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Noise Impact Study
Proposed Residential Development
1444 – 1458 Cawthra Road
Mississauga, Ontario

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Project No. 01700941

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1 INTRODUCTION & SUMMARY

Howe Gastmeier Chapnik Limited (HGC Engineering) was retained by 2530173 Ontario Corporation to conduct a noise impact study for a proposed residential development including four single detached 2-storey houses and four blocks of 3-storey townhouses for a total of twelve townhouse units. The proposed site is located at 1444 – 1458 Cawthra Road in Mississauga, Ontario. The study is required by the municipality as part of their planning and approvals process.

This report is being updated to reflect the latest drawings prepared by KFA Architects + Planners Inc., dated August 13, 2019 ("Issued for Review").

The dominant noise source impacting the site is road traffic on Cawthra Road. Ultimate traffic data was obtained from the Region of Peel to determine predicted sound levels at the locations of the proposed building façades and in rear yard outdoor living areas. The predicted sound levels were compared to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP) and the municipality to develop noise control recommendations for the proposed site.

The sound level predictions indicate that the future road traffic sound levels will exceed MECP guidelines at the dwelling units closest to Cawthra Road. Physical mitigation in the form of acoustic barriers are required for the flanking rear yards adjacent to Cawthra Road. Forced air ventilation systems with ducts sized to accommodate the future installation of central air conditioning will be required for the dwelling units closest to Cawthra Road. Building constructions meeting the minimum requirements of the Ontario Building Code will provide sufficient acoustical insulation for all units within the development. Warning clauses are also recommended to inform future residents/occupants and owners of the traffic noise impacts.

In summary, with suitable controls integrated into the building plans and the development site, it is concluded that this proposed development is feasible from the perspective of noise impact. Details of the assessment leading to this conclusion are provided herein.

2 SITE DESCRIPTION & NOISE SOURCES

The site is located at 1444 – 1458 Cawthra Road, in Mississauga, Ontario. The proposed site is located west of Cawthra Road and east of Blanefield Road. Figure 1 shows an aerial photo illustrating the location of the proposed site. A site plan prepared by KFA Architects + Planners Inc., dated August 13, 2019 ("Issued for Review") is shown as Figure 2. Figure 2 also indicates the sound level prediction locations for reference purposes. The proposed development includes four single detached 2-storey houses and twelve 3-storey townhouses in four blocks with a third floor living space. All dwellings are designed to have a 1 storey basement. Floor plans and building elevations are provided in Appendix A.

A site visit was made by HGC Engineering personnel in January 2018 to make observations of the acoustical environment. The dominant noise source is road traffic on Cawthra Road. QEW and Lakeshore Road are distant from the site and are therefore not considered further in the analysis. There are existing residences around the proposed site. Cawthra Park and a community centre are located to the southeast of the proposed site.

3 ROAD TRAFFIC NOISE ASSESSMENT

3.1 Road Traffic Noise

Guidelines for acceptable levels of road noise impacting residential developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", release date October 21, 2013, and are listed in Table I below. The values in Table I are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table I: MECP Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour)	Nighttime L_{EQ}(8 hour)
Outdoor Living Area	55 dBA	--
Inside Living/Dining Room	45 dBA	45 dBA
Inside Bedroom	45 dBA	40 dBA

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term “Outdoor Living Area” (OLA) is used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Small balconies are not considered OLAs for the purposes of assessment. Terraces greater than 4 m in depth (measured perpendicular to the building façade) are considered to be OLAs.

The guidelines in the MECP publication allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise.

Warning clauses to notify future residents of possible noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of the bedroom or living/dining room window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the bedroom or living/dining room window due to road traffic.

3.2 Road Traffic

Ultimate road traffic data for Cawthra Road was obtained from the Region of Peel and is provided in Appendix B. A commercial vehicle percentage of 3.17% was used and split into 0.59% of medium trucks and 2.58% of heavy trucks. A day/night split of 90/10% and a speed limit of 50 km/h were also applied to Cawthra Road. The provided ultimate traffic volumes are listed in Table II.

Table II: Ultimate Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Cawthra Road	Daytime	28 236	172	752	29 160
	Nighttime	3 137	19	84	3 240
	Total	**31 373**	**191**	**836**	**32 400**

3.3 Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the site in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix C.

Prediction locations were chosen around the development site to obtain a good representation of the future sound levels at the building façades and in rear yard outdoor living areas. The worst case prediction locations were chosen to represent the top floors (2nd floor of detached units and 3rd floor of townhouse units) of the dwelling units to investigate ventilation requirements and in the ground level outdoor amenity areas to determine acoustic barrier requirements. The results of these predictions are summarized in Table III.

Table III: Predicted Future Traffic Sound Levels, without Mitigation, [dBA]

Prediction Location	Building/ Unit No.	Description	Daytime – in OLA ($L_{EQ-16hr}$)	Daytime – at the Façade ($L_{EQ-16hr}$)	Nighttime – at the Façade (L_{EQ-8hr})
A	Building B/ Unit 10	Townhouse unit with flanking exposure to Cawthra Road	62	64	57
B	Building B/ Unit 9	Townhouse unit with some exposure to Cawthra Road	59	60	53
C	Building D/ Unit 5	Townhouse unit with some exposure to Cawthra Road	55	56	50
D	Building A/ Unit 16	Townhouse unit with flanking exposure to Cawthra Road	62	64	58
E	Building A/ Unit 15	Townhouse unit with some exposure to Cawthra Road	60	60	54
F	Building C/ Unit 11	Townhouse unit with some exposure to Cawthra Road	55	57	50
G	Unit 4	Detached dwelling unit with some exposure to Cawthra Road	<55	<55	<50

4 TRAFFIC NOISE RECOMMENDATIONS

The predictions indicate that the future traffic sound levels will exceed MECP guidelines at the dwelling units closest to Cawthra Road. Recommendations for acoustic barriers, ventilation and warning clauses to achieve the noise criteria stated in Table I are discussed below.

