A	Garage	19 m²
Block A	Type 1	200 m²
Block A	Garage	20 m²
Block A	Type 1	204 m²
Block A: 15		663 m²

Block B	Garage	23 m²
Block B	Type 2	197 m²
Block B	Garage	19 m²
Block B	Type 1	200 m²
Block B	Garage	20 m²
Block B	Type 1	204 m²
Block B: 15		663 m²

Block C	Garage	20 m²
Block C	Type 1	205 m²
Block C	Garage	20 m²
Block C	Type 1	200 m²
Block C	Garage	21 m²
Block C	Type 1	205 m²
Block C: 15		671 m²

Block D	Garage	20 m²
Block D	Type 1	205 m²
Block D	Garage	20 m²
Block D	Type 1	200 m²
Block D	Garage	21 m²
Block D	Type 1	205 m²
Block D: 15		671 m²

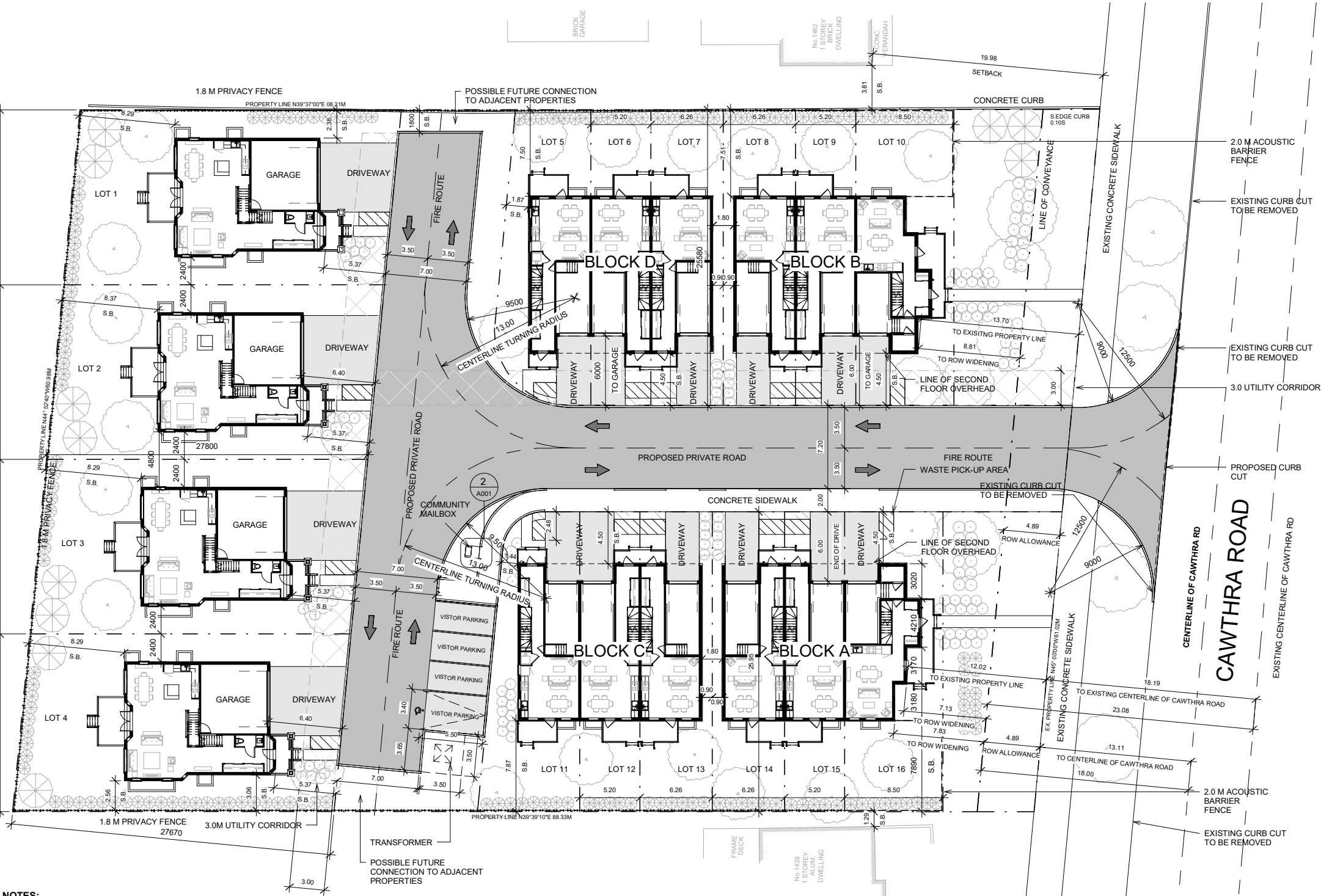
Detached 1	Basement	89 m²
Detached 1	Level 1	88 m²
Detached 1	Level 2	126 m²
Detached 1	Garage	38 m²
Detached 1: 4		341 m²

Detached 2	Basement	89 m²
Detached 2	Level 1	88 m²
Detached 2	Level 2	126 m²
Detached 2	Garage	38 m²
Detached 2: 4		341 m²

Detached 3	Basement	89 m²
Detached 3	Level 1	88 m²
Detached 3	Level 2	126 m²
Detached 3	Garage	38 m²
Detached 3: 4		341 m²

Detached 4	Basement	89 m²
Detached 4	Level 1	88 m²
Detached 4	Level 2	126 m²
Detached 4	Garage	38 m²
Detached 4: 4		341 m²

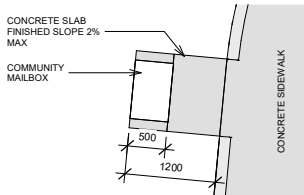
Area Schedule Total	
	4032 m²



NOTES:

- THIS SITE HAS BEEN PREPARED IN ACCORDANCE WITH THE CITY OF MISSISSAUGA ZONING BYLAW NO. 2016-01-001 FOR STORM WATER MANAGEMENT, SITE SERVICING AND GRADING INFORMATION REFER TO DRAWINGS PREPARED BY LITHOS GROUP INC. 150 BERNARDSEY ROAD UNIT #200 TORONTO ON, M4A 1Y1
- FOR LANDSCAPE INFORMATION, REFER TO DRAWINGS PREPARED BY JOHN RUSSO LANDSCAPE ARCHITECT SURVEY CREDIT
- INFORMATION TAKEN FROM PLAN OF PART OF LOTS 188, 189, 190, & 191 REGISTERED PLAN B-19, CITY OF MISSISSAUGA PREPARED BY: TOM A. SENKUS ONTARIO LAND SURVEYOR, 40 BURROWS AVENUE TORONTO (ISLINGTON), ON M9B 4W7
- ANY GRADE ELEVATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO GRADING AND SITE SERVICING PLAN FOR GRADING AND UIG SERVICES
- ALL SITE AREA LIGHTING TO BE DIRECTED DOWNWARD AND DEFLECTED AWAY FROM ADJACENT LOTS ROADS AND STREETS
- ALL CURBING AND DRIVEWAY ENTRANCES TO BE DESIGNED IN ACCORDANCE WITH THE CITY'S MATERIALS STANDARDS AND SPECIFICATIONS MANUAL
- GUARD RAILS IN ACCORDANCE TO THE OBC 2012 SHALL BE PROVIDED WHENEVER GRADE DEFERENCE EXCEEDS 600MM DETAILS TO BE SUBMITTED AND BUILDING PERMIT STAGE.
- BOULEVARD TO BE REINSTITATED IN ACCORDANCE WITH CITY STANDARDS AND TO THE SATISFACTION OF THE CHIEF ENGINEER, EXECUTIVE DIRECTOR OF ENGINEERING AND CONSTRUCTION SERVICES
- EXISTING WATER SERVICE TO BE DISCONNECTED BY THE CITY OF MISSISSAUGA
- SNOW WILL BE REMOVED OFF SITE

SITE SERVICES DISCLAIMER
BE ADVISED THAT SHOULD ANY PARTY INCLUDING THE APPLICANT OR ANY SUBSEQUENT OWNER, APPLY FOR MORE THAN ONE CONDOMINIUM CORPORATION ENCOMPASSING ANY OR ALL OF THIS DEVELOPMENT OR MAKE AN APPLICATION THAT RESULTS IN A LAND DIVISION, STAFF MAY REQUIRE LEGAL ASSURANCES, INCLUDING BUT NOT LIMITED TO EASEMENTS WITH RESPECT TO THE APPROVED SERVICES, SUCH ASSURANCES WILL BE DETERMINED AT THE TIME OF THE APPLICATION FOR CONDOMINIUM APPROVAL.



SURFACE MATERIAL LEGEND

- WASTE STORAGE AREA
- UTILITIES
- FIRE ROUTE

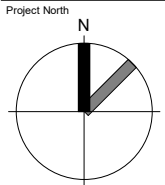
2 Community Mailbox Plan
1 : 50

1444
1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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1	Issue to Consultants	2018.09.12
2	Issue for OPI/RZ	2018.09.28



KFA
architects +
planners inc.

Project No: 16071

Scale: As indicated

Date: 2017/04/05

Drawn by: R.V.V.

Drawing Title

Site Plan

Drawing
Number

A001

2 Study Approach

This study will:

- Focus on the intersections of:
 - Cawthra Road and Arbor Road/Arbor Crescent (Signalized);
 - Cawthra Road and South Service Road(Signalized); and,
 - Cawthra Road and Future Site Access (Unsignalized).
- Assess the existing operations of the above-noted study area intersections during the weekday AM and PM peak hours;
- Assuming the opening year of 2019, estimate the future (2024) background volumes by adding background traffic growth from outside the study area and the traffic generated from other proposed developments in the vicinity of the proposed site;
- Assess the future (2024) background traffic operations of the above-noted study area intersections during the weekday AM and PM peak hours;
- Estimate site traffic based on information published in the Trip Generation Manual, 10th Edition, by the Institute of Transportation Engineers (ITE)) and distribute based on existing traffic patterns and information extracted from 2011 Transportation Tomorrow Survey (TTS);
- Assess future total traffic operations in the horizon year 2024 during the weekday AM and PM peak hours for the subject development;
- Develop mitigation measures to address any deficiencies at each stage (existing, future background and future total traffic) for all key study area intersections;
- Review the Draft Plan regarding the functionality of the internal vehicular circulation to facilitate the fire route related to the proposed residential development using AutoTURN, as required;
- Review parking provided on the Draft Plan; and,
- Prepare a Transportation Demand Management (TDM) plan.

3 Existing Conditions

3.1 Existing Road Network

The existing road network and lane configurations are illustrated in **Figure 3.1**. The details of the road segments are described as follows:

- **Arbor Road/Arbor Crescent** is a local minor road that runs east-west in the city of Mississauga. The roadway is called Arbor Road west of Cawthra Road and Arbor Crescent is east of it. The assigned speed limit for this roadway is 50 km/h and sidewalks are present on one side of the roadway.
- **South Service Road** is an east-west local major roadway in Mississauga. The posted speed limit is 60km/h and sidewalks are present on the south side of the roadway.
- **Cawthra Road** is a regional arterial road that runs in the north-south direction. The posted speed limit is 50km/h. The left turn lane also operates a two-way-left-turn lane between South Service Road and Arbor Road / Arbor Crescent. Sidewalks are present on both sides of the road in the vicinity of the proposed development.