4.1 Outdoor Living Areas

The future predicted sound level in the rear yards of the dwelling units with flanking exposure to Cawthra Road (Prediction Locations [A] and [D]) will up to 62 dBA, 7 dBA in excess of the MECP criteria. Physical mitigation in the form of an acoustic barrier is required.

The various heights required to achieve 55 to 60 dBA in these rear yards are provided in Table IV.

The Planning Department has indicated that they will choose the final barrier heights. Figure 3 also indicates the approximate extent of the required acoustic barriers. When grading information is available, the acoustic barrier heights should be refined.

Table IV: Required Barrier Heights to Achieve MECP OLA Sound Levels

Prediction Location	Sound Level in OLA [dBA]				
	55	56	57	58	59
[A]	2.5	2.2	2.0	--	--
[D]	2.5	2.3	2.0	--	--
Remaining Units	--	--	--	--	--

Notes:
-- no specific requirement

Acoustic barriers can be any combination of an earth berm with an acoustic wall on top. All noise barriers must return back to the dwelling units so that the rear yards are entirely shielded from the roadway. The wall component of the barrier should be of a solid construction with a surface density of no less than 20 kg/m^2. The walls may be constructed from a variety of materials such as wood, brick, pre-cast concrete or other concrete/wood composite systems provided that it is free of gaps or cracks within or below its extent. The heights and extents should be chosen to reduce the sound levels in the OLA's to below 60 dBA and as close to 55 dBA as technically, administratively and economically feasible, subject to the approval of the municipality respecting any applicable fence height by-laws.

The predicted daytime sound levels in the OLA's of the remainder of the dwelling units will be between 55 dBA and 59 dBA. With the acoustic barrier in place for the rear yards at prediction locations [A] and [D], the sound levels in the rear yards to the west will be reduced to 55 dBA or less.

4.2 Indoor Living Areas & Ventilation Requirements

Provision for the Forced Air Conditioning

The predicted future sound levels outside the living/bedroom windows of all proposed townhouses (Prediction Locations [A] to [F]) will be between 51 – 60 dBA during nighttime and/or between 55 – 65 dBA during daytime. To address these excesses, the MECP guidelines recommend that these dwellings be equipped with forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

Window or through-the-wall air conditioning units are not recommended for any commercial or residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope unless they are in their own closet with an access door. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300. The guidelines also recommend warning clauses for units with ventilation requirements. The remaining units are within MECP guidelines and have no specific ventilation requirements.

4.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements to inform residents about possible noise concerns from excess traffic noises. The following noise warning clauses are required for specific dwellings as indicated in Table V.

Suggested wording for future dwellings with minor sound level excesses.

Type A:

> Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling unit occupants as the sound levels exceed the Municipality's and the Municipality and the Ministry of the Environment, Conservation and Parks' noise criteria.

Suggested wording for future dwellings requiring forced air ventilation systems is given below.

Type B:

> This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

Suggested wording for future dwellings for which physical mitigation has been provided is given below.

Type C:

> Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment, Conservation and Parks' noise criteria. The acoustical barrier as installed shall be maintained, repaired or replaced by the owner. Any maintenance, repair or replacement shall be with the same material, to the same standards and having the same colour and appearance of the original.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

4.3 Building Façade Constructions

All the units within the development will have predicted sound levels less than 65 dBA during the daytime and less than or equal to 60 dBA during the nighttime. Thus, any exterior wall and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation.

5 SUMMARY OF RECOMMENDATIONS

The following recommendations are provided in regard to noise mitigation for road traffic noise for the proposed residential development.

1. Acoustic barriers are required for the rear yards of the dwelling units with flanking exposure to Cawthra Road. When grading information is available, the acoustic barrier heights should be refined.

2. Forced air ventilation systems with ducts sized for the future installation of central air conditioning by the occupant will be required for the proposed townhouse units. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.

3. Building constructions meeting the minimum requirements of the Ontario Building Code (OBC) will provide sufficient acoustical insulation for the indoor spaces for all the dwellings in the development.

4. Warning clauses should be included in the property and tenancy agreements and offers of purchase and sale to inform the future residents/occupants of the noise impacts, and the presence of the roadway.

The following table summarizes the noise control recommendations and noise warning clauses for the proposed site.

Table V: Summary of Noise Control Requirements and Noise Warning Clauses

Prediction Location	Building	Unit No.	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Building Façade Constructions
A	B	10	✓+	Forced Air	B, C	OBC
B	B	8 – 9	--	Forced Air	A, B	OBC
	D	6 – 7				
C	D	5	--	Forced Air	A, B	OBC
D	A	16	✓+	Forced Air	B, C	OBC
E	A	14 – 15	--	Forced Air	A, B	OBC
	C	12 – 13				
F	F	11	--	Forced Air	A, B	OBC
G	--	1 – 4	--	--	--	OBC

Notes:
-- no specific requirement
OBC – meeting the minimum requirements of the Ontario Building Code
+ When grading information is available, an acoustical consultant should provide refined acoustic barrier heights. See Table IV for recommended acoustic barrier heights for various sound levels.
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.