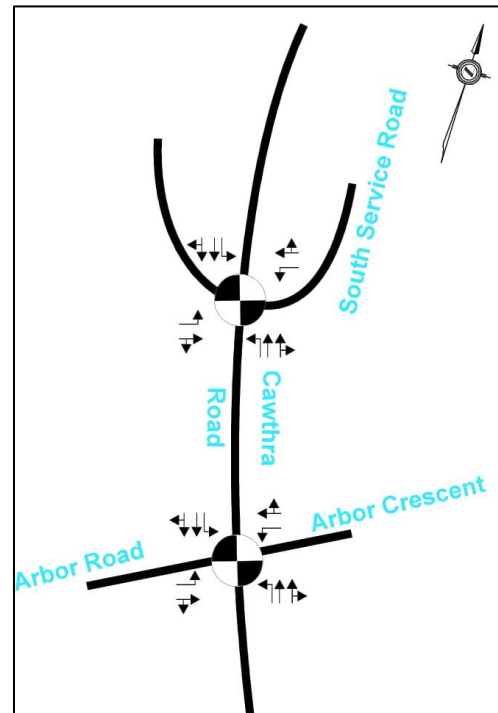


Figure 3.1 Existing Lane Configuration

3.2 Existing Transit Network

Mississauga MiWay transit services provide a network of local bus services through a large portion of the study. Key routes operating within the study area are as follows:

MiWay Bus 8 - (a stop is approximately 100 m away from the site on Cawthra Road) operates Monday-Saturday from the City Centre Transit Terminal to the Lakeshore along Cawthra Road.

MiWay Bus 312 - (a stop is approximately 200 m away from the site on Cawthra Road) operates Monday-Friday (PM only) from Gordon Graydon Centre to the City Centre Transit Terminal.

MiWay Bus 335 – (a stop is on Atwater Avenue near Cawthra Road) operates Monday- Friday (PM only) from the Clarkson GO Station Terminal to Allan A. Martin school.

MiWay Bus 23 - (a stop is on Lakeshore Road near Cawthra Road) operates Monday- Sunday from the Clarkson GO Station Terminal to the Long Branch GO Station Terminal.

In addition to MiWay bus services, GO Transit operates the Lakeshore West Train service and the Milton Train Station near the site. Four Go Train Stations are near the site: Port Credit and Long Branch (along with the Lakeshore West route), and Dixie and Cooksville (along with the Milton route).

3.3 Peak Periods of Analysis

Peak periods were chosen on the basis of the “Worst Case” combination of site-generated trips plus background traffic/transit across the study area. Existing operations of the study area intersections during the weekday morning (7:00 AM – 9:00 AM) and weekday evening (4:00 PM – 6:00 PM) peak periods were assessed as part of this Study.

The existing traffic volumes are based on recent traffic count surveys undertaken on February 27, 2018, by Spectrum Traffic Data Inc. The weekday peak hours were observed between 7:45 AM to 8:45 AM in the morning and approximately between 4:45 PM and 5:45 PM in the evening. Existing traffic volumes at the study area intersections are illustrated in **Figure 3.2** for the weekday AM and PM peak hours. Source information for the traffic counts is provided in **Appendix A-1**.

Existing signal timings were collected from the Region staff and were used to conduct the intersection capacity analysis. Source data is provided in **Appendix A-2**.

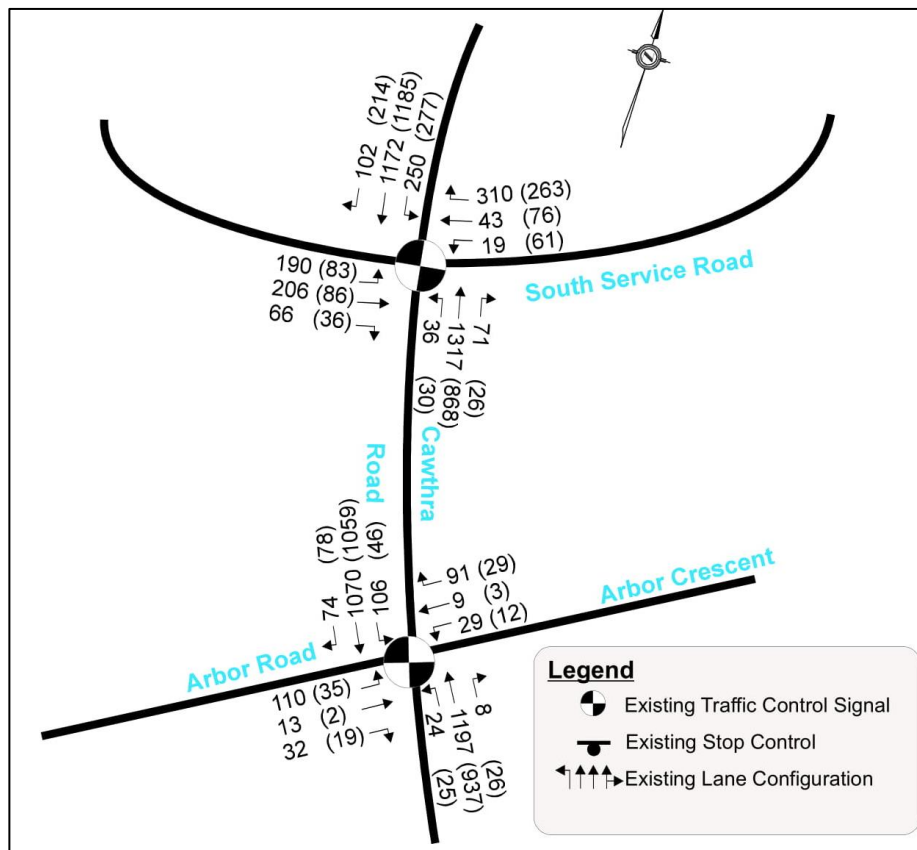


Figure 3.2 Existing (2018) Traffic Volumes

3.4 Existing Traffic Assessment

3.4.1 Input Parameters and Assumptions

Existing Traffic Analysis Traffic operations conditions at signalized and unsignalized intersections were analyzed using *Synchro Version 9.0*, which incorporates the methodology outlined in the *Highway Capacity Manual* (HCM 2000). Analysis parameters and assumptions have been adopted in accordance with the Region's Synchro guidelines (*Peel Region Guidelines for Using Synchro- Version 7.73 Rev 8 dated December 2010*).

This includes the following assumptions:

- Peak hour factors of 1.00 for all movements on all approaches;
- Ideal saturation flow rate based on the Synchro default value of 1,900 vphpl for all movements;
- Existing signal timing and phasing provided by the Region (provided in **Appendix A-2**); and,
- 3.7 m lane width for all through lanes and 3.5 m for auxiliary turn lanes on all approaches.

The intersection operations are reported in two ways:

- The volume to capacity (v/c) ratio which is represented numerically for signalized and unsignalized intersections; and,
- The level of service (LOS) which is indicated by a letter and is based on the average control delay per vehicle.

3.4.2 Critical Movement Classifications

Per the Region Traffic Impact Study Guidelines the following movements are defined as critical movements:

- Through movements; and shared through-turning movements operating with volume to capacity (v/c) ratios equal to or above 0.90;
- Overall intersection operation with volume to capacity (v/c) ratios equal to or above 0.90; and,
- Exclusive turning movements operating with volume to capacity (v/c) ratios equal to or above 1.00.

3.5 Intersection Capacity Analysis

The existing traffic volumes were analyzed using *Synchro 9.0* software. Results from the intersection capacity analysis, based on the existing road network configuration, existing signal timing plans, and existing traffic volumes, are summarized in **Table 3-1**. Critical movements, if any, are bolded. Detailed intersection capacity and queuing analysis reports under the existing conditions are provided in **Appendix B**.

Table 3-1 Existing Traffic - Intersection Operations

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Cawthra Road and South Service Road	Overall	C (0.76)	C (0.56)
	EB Left	E (0.79)	D (0.39)
	EB Through	D (0.60)	D (0.28)
	EB Right	D (0.04)	D (0.02)
	WB Left	D (0.12)	D (0.29)
	WB Through	D (0.13)	D (0.24)
	WB Right	D (0.20)	D (0.16)
	NB Left	C (0.19)	C (0.21)
	NB Through + Right	D (0.84)	C (0.63)
	SB Left	D (0.57)	B (0.40)
	SB Through + Right	A (0.52)	A (0.54)
Cawthra Road and Arbor Road / Arbor Crescent	Overall	B (0.58)	A (0.40)
	EB Left + Through + Right	D (0.69)	D (0.38)
	WB Left	D (0.16)	D (0.17)
	WB Through + Right	D (0.09)	D (0.05)
	NB Left	A (0.10)	A (0.07)
	NB Through + Right	B (0.57)	A (0.34)
	SB Left	A (0.32)	A (0.12)
	SB Through + Right	A (0.47)	A (0.40)

Based on the analysis conducted for the existing traffic conditions during the weekday AM and PM peak hours, all intersections are performing with good levels of service and well below capacity. It is important to note that the LOS is a qualifying measure of traffic operations at an intersection, for a 15-minute analysis period, LOS 'A' is an indication of almost no delays and LOS 'F' indicates very long delays. No additional mitigation measures are recommended.

4 Future Background Conditions

4.1 Background Traffic Growth Rates

Future background traffic volumes for the 2024 horizon year consist of the following components:

- Background traffic growth from outside the study area; and,
- Traffic generated within the study area from other proposed developments.

Growth rates were received from the Region and City staff growth rates presented in **Table 4-1**.

Table 4-1 Annual Traffic Growth Rate

	South Service Road				Cawthra Road
	Compound Annual Growth from Existing to 2021		Compound Annual Growth from 2021-2024		Compound Annual Growth from Existing to 2024
Time	EB	WB	EB	WB	NB/SB
AM Peak Hour	0.50%	1.00%	1.50%	0.00%	1.00%
PM Peak Hour	1.00%	1.50%	1.00%	0.50%	

Growth rates on South Service Road vary due to the Light Rail Transit, which is expected to be in operation by 2021, on Hurontario Road to the east on Cawthra Road. Discussions with the Region and City are shown in **Appendix C**.

4.2 Background Developments

As discussed with City Staff, it was suggested to include the following three developments in the future background traffic analysis:

1. 650 Atwater Avenue Ltd.: This residential development is located in the southwest corner of Atwater Avenue and Cawthra Road in the City of Mississauga. The site is expected to have a total of 110 townhouse units. Access for the development is proposed to Atwater Avenue via a full moves driveway located west of Cawthra Road. A Traffic Impact Study for this development was conducted by GHD in April 2016.
2. Cawthra & Atwater: This residential townhouse development on the south-east corner of the Cawthra Road and Atwater Avenue intersection. The site is approximately 14,855 m² in size and the development consists of a total of 171 residential townhouse units and a new private road connection between Village Green Boulevard and Parkwest Place. Traffic Impact Study was conducted by BA Group, originally in July 2017, and revised in December 2017.
3. Queenscorp (Cawthra South) Inc.: This residential townhouse development is located on Cawthra Road opposite Village Green Boulevard in the City of Mississauga. The site is expected to include 154 dwelling units and Access for the development is proposed to Cawthra Road via a full moves driveway approximately 200 meters south of Atwater Avenue. A Traffic Impact Study for this development was conducted by GHD in March 2016.