5.1 Implementation

To ensure that noise control recommendations outlined above are fully implemented, it is recommended that:

1) When grading information is available for the development, an acoustical consultant should review the plans to refine acoustic barrier requirements.

2) Prior to the issuance of building permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated.

3) Prior to assumption of the subdivision, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly installed and constructed.

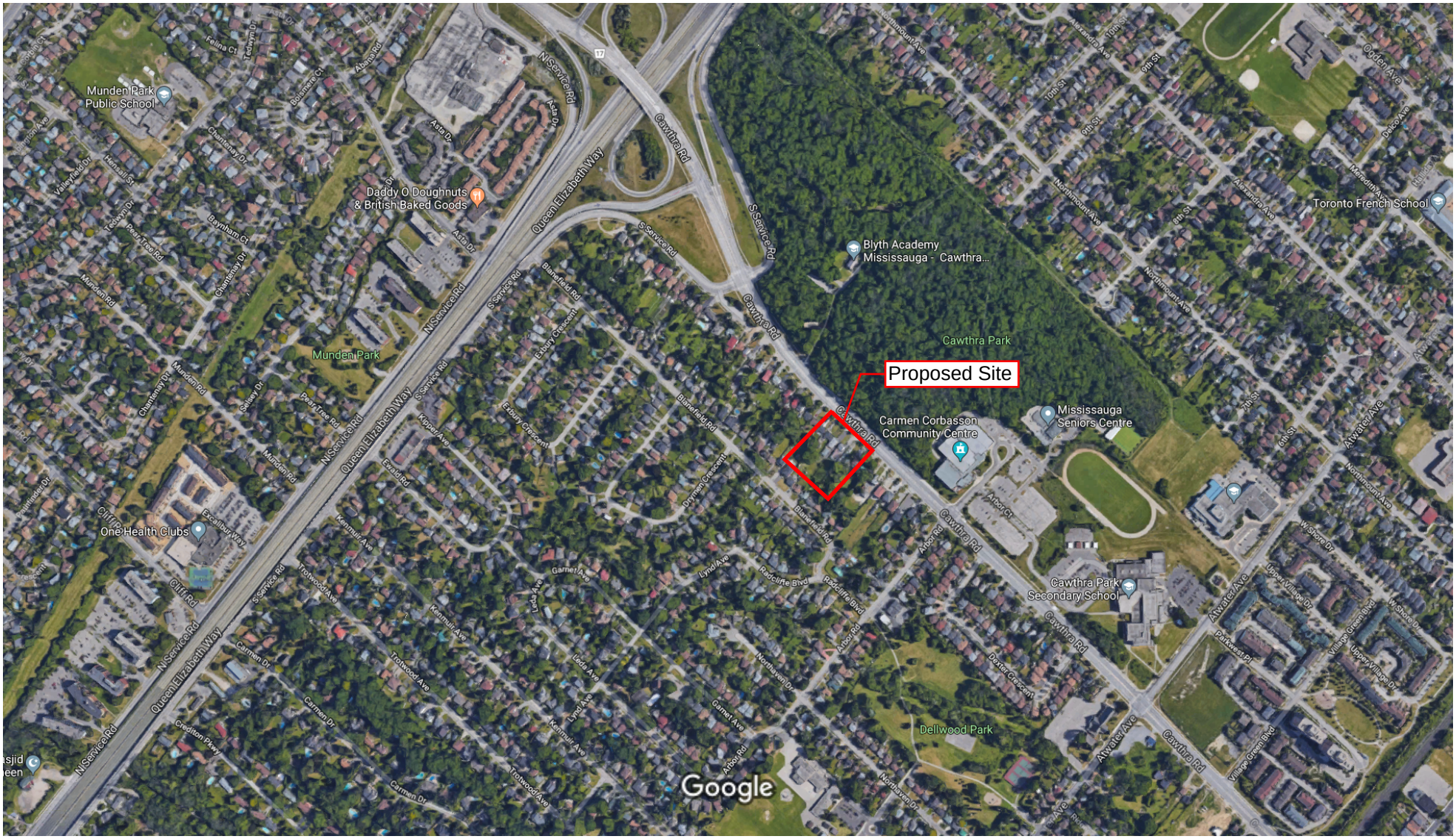
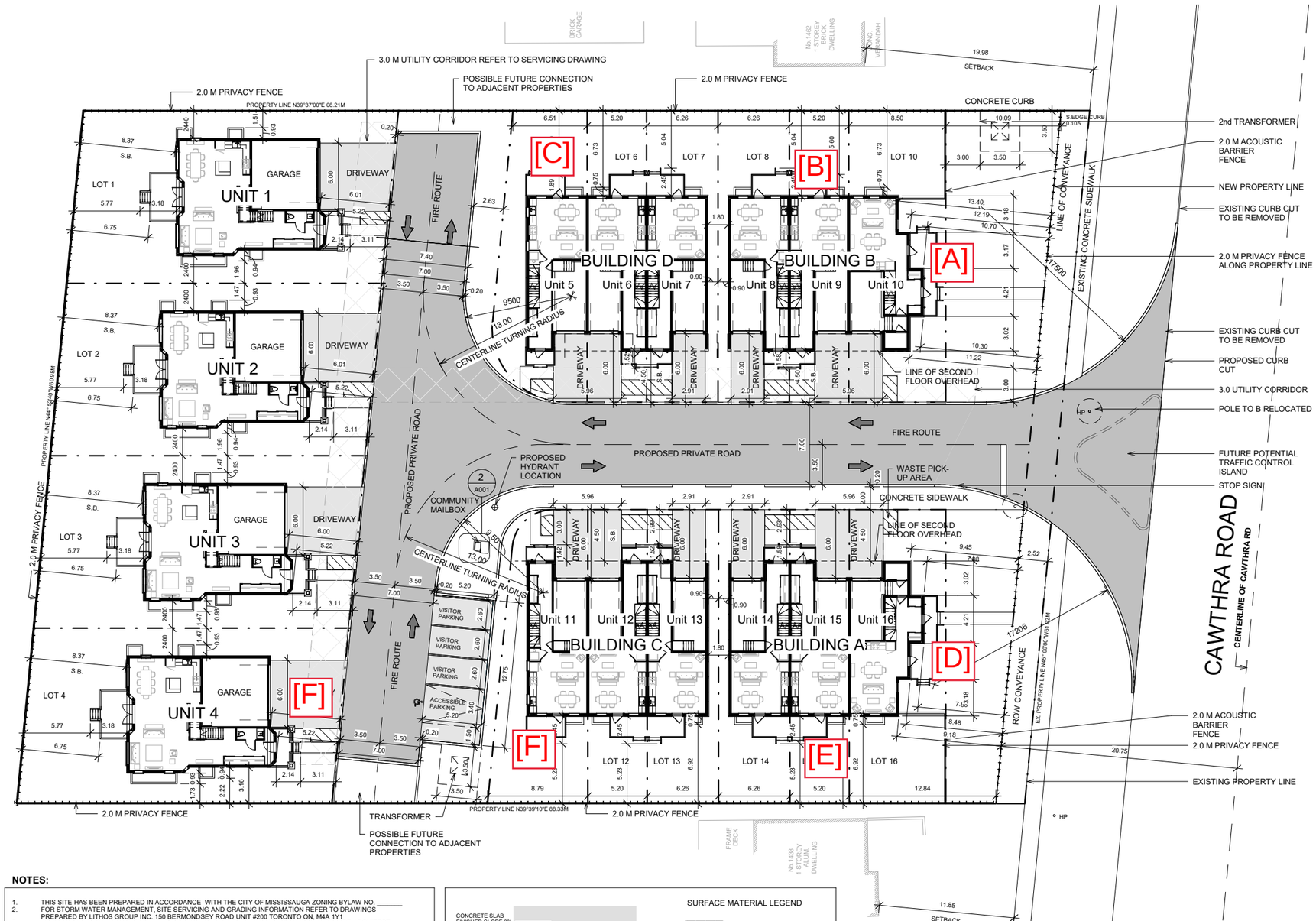