The site generated from the above developments is included in the future background analysis. Site generated figures from the traffic impact studies for the above developments are provided in **Appendix D**.

4.3 Future Background Analysis

The future (2024) background traffic volumes consists:

- Background traffic growth from outside the study area; and,
- Traffic generated within the study area from other proposed developments in the vicinity of the subject development.

The future (2024) background traffic volumes are illustrated in **Figure 4.1**.

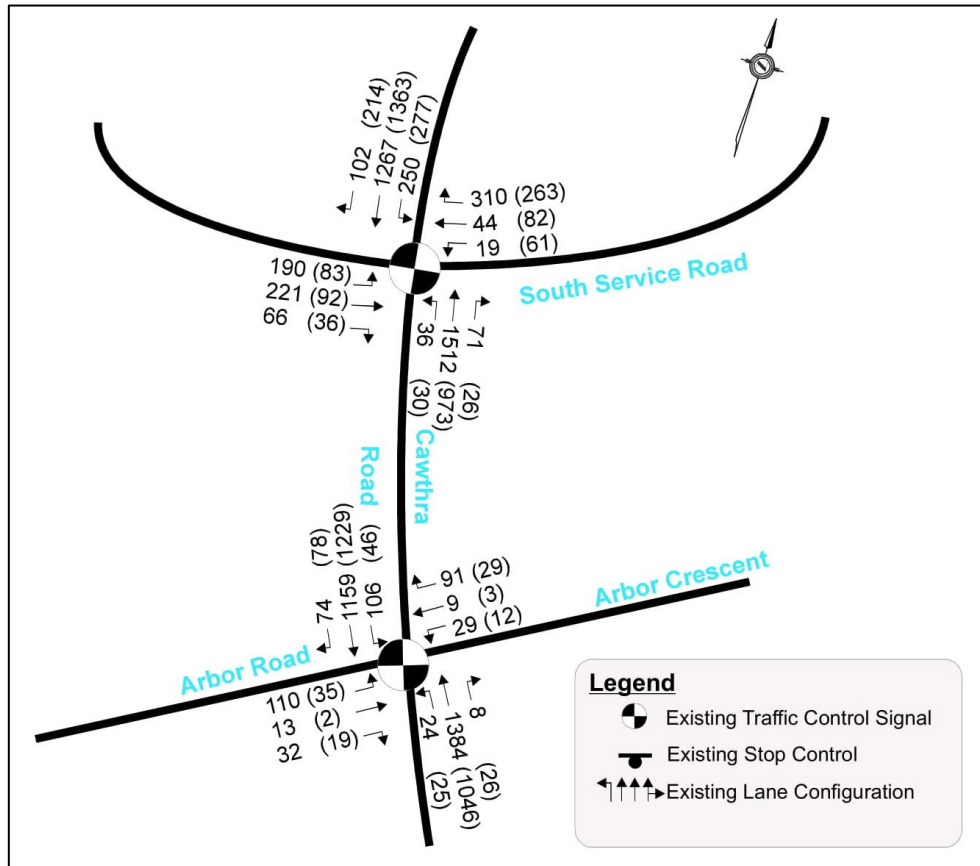


Figure 4.1 Future (2024) Background Traffic Volumes

4.3.1 Intersection Capacity Analysis

The future background traffic volumes were analyzed using Synchro 9.0 software. Results from the intersection capacity analysis, based on the existing road network configuration, existing signal timing plans, and existing traffic volumes, are summarized in **Table 3-1**. Critical movements, if any, are bolded. Detailed intersection capacity and queuing analysis reports under the existing conditions are provided in **Appendix E**.

Table 4-2 Future Background Traffic - Intersection Operations

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Cawthra Road and South Service Road	Overall	D (0.82)	C (0.62)
	EB Left	E (0.79)	E (0.60)
	EB Through	D (0.64)	D (0.46)
	EB right	D (0.06)	D (0.02)
	WB Left	D (0.13)	D (0.44)
	WB Through	D (0.13)	D (0.40)
	WB right	D (0.25)	D (0.16)
	NB Left	C (0.20)	C (0.24)
	NB Through + Right	D (0.89)	C (0.66)
	SB left	D (0.68)	B (0.39)
	SB through + right	A (0.56)	A (0.57)
Cawthra Road and Arbor Road/Arbor Crescent	Overall	B (0.65)	A (0.45)
	EB left + through + right	D (0.69)	D (0.38)
	WB Left	D (0.16)	D (0.17)
	WB through + right	D (0.09)	D (0.05)
	NB Left	A (0.11)	A (0.09)
	NB Through + Right	B (0.65)	A (0.38)
	SB left	A (0.39)	A (0.13)
	SB through + right	A (0.50)	A (0.46)

Based on the analysis conducted with the future background traffic conditions during the weekday AM and PM peak hours, all intersections are performing with good levels of service and well below capacity. It is important to note that the LOS is a qualifying measure of traffic operations at an intersection, for a 15-minute analysis period, LOS 'A' is an indication of almost no delays and LOS 'F' indicates very long delays. No additional mitigation measures are recommended.

5 Future Total Conditions

5.1 Site Generated Traffic

Site trip generation for the proposed development was undertaken using information contained in the *Trip Generation Manual, 10th Edition* published by the ITE. The Land Use Codes 210 (Single Family Detached Housing) and 221 (Multifamily Housing-Low Rise) were used to estimate the weekday AM and PM peak hour traffic.

A 10% non-auto mode reduction was applied to the gross trips generated as calculated from the 2011 Transportation Tomorrow Survey (TTS) data results. The non-auto mode reduction was calculated using the information collected in the 2011 TTS for zones of household (3642, 3648, 3649, and 3653). Detailed analysis of the 2011 TTS data is provided in **Appendix F**.

The trip generation calculations for the residential units are tabulated in **Table 5-1** below.

Table 5-1 Trip Generation Based on ITE Manual

Land Use	Units	Parameter	AM Peak Hour			PM Peak Hour		
			In	Out	2-Way	In	Out	2-Way
(LUC 210) Single Family Detached Houses	4	Gross Trips	2	6	8	3	2	5
		Gross Rate	0.50	1.50	2.00	0.75	0.50	1.25
		New Trips	2	5	7	2	2	4
		New Rate	0.50	0.03	0.04	0.50	0.50	1.00
(LUC 221) Multifamily Housing Low Rise	12	Gross Trips	1	5	6	6	3	9
		Gross Rate	0.11	0.35	0.46	0.47	0.28	0.75
		New Trips	1	4	5	5	3	8
		New Rate	0.08	0.33	0.42	0.42	0.25	0.67
Total New Trips			3	9	12	7	5	12

Based on the site statistics, the proposed development at full build-out is expected to generate 12 new vehicular 2-way trips during the morning peak hour (three trips in / nine trips out), and 12 new vehicular 2-way trips during the afternoon peak hour (seven trips in / five trips out).

5.2 Site Distribution and Assignment

The trip distribution for the proposed development is based on traffic patterns extracted from the 2011 Transportation Tomorrow Survey (TTS). The detailed trip distribution calculations based on the TTS data are summarized in **Table 5-2**, with the raw data presented in **Appendix F**.

Table 5-2 2011 TTS Trip Distribution

To/From	AM Peak hour	PM Peak Hour
North	40%	30%
South	20%	20%
West	10%	15%
East	30%	35%
Total	100%	100%

Site generated traffic summarized in **Table 5-1** was assigned onto the existing road network using the distribution presented in **Table 5-2**. The assigned site generated traffic is presented in **Figure 5.1**.

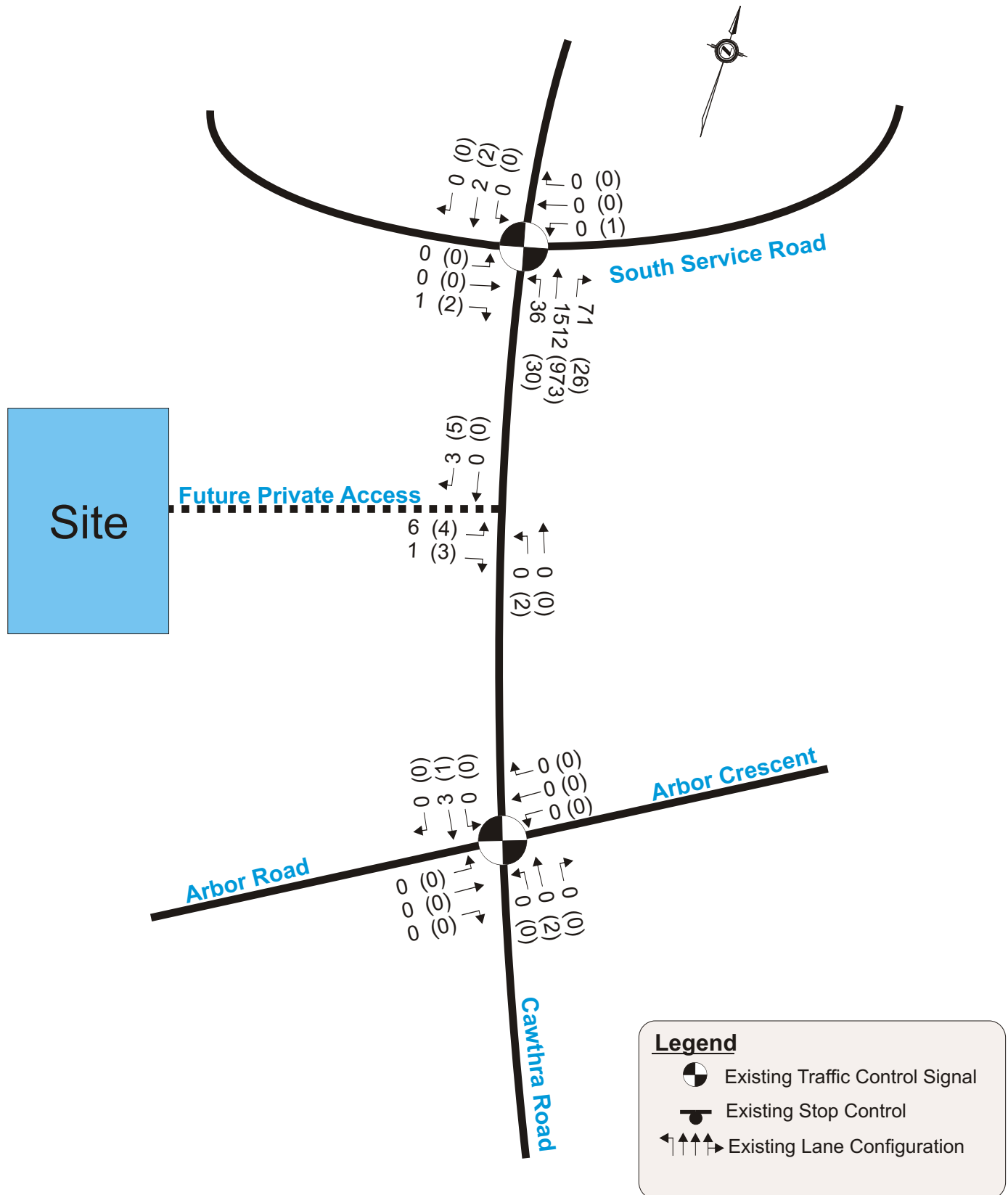


Figure5-1
Site Generated Traffic Volumes

5.3 Future Total Analysis

The Future total traffic volumes consist of the following components:

- Future background traffic volumes from corresponding horizon year; and,
- Proposed development site generated traffic volumes.