Figure 1: Key Plan



NOTES:

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3. FOR LANDSCAPE INFORMATION, REFER TO DRAWINGS PREPARED BY JOHN RUSSO LANDSCAPE ARCHITECT
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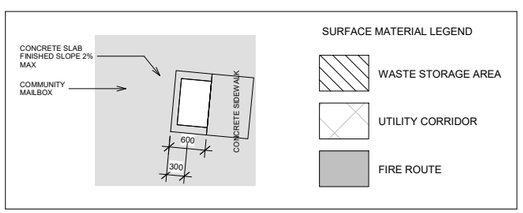


2 Community Mailbox Plan
1 : 50

Figure 2: Proposed Site Plan

1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

1	Issue to Consultants	2018.09.12
2	Issue for OP/RZ	2018.09.28
3	Issued for Review	2019.08.13

Project North

KFA architects + planners inc.

Project No:	16071
Scale:	As indicated
Date:	2017/04/05
Drawn by:	R.V.W.

Drawing Title

Site Plan

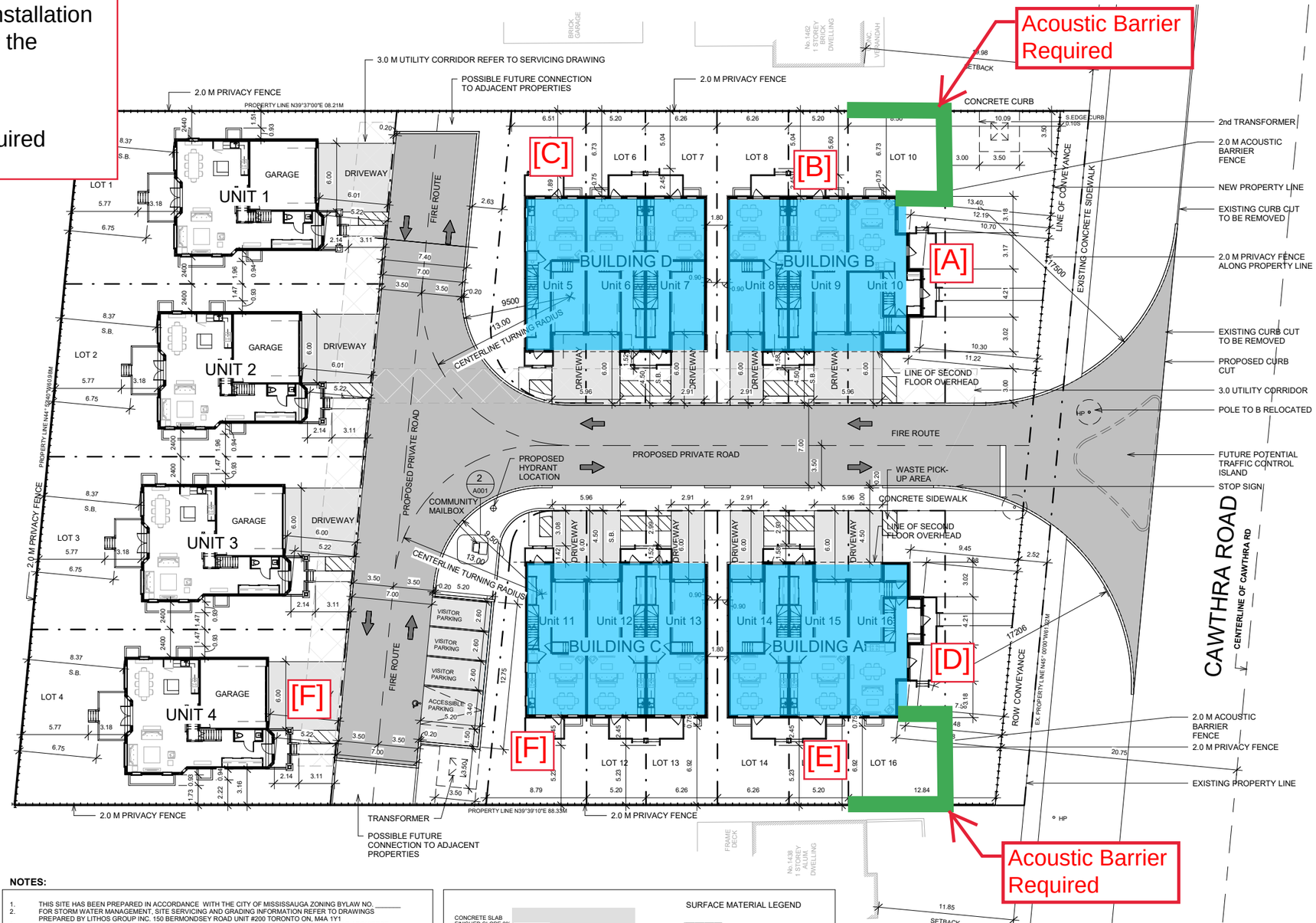
Drawing Number

A001

LEGEND

Forced air heating with ducts sized for the future installation of air conditioning by the occupant

Acoustic Barrier Required



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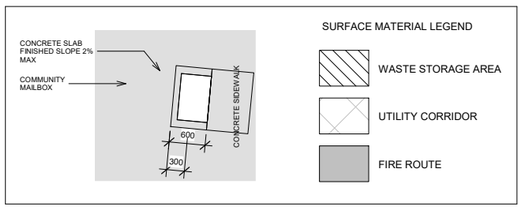

2 Community Mailbox Plan
1 : 50

Figure 3: Proposed Site Plan Showing Ventilation and Barrier Requirements

1444 - 1458

1444-1458 CAWTHRA ROAD
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Drawing Title

Site Plan

Drawing Number

A001

APPENDIX A

Supporting Documents

1 Context Plan
1 : 1000

Sheet List	
Sheet Number	Sheet Name
A000	Cover Page
A001	Site Plan
A002	Concept Plan
A003	Typical Site Details
A004	Development Statistics & Zoning Table
A100	Basement
A101	Level 1
A102	Level 2
A103	Level 3
A104	Roof Plan
A200	Block A/B Elevations
A201	Block C/D Elevations
A202	Detached Dwelling Elevations
A301	Elevations