The resulting future total traffic in the horizon year 2024 is presented in **Figure 5.2**.

5.4 Intersection Capacity Analysis

The future total traffic volumes were analyzed using *Synchro 9.0* software. Results from the intersection capacity analysis, based on the existing road network configuration, existing signal timing plans and existing traffic volumes, are summarized in **Table 5-3**. Critical movements, if any, are bolded. Detailed intersection capacity and queuing analysis reports under the existing conditions are provided in **Appendix G**.

Table 5-3 Future Total Traffic - Intersection Operations

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Cawthra Road and South Service Road	Overall	D (0.82)	C (0.62)
	EB Left	E (0.79)	E (0.59)
	EB Through	D (0.64)	D (0.46)
	EB right	D (0.06)	D (0.02)
	WB Left	D (0.13)	D (0.45)
	WB Through	D (0.13)	D (0.40)
	WB right	D (0.25)	D (0.16)
	NB Left	C (0.21)	C (0.25)
	NB Through + Right	D (0.89)	C (0.66)
	SB left	D (0.68)	B (0.39)
	SB through + right	A (0.56)	A (0.57)
Cawthra Road and Arbor Road/Arbor Crescent	Overall	B (0.65)	A (0.45)
	EB left + through + right	D (0.69)	D (0.38)
	WB Left	D (0.16)	D (0.17)
	WB through + right	D (0.09)	D (0.05)
	NB Left	A (0.11)	A (0.09)
	NB Through + Right	B (0.65)	A (0.38)
	SB left	A (0.39)	A (0.13)
	SB through + right	A (0.50)	A (0.46)
Cawthra Road and Future Site Access	EB left + right	B (0.02)	C (0.02)
	NB left	A (0.00)	B (0.00)
	NB through	A (0.47)	A (0.40)
	SB through + right	A (0.27)	A (0.28)

Based on the analysis conducted, all intersections are performing with good levels of service and well below capacity. All movements at the future intersection of Cawthra Road and the new site access are expected to operate well below capacity and with a good level of service. No additional mitigation measures are recommended.

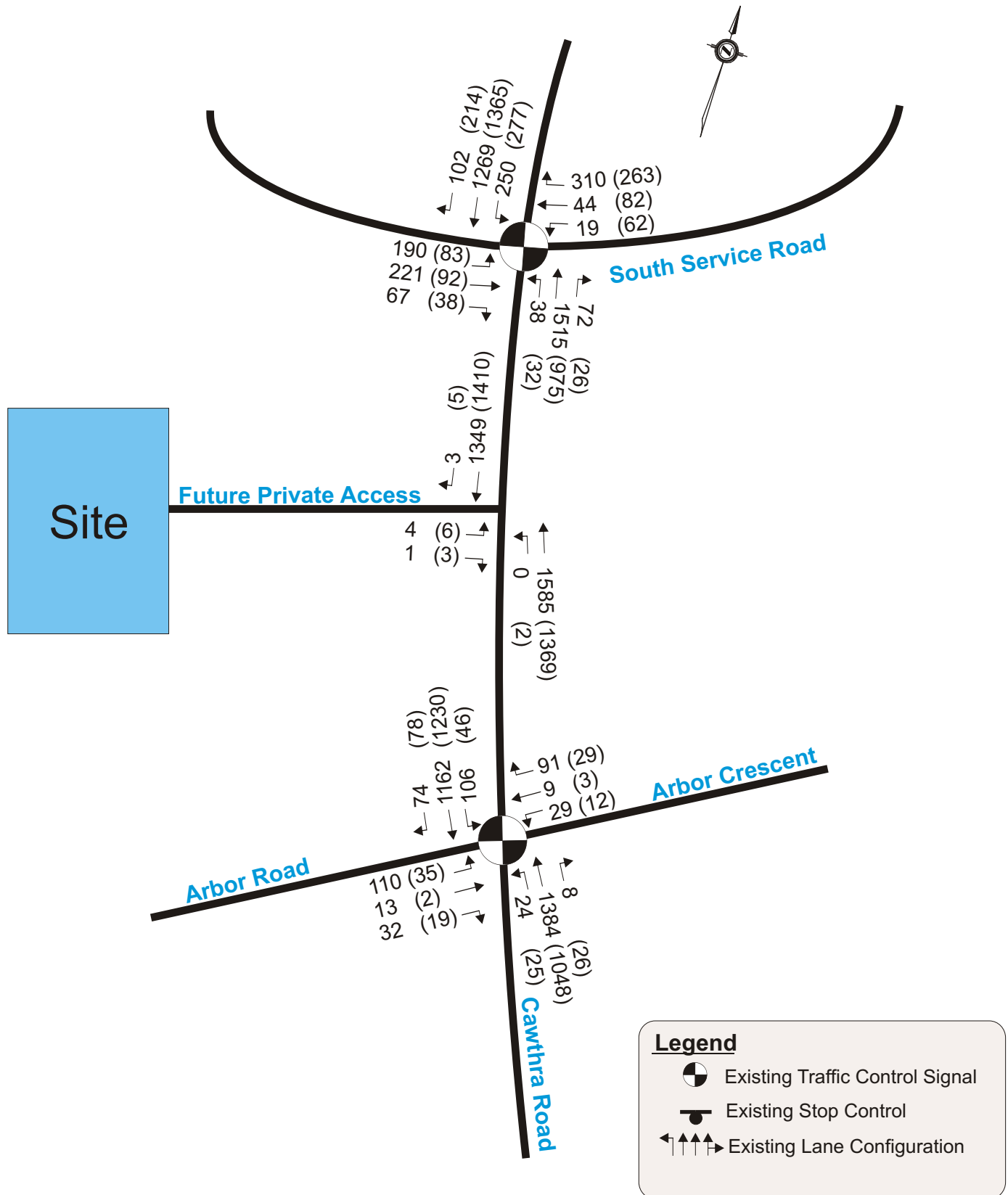


Figure 5-2
Future (2024) Total Traffic Volumes

6 Parking and On-Site Circulation Review

6.1 Parking Analysis

The parking requirement for 'Detached Dwelling' and 'Dwelling, Townhouse or Stacked Townhouse on Public Road' land use category, as outlined in the City's Zoning By-Law 0225-2007 was used to determine the required number of parking spaces. **Table 6-1** on the following page summarizes the automobile parking requirement as per the Zoning By-law.

Table 6-1 Parking Requirement Using the City's By-Law # 2225-2007

Land Use	Units	Required Parking		Provided Parking
		Parking Rate	Parking Requirement	
Detached Dwelling	4	2.0 parking space / dwelling	8	8
Condominium Townhouse Dwelling	12	2 parking spaces per dwelling unit for residents	24	24
		0.25 visitor spaces per dwelling unit	3	4
Total	193		35	36

Each dwelling unit is to have two parking spaces per unit as well as four visitor parking spaces. Therefore, the parking requirement for the proposed single detached dwellings and the townhouses meet the City's By-Law requirement. The parking assessment shows that the parking provided will meet the City's Zoning By-Law parking requirement.

6.2 On-Site Circulation Review

An *AutoTURN* analysis was undertaken to confirm the turning radii that garbage trucks and fire trucks can maneuver throughout the site. **Figure 6.1** and **Figure 6.2** illustrates the maneuvers of a 12.19 m fire truck and a 12.00 m garbage truck, respectively through the site.

Figure 6.3 and **Figure 6.4** illustrates the maneuvers of a 12.19 m fire truck and a 12.00 m garbage truck, respectively through the site.

6.3 Sightline Review

Sightlines and available sight distances were reviewed based on the Geometric Design Guide for Canadian Roads, published by the *Transportation Association of Canada (TAC)*, and dated *June 2017*. *Chapter 9, Section 9.9* was reviewed to identify the appropriate cases applicable to the proposed site. Case 'B', which refers to intersections with stop control on the minor road was reviewed. *Table 9.9.4* which covers stopping and turning distances for left turns, and *Table 9.9.6* which covers stopping and turning distances for right turns, were reviewed. The summary of intersection sight distance is illustrated in **Table 6-2**.

Available sight distances provide the minimum distances required for a driver, at a stop, to navigate an intersection safely. The sight distances requiring consideration for this case are for crossing and turning movements. Distances for turning movements are the minimum sight distance for a driver, at a stop, to

turn in a direction without being overtaken by an approaching vehicle heading in that same direction. The posted speed limit is 50 km/h on Cawthra Road, in the vicinity of the subject site.

Table 6-2 Intersection Sight Distance

Design Speed (80 km/h)	Stopping Sight Distance	Intersection Sight Distance for Passenger Vehicles (m)
Right Turn from Stop	105m	130m
Left Turn from Stop		150m
Crossing Maneuver		130m

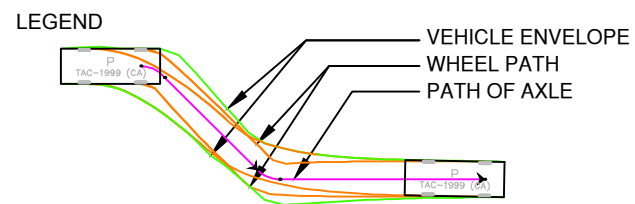
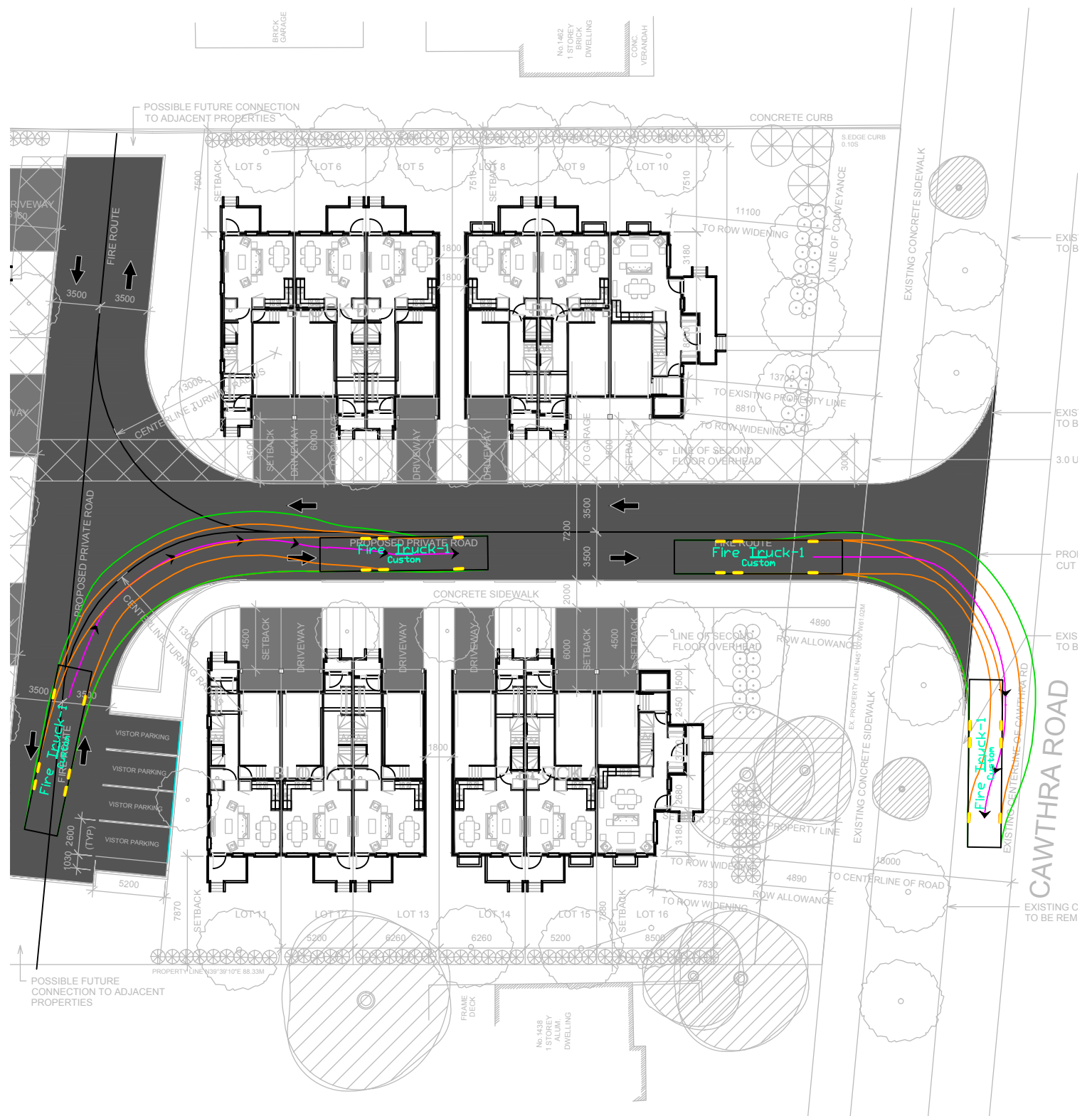
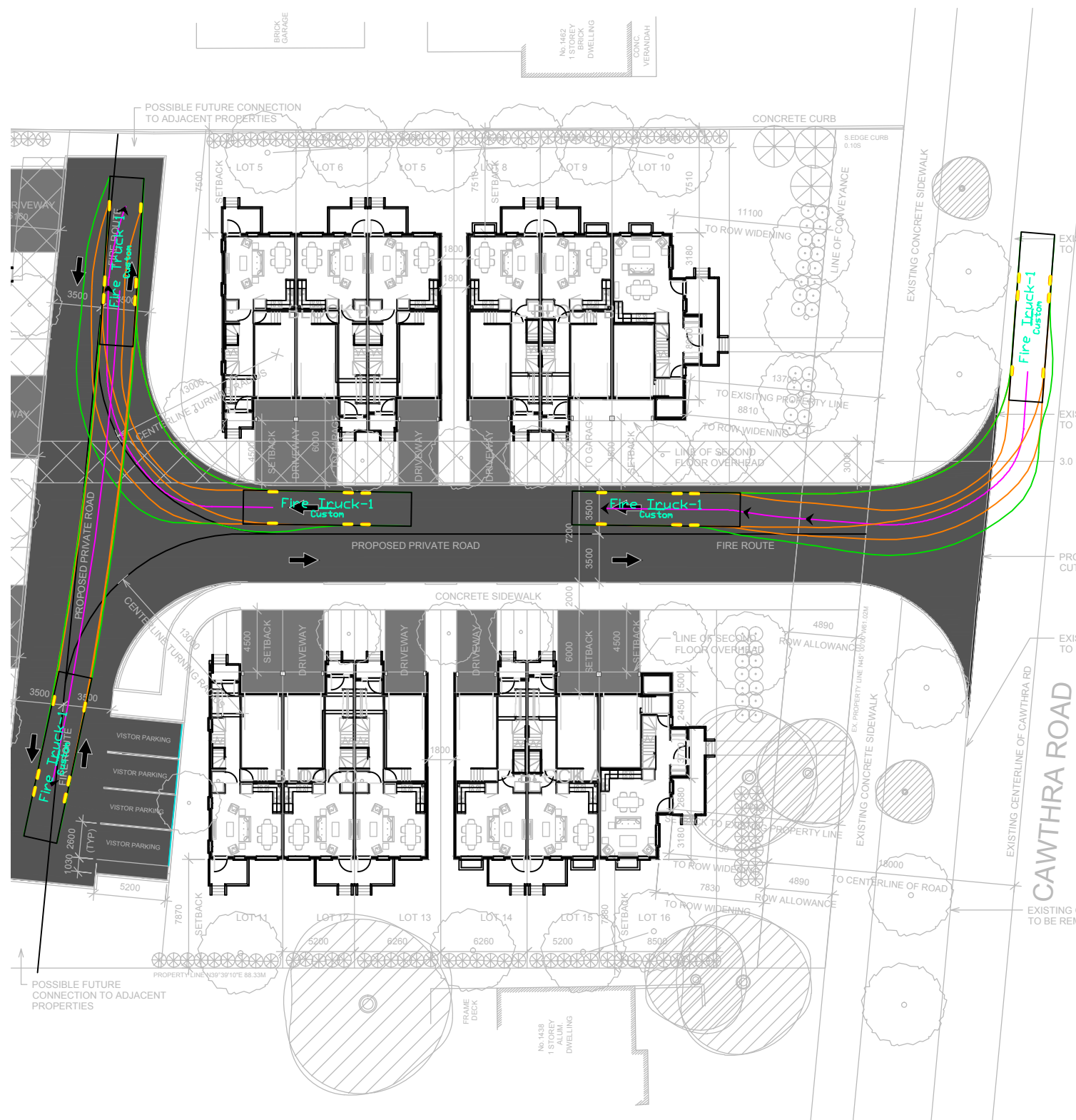
Based on a design speed of 70km/h along Cawthra Road, the minimum sight distance for crossing and turning movements are 130m and 150m, respectively.

Additionally, when vehicles approaching the intersection while opposing drivers are at the stop, also need to stop, the minimum safe stopping distance is required. Based on the TAC guidelines, Chapter 9, Section 9.10 was reviewed to identify the minimum stopping sight distance to the proposed site. **Figure 9.10.1**, which covers sight distance was reviewed and are summarized in **Table 6-3**.

Table 6-3 Decision Sight Distance

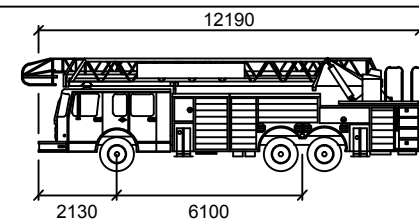
Posted Speed	50km/h
Design Speed	70km/h
Decision Sight Distance	200m
Available Sight Distance	>200m

Based on a design speed of 70km/h, the decision sight distance is 200 m. The sight lines provided at the future site access with Cawthra Road are depicted in **Figure 6.5**. This figure shows that the available sight distance achieved exceeds 200 m, which therefore satisfies the minimum stopping sight distance of 105 m, intersection sight distance of 130 m and decision sight distance of 200 m.



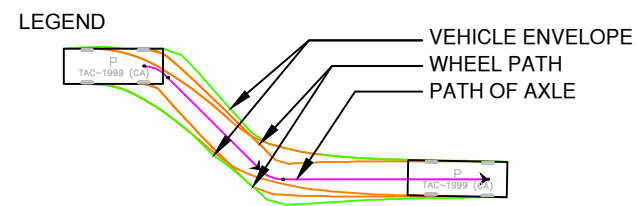
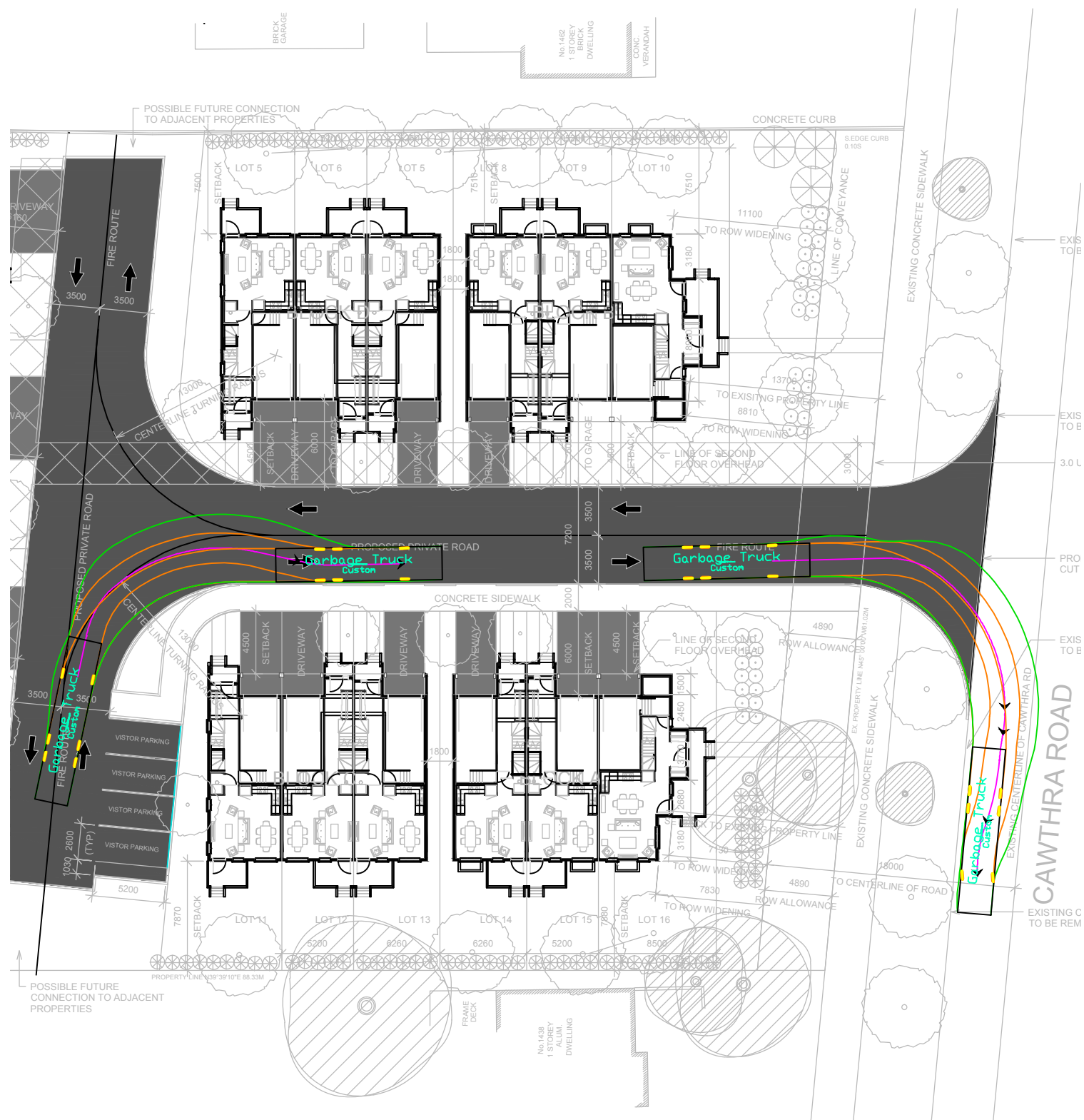
DESIGN VEHICLE
Fire Truck-1