1444 - 1458

1444-1458 CAWTHRA ROAD
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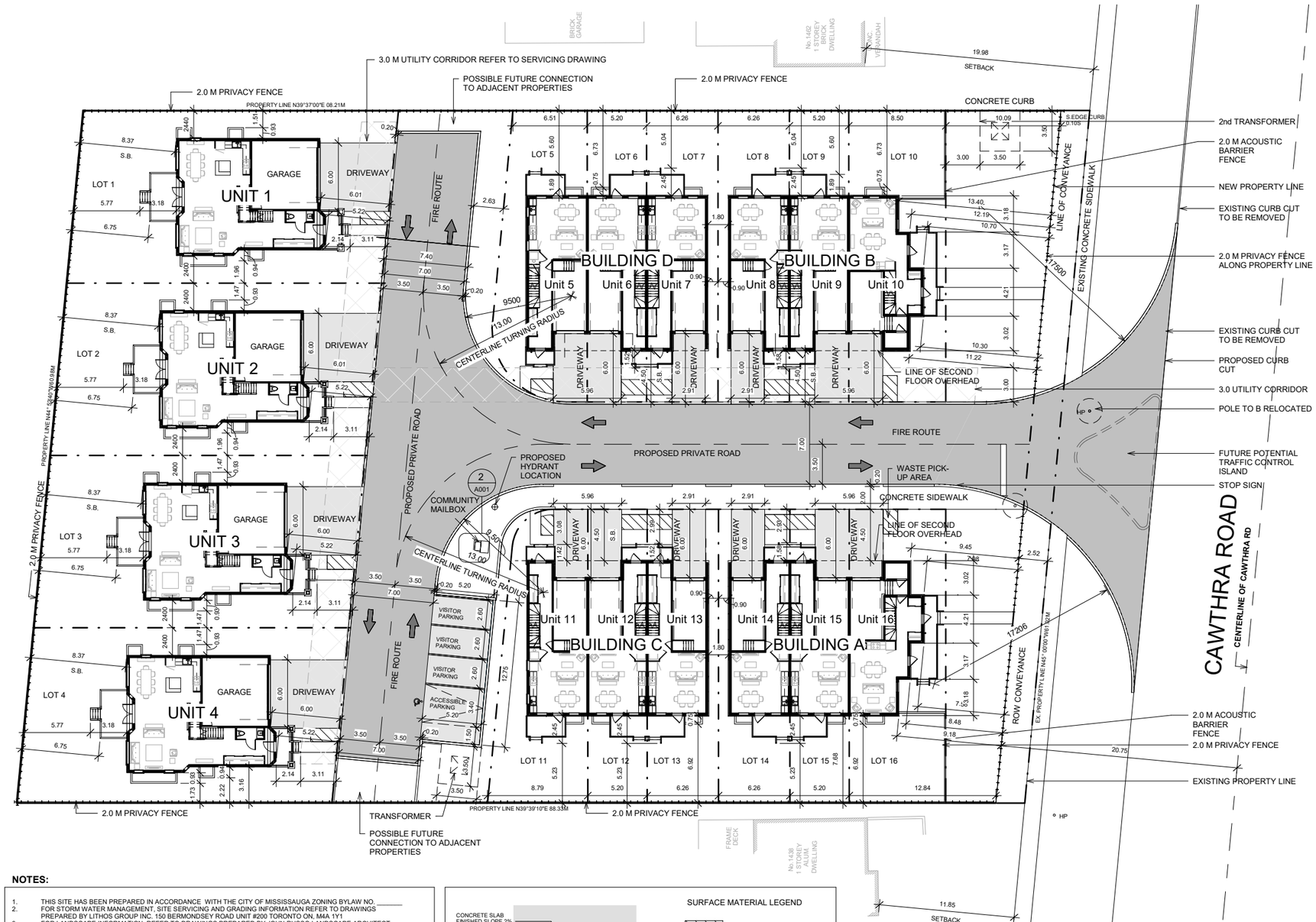
Cover Page

Drawing Number

A000



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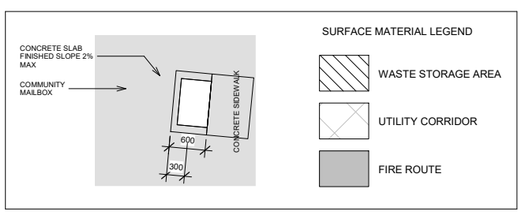

2 Community Mailbox Plan
1 : 50

1444 - 1458

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Site Plan

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A001

1444 - 1458

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Project North

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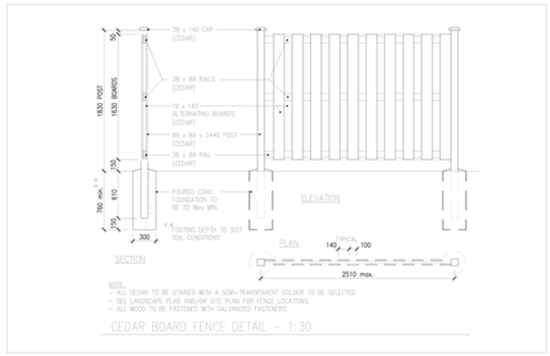
Project No:	16071
Scale:	1 : 1000
Date:	2017/04/05
Drawn by:	RT

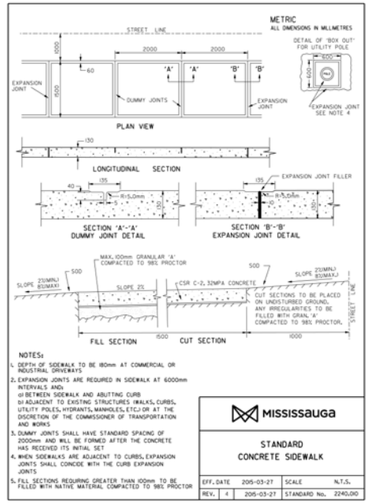
Drawing Title

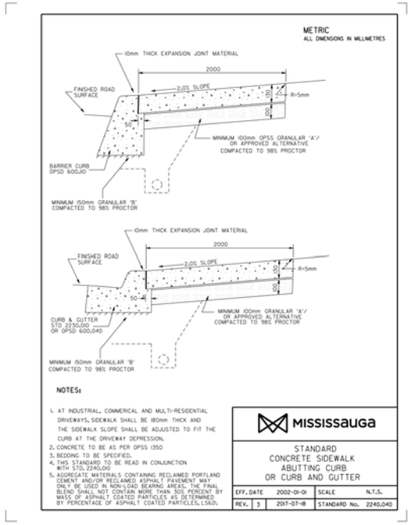
Concept Plan

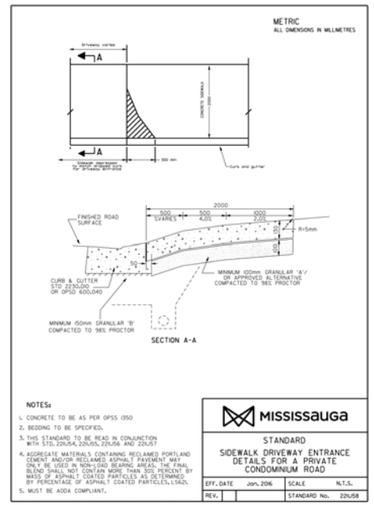
Drawing Number

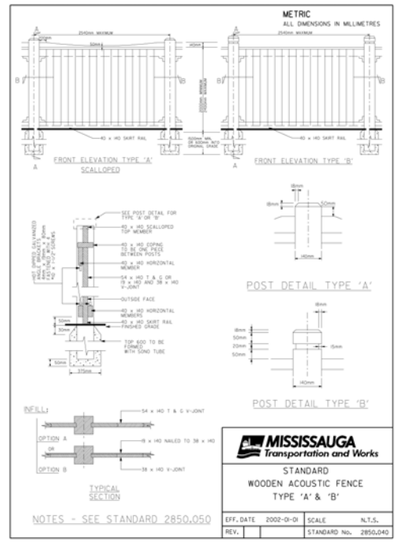
A002

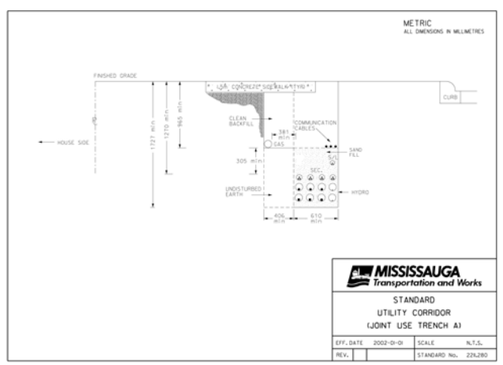


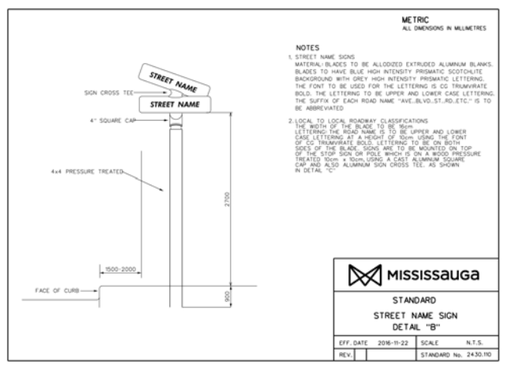


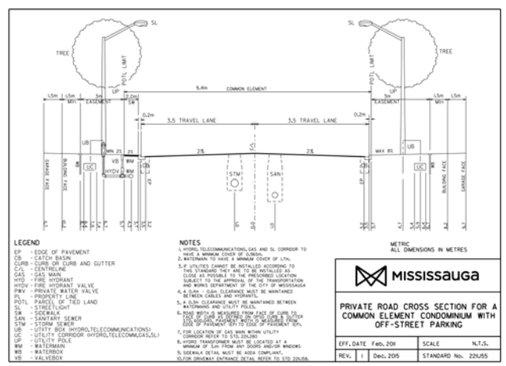










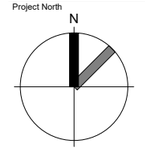


1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North



KFA architects + planners inc.

Project No:	16071
Scale:	
Date:	2017/04/05
Drawn by:	N/A

Drawing Title

Typical Site Details

Drawing Number

A003

1444-1458
CAWTHRA

KFA ARCHITECTS + PLANNERS

Date: 9-Dec-2019

Development Statistics

Site Area (a)			
m^2	sq.ft	ha	acre
4898.7	52730.8	0.49	1.21
		Units/Ha	Units/Acre
		33	13

General Development Statisitics Table	
Total Number of Units	16.0
Average Unit Size Construction Area (m^2)	252.5
Average Unit Size Construction Area (SF)	2718
Gross Construction Area (m^2)	4040.0

Zoning By-law 0225-2007	
FSI*	0.74
FSI**	0.66
Total GFA (m^2): Residential ZBL Definition*	3642
Total GFA (m^2): Infill Residential ZBL Definition**	3210

*Calculated including basement but excluding garage

**Calculated excluding Basement but including garage

Official Planning Designation: Residential Low Density II

Zoning By-law 0225-2007: R3-1

Site Area Breakdown Table (m2)	Area	
Paving	1234	25.19% of total site area
Soft Landscaping Area	1760.3	35.93% of total site area
Hard Landscape Area	232.0	4.74% of total site area
Building Area (Lot Coverage)	1672.4	34.14% of total site area

Building Heights & Setbacks (m)					
Building A	Height:	9.50	Detached Lot 1	Height:	9.00
Property Line setback:	North	4.50	Property Line setback:	North	2.44
	East	2.56		East	5.22
	South	7.68		South	2.40
	West	0.90		West	8.37
Building B	Height:	9.50	Detached Lot 2	Height:	9.00
Property Line setback:	North	7.49	Property Line setback:	North	2.40
	East	5.27		East	5.22
	South	4.50		South	2.40
	West	0.90		West	8.37
Building C	Height:	9.50	Detached Lot 3	Height:	9.00
Property Line setback:	North	4.50	Property Line setback:	North	2.40
	East	0.90		East	5.22
	South	7.68		South	2.40
	West	1.39		West	8.37
Building D	Height:	9.50	Detached Lot 4	Height:	9.00
Property Line setback:	North	7.49	Property Line setback:	North	2.40
	East	0.90		East	5.22
	South	4.50		South	2.40
	West	1.88		West	8.37

Note: Building height measured from established grade.