Width	: 2440
Track	: 2440
Lock to Lock Time	: 6.0
Steering Angle	: 31.4



AUTOTURN ANALYSIS FOR FIRE TRUCK
PROPOSED RESIDENTIAL DEVELOPMENT
1444-1458 CAWTHRA ROAD
CITY OF MISSISSAUGA
REGION OF PEEL

DATE:	MARCH 2019	PROJECT No.:	2017-0792
SCALE:	N.T.S.	FIGURE No.:	6-1



DESIGN VEHICLE

Typical Garbage Truck

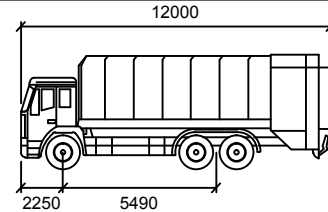
mm

Width : 2400

Track : 2400

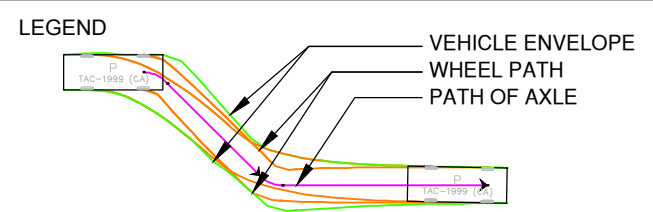
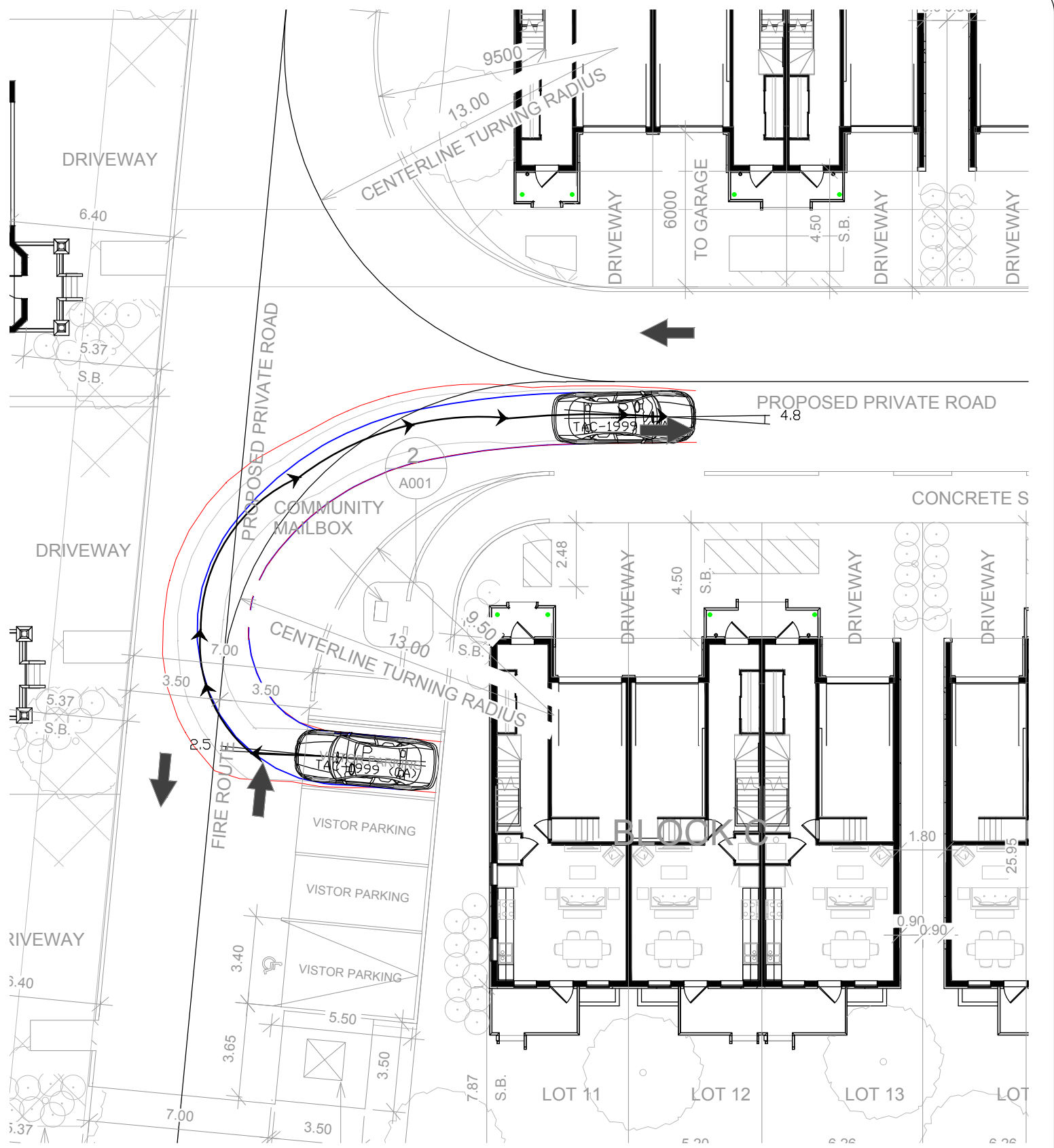
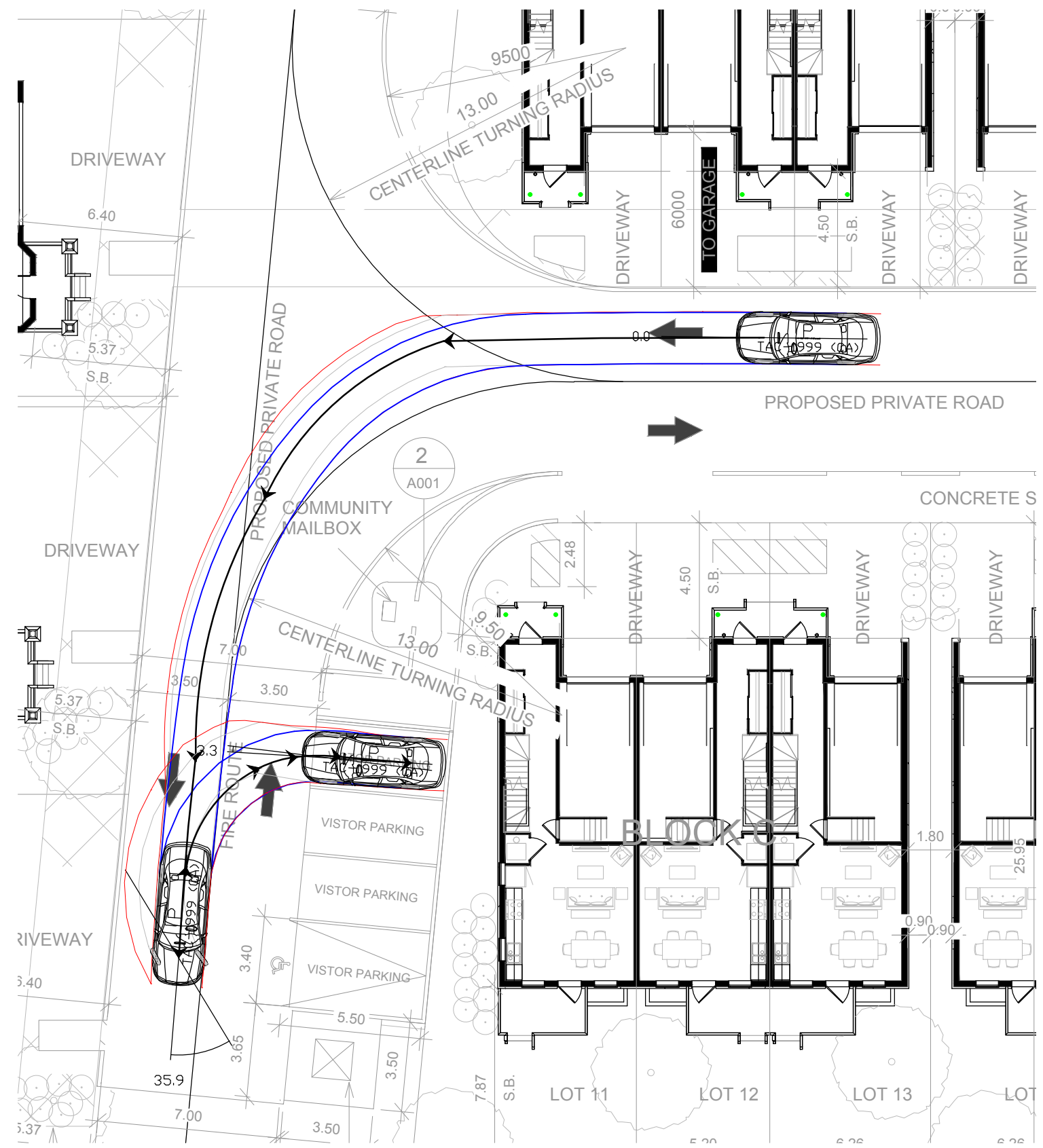
Lock to Lock Time : 6.0

Steering Angle : 24.1



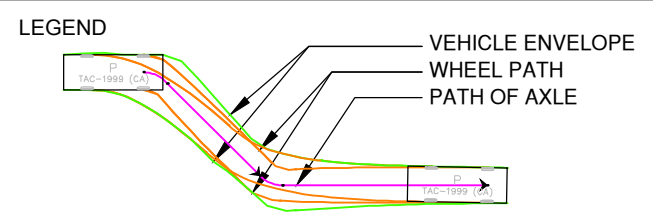
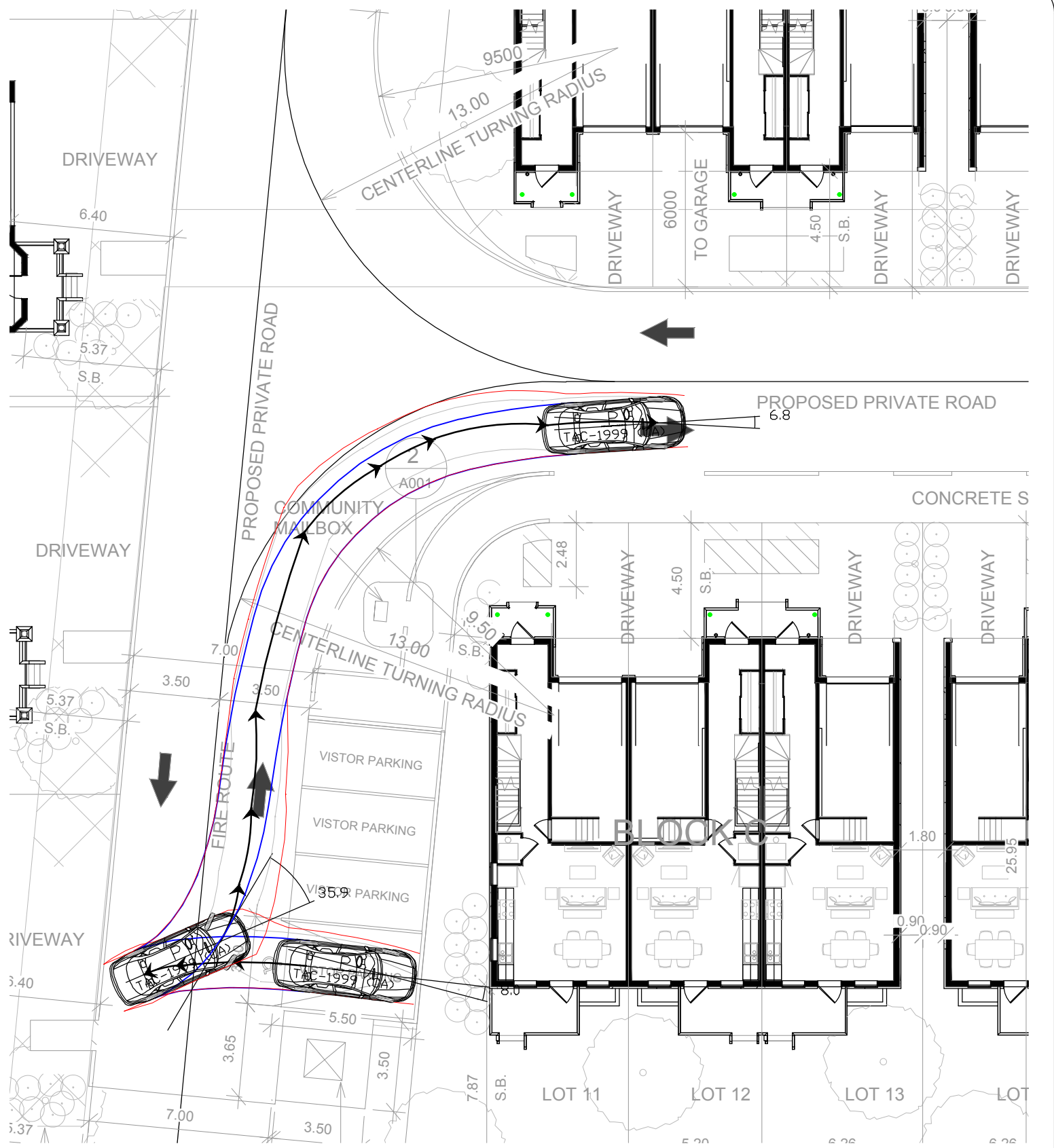
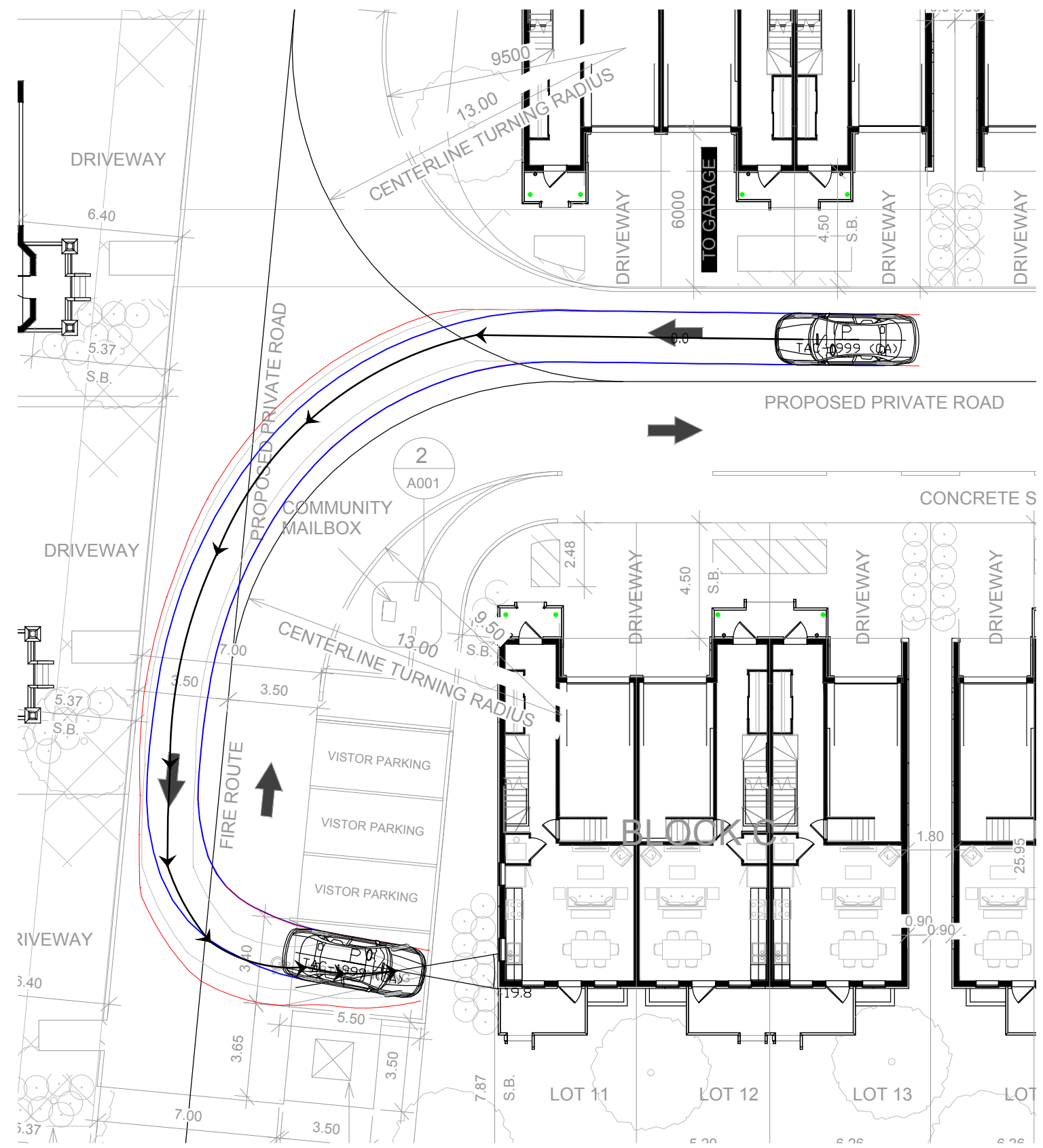
AUTOTURN ANALYSIS FOR GARBAGE TRUCK
PROPOSED RESIDENTIAL DEVELOPMENT
1444-1458 CAWTHRA ROAD
CITY OF MISSISSAUGA
REGION OF PEEL

DATE:	MARCH 2019	PROJECT No.:	2017-0792
SCALE:	N.T.S.	FIGURE No.:	6-2



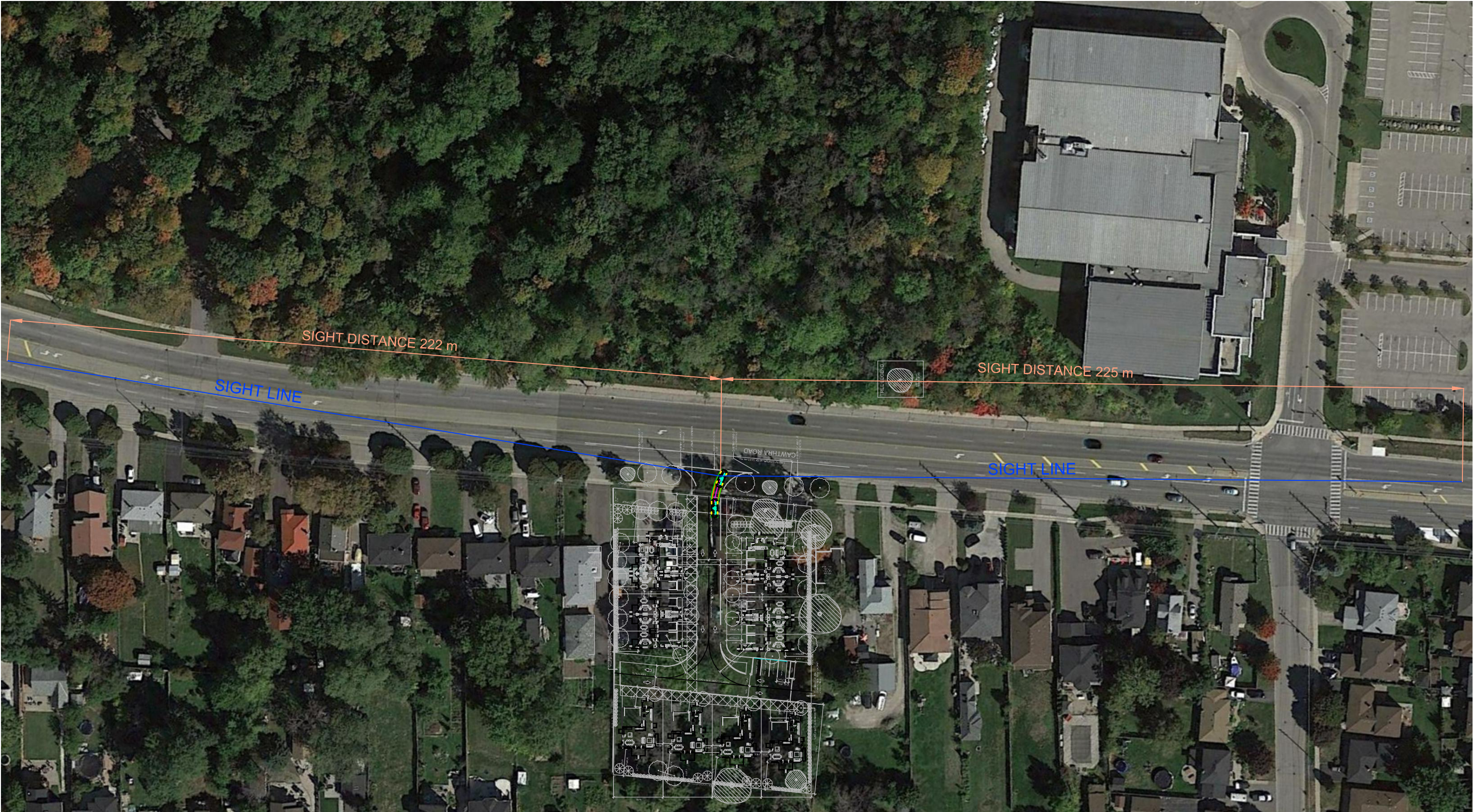
DESIGN VEHICLE

AUTOTURN ANALYSIS FOR PASSENGER CAR INGRESS AND EGRESS REGULAR PARKING SPACE			
PROPOSED RESIDENTIAL DEVELOPMENT			
1444-1458 CAWTHRA ROAD			
CITY OF MISSISSAUGA			
DATE:	MARCH 2019	PROJECT No.:	2017-0792
SCALE:	1:200	FIGURE No.:	6-3



DESIGN VEHICLE

AUTOTURN ANALYSIS FOR PASSENGER CAR INGRESS AND EGRESS ACCESSIBLE PARKING SPACE PROPOSED RESIDENTIAL DEVELOPMENT 1444-1458 CAWTHRA ROAD CITY OF MISSISSAUGA			
DATE:	MARCH 2019	PROJECT No.:	2017-0792
SCALE:	1:200	FIGURE No.:	6-4



COLE

LEGEND

— SIGHT LINE

— AVAILABLE SIGHT DISTANCE

SIGHT LINE ANALYSIS
PROPOSED RESIDENTIAL DEVELOPMENT
1444-1458 CAWTHRA ROAD
CITY OF MISSISSAUGA
REGION OF PEEL

DATE: MARCH 2019

SCALE: N.T.S.