Residential Area Calculations by Building and Lot Number		Gross Construction Area (m2)	Garage	Basement	Gross Floor Area (m2)*	Gross Floor Area (m2)**	Unit Mix Breakdown							
							1	1+Den	2	2+Den	3	3+Den	4	4+Den
Detached Homes														
Lot 1		341.0	38.0	89.0	303.0	252.0								1
Lot 2		341.0	38.0	89.0	303.0	252.0								1
Lot 3		341.0	38.0	89.0	303.0	252.0								1
Lot 4		341.0	38.0	89.0	303.0	252.0								1
Building A														
Lot 14	Unit Type 1	224.0	20.0	40.0	204.0	184.0				1				
Lot 15	Unit Type 1	219.0	19.0	39.0	200.0	180.0				1				
Lot 16	Unit Type 2	224.0	23.0	39.0	201.0	185.0				1				
Building A Totals		**667**	**62**	**118**	**605**	**549**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
Building B														
Lot 8	Unit Type 1	224.0	20.0	40.0	204.0	184.0				1				
Lot 9	Unit Type 1	219.0	19.0	39.0	200.0	180.0				1				
Lot 10	Unit Type 2	224.0	23.0	39.0	201.0	185.0				1				
Building B Totals		**667**	**62**	**118**	**605**	**549**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
Building C														
Lot 11	Unit Type 1	225.0	21.0	40.0	204.0	185.0				1				
Lot 12	Unit Type 1	221.0	20.0	39.0	201.0	182.0				1				
Lot 13	Unit Type 1	225.0	20.0	40.0	205.0	185.0				1				
Building C Totals		**671**	**61**	**119**	**610**	**552**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
Building D														
Lot 5	Unit Type 1	225.0	21.0	40.0	204.0	185.0				1				
Lot 6	Unit Type 1	221.0	20.0	39.0	201.0	182.0				1				
Lot 7	Unit Type 1	225.0	20.0	40.0	205.0	185.0				1				
Building D Totals		**671**	**61**	**119**	**610**	**552**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
Combined Total		**4040.0**	**398.0**	**830.0**	**3642.0**	**3210.0**	**0.0**	**0.0**	**0.0**	**12.0**	**0.0**	**0.0**	**0.0**	**4.0**

1444-1458
CAWTHRA

KFA ARCHITECTS + PLANNERS — Date: December 5, 2019

ZONING TABLE

Zone Regulations	RM 6 Required	Proposed Draft ZBL (Exception)	RM6 - Townhouses												RM6 - Detached Homes			
			Building D			Building B			Building C			Building A			Lot 1	Lot 2	Lot 3	Lot 4
			Lot 5	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10	Lot 11	Lot 12	Lot 13	Lot 14	Lot 15	Lot 16				
PERMITTED USES																		
Townhouses on a CEC - road	Townhouses	Townhouses & Detached homes	Townhouses												Detached Homes			
MINIMUM LOT AREA																		
Interior lot	115 sq.m.	-	-	133.61	160.71	160.71	133.61	-		133.37	160.42	160.42	133.37	-	418.86	417.63	417.74	424.83
CLC - Corner Lot	190 sq.m.	185 sq.m.	208.29	-			-	212.77	191.27	-				231.08	-			
MINIMUM LOT FRONTAGE																		
Interior Lot	5.0 m	-		5.2 m	6.26 m	6.26 m	5.2 m	8.50 m		5.2 m	6.26 m	6.26 m	5.2 m	10.21 m	15.14	15.1	15.1	15.36
CLC - Corner Lot	8.3 m	7.0 m	8.34 m	-			-		6.64	-					-			
MINIMUM FRONT YARD																		
Interior Lot/CLC - Corner Lot	4.5 m	-	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m	5.22	5.22	5.22	5.22
Minimum setback from a garage face to a street, CLC - road or CLC - sidewalk	6.0 m	-	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.01 m	6.01 m	6.01 m	6.00 m
MINIMUM EXTERIOR SIDE YARD																		
lot with an exterior side lot line that is a street line of a designated right-of way 20.0m or greater	7.5 m	7.1 m	-					7.93 m	-					6.23 m	-			
lot with an exterior side lot line abutting a CLC – private road	4.5 m	1.4 m	1.87 m	-					1.44 m	-					-			
MINIMUM INTERIOR SIDE YARD																		
Unattached side	1.5 m	0.9 m	-	-	0.9 m	0.9 m	-	-	-	-	0.9 m	0.9 m	-	-	2.56 m	-	-	2.64 m
MAXIMUM HEIGHT	10.7 m and 3 storeys	9.5 m and 3 storeys	9.5 m and 3 storeys															
ENCROACHMENTS, PROJECTIONS AND SETBACKS																		
Maximum encroachment of a **porch