PROJECT No.: 2017-0792

FIGURE No.: 6-3

7 Transportation Demand Management (TDM)

Transportation Demand Management (TDM) refers to a variety of strategies to reduce traffic congestion, minimize the number of single-occupant vehicles, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. In summary, TDM works to change how, when, where and why people travel.

TDM strategies have multiple benefits including the following:

- Reduced auto-related emissions to improve air quality;
- Decreased traffic congestion to reduce travel time;
- Increased travel options for residents and commuters;
- Reduced personal transportation costs and energy consumption; and,
- Support Provincial Smart Growth Objectives.

The above-combined benefits will assist in creating a more active and liveable community.

7.1 TDM Strategies Identification

7.1.1 Walking / Cycling

The Municipality is a pedestrian and cycling supportive community that embraces the “complete streets” concept by encouraging both commuter and recreational travel by walking, cycling and using public transit through a safe and desirable Municipality-wide network of on-road and off-road pedestrian and cycling facilities.

Currently, there are sidewalks available on all roads in the vicinity of the site. Near the site, there are two small trails through Cawthra Park and Dellwood Park. Additionally, Lakefront Promenade has a dedicated multi-purpose trail in both directions with many nearby waterfront trails.

7.2 TDM Strategies Implementation

TDM programs nationally have experienced a wide range of implementation success. This TDM plan will be a site focused to achieve the desired outcome at the reduced dependency on single occupant vehicle (SOV) from a holistic perspective.

7.2.1 Transit Incentive

An increase in transit use is fundamental to the overall reduction of automobile use. In general, people associate utilities with each mode of transportation (such as safety, reliability, comfort, accessibility, speed, cost and travel time), their mode choice is based on the relative costs associated with one versus another mode. The two characteristics that will most likely influence mode choice are monetary cost and travel time.

Transit productivity is a measure of return on investment in the transit system. It measures how much travelers use the transit service provided in a region. Local buses with few passengers, suggests that transit systems are not providing transportation benefits consistent with their capital and operating costs. Having more passengers on each bus generates more revenue for transit agencies and can result in better

air quality and less congestion. Moreover, transit service level (i.e. network coverage and frequency) have a strong positive correlation with transit demand (i.e. ridership).

As an incentive to encourage residents to use the MiWay transit service, the Region would provide and distribute (one time) prepaid and fee-waived complimentary PRESTO cards. This subsidized transit card will provide a financial incentive to encourage the use of public transit, especially for 'first-time' users to try local transit services as a primary mode of transportation, which is in keeping with a recent incentive (offering free preloaded PRESTO cards) initiated by the Region. Each PRESTO card is to be pre-loaded with \$50 - \$100. The total cost of the PRESTO cards is estimated to be (\$50 - \$100 PRESTO card x 16 units) \$800 - \$1,600 to be borne by the Region. Note that the amount and provision of PRESTO cards are subject to the Region's discretion.

7.2.2 Marketing

It is recommended that an information package is made available by the Region to inform new/prospective residents with alternative traveling options. It is recommended that the Owner consults with the Region to provide the following materials to promote active transportation:

- Peel Region Transit Map;
- City of Mississauga Trails Map;
- Peel Region Cycling Map; and,
- Peel Region Bike-to-Work Practical Guide.

In addition to the above-noted materials, the information package will also include information on transit schedules (i.e. MiWay Transit, Go Transit) to assist residents in planning their trips (i.e. to/from work/school) utilizing the existing and growing transit network system. A location map will also be prepared to indicate the nearby facilities and points of interest (i.e. retail store, grocery store, school, community centre and library) within convenience and comfortable walking distance to further discourage vehicle dependency.

The total approximate cost for the Region to compile the above information into an information package will be approximately \$500 in total to be borne by the Region. The above information is subject to availability and to be provided at the Region's discretion.

7.3 TDM Monitoring

Monitoring a TDM program can be accomplished by conducting a biennial commuter survey to determine the success of the TDM measures (individually or as a combination). It is recommended that the first survey is conducted at substantial occupancy (80%) and thereafter every two years.

A commuter survey typically gathers quantitative data (i.e. percentage use of the various modes of transportation) and qualitative data (i.e. respondents' perception of the alternative transportation programs). This survey will produce and collect essential information to understand the effectiveness of the proposed TDM strategies, which in turn will provide valuable indications (if any) in the determination of adjustments to the TDM initiatives to be required in order to achieve or exceed the targeted outcomes. Moreover, the collected data can also be used to focus the marketing initiatives and efforts of the Region.

The questionnaire is recommended to contain no more than five questions, as the length of the survey has a negative correlation with both respondent rate as well as accuracy. Keeping the survey short and

simple to understand is the first principle in achieving substantial survey data. In general, the survey should gather the following information:

- **Trip Rate** – to obtain information on how many people travel during the morning and afternoon peak hours (sample question 1);
- **Modal Split** – what is the primary transportation modes when traveling during peak hours (sample question 2);
- **Trip Purpose** – this is to test whether the majority of trips are the journey-to-work trip or other trips, as the TDM strategies should be altered accordingly between work trips and non-work trips (sample question 3);
- **Traveler's preference** – to understand aside from driving alone, which TDM measures have the greatest potential to further reduce vehicle dependency (sample question 4); and,
- **Comments** – to give respondents an opportunity to express any comments that can assist in improving the proposed/implemented TDM strategies (sample question 5).

The statistical reliability of a survey depends in part upon the response rate, which is the number of correctly completed surveys compared to the total number of distributed surveys. Therefore, it is important to maximize the survey response rate. Some of the methods that can be used to maximize the response rate are listed as follows:

- Place a notice on a bulletin board and other high pedestrian locations, and attach a cover memorandum to the questionnaire describing the purpose of the survey and requesting cooperation;
- Inform recipients of the duration it takes to respond to the questionnaire, and note that their responses are strictly confidential;
- Offer prizes to respondents, and it is preferably based on a drawing to ensure un-biases;
- Offer a contact person and phone number to respond to any questions that survey recipients may have;
- Facilitate access to the survey questionnaire by posting it on a web-page. As an alternative, deliver the questionnaire and pick-up responses of the different tenants;
- Providing the survey in different languages to assist in non-English speaking residents to understand the survey; and,
- Send one or more reminders (e-mail and flyers) requesting to complete the survey by the due date.

As noted previously, allowing the completion of the survey online can help reduce the time and effort spent on circulating and administrating the survey.

It is recommended to conduct a baseline survey to residents before starting the TDM program. This can assist in evaluating the program's effectiveness (before and after comparative analysis). In addition, comparing the results of the biennial survey to previous years can result in evaluating the program's progress and potential modifications. It is possible to add survey questions to assess the new improvements. Furthermore, MiWay can be consulted for ridership statistics. The estimated cost to conduct the survey is \$500.

7.4 TDM Communications Strategy

To facilitate the implementation of TDM strategies, it is important that information and incentives be passed from the Region to the public effectively.

The owner is to contact the Region, which will, in turn, provide information packages with site-specific information on nearby pedestrian, bicycle and transit facilities. These information packages are to be provided by the Region and would be distributed by the Owner at the time of house closing.

The Owner is to prepare a TDM event which is to take place when the units are at a minimum of 50% occupancy. This event would promote sustainable transportation through presentations and question/answer sessions, to encourage engagement and participation in creating and maintaining a sustainable community. Distribution of PRESTO cards would take place at this event. The estimated cost of the TDM event is \$1,000 to be borne by the Owner.

7.5 Projected Program Cost

The estimated cost to implement the TDM program components are outlined in **Table 7-1**.

Table 7-1 Estimated TDM Program Cost

TDM Measure	Unit Price	Quantity / Number of Units	Product Cost
PRESTO Cards	\$50 - \$100	16	\$800 - \$1,600
TDM Information Package	\$500	1	\$500
Travel Survey	\$500	1	\$500
TDM Event	\$1,000	1	\$1,000
Total Cost			\$2,800 - \$3,600

The estimated cost to administer the TDM plan would be \$2,800 - \$3,600.

8 Conclusions and Recommendations

8.1 Conclusions

Based on the analysis, our conclusions are as follows:

Development Proposal

- The proposed site will consist of:
 - Four single detached homes; and,
 - 12 townhomes.

Existing Conditions

- Turning movement counts were collected during weekday AM and PM peak hours;
- Existing signal timings for the signalized intersections in the study area was applied; and,
- All intersections operate under capacity after minimal signal optimizations in both peak hours.

Background Conditions

- Growth rates, as advised by the regional and city staff were applied to all through movements along boundary roads in the study area that are not directly entering or exiting the site;
- Background developments included the site traffic generated by three developments in the vicinity of the site;
- Optimized signal timings for the signalized intersections in the study area was applied; and,
- All intersections operate similarly to the existing conditions in both peak hours.

Traffic Trip Generation

- The proposed development is expected to generate 12 new vehicular 2-way trips during the morning peak hour (three trips in / nine trips out), and 12 new vehicular 2-way trips during the afternoon peak hour (seven trips in / five trips out).

Future Conditions

- The intersection capacity analysis under the future (2024) total traffic conditions indicate that all the intersections will operate similarly to the future background conditions during both peak hours

Parking Analysis

- Each dwelling unit is to have two parking spaces per unit as well as four visitor parking spaces. Therefore, the parking requirement for the proposed single detached dwellings and the townhouses meet the City's By-Law requirement

On-Site-Circulation

- Based on the *AutoTURN* Analysis, fire trucks and garbage trucks are able to maneuver through the site with no constraints.

Sightline Analysis

- The available sight lines for the proposed site access at Cawthra Road exceeds the sight distance requirements as stipulated in the TAC Geometric Design for Canadian Roads June 2017 Chapter 9 – Intersections.

Transportation Demand Management

- A number of Transportation Demand Management opportunities and strategies are to be introduced to discourage single-occupant vehicle usage within the study area.

8.2 Recommendations

Based on the traffic analysis completed for the subject site, the recommended mitigation measures are as follows:

- At the intersection of Cawthra Road and South Service Road, in the A.M. peak hour it is recommended to optimize to the total split timings and to increase the time allotted to the northbound and southbound movements; and,
- At the intersection of Cawthra Road and South Service Road, in the P.M. peak hour, it is recommended to optimize to the total split timings and to increase the time allotted to the eastbound and westbound movements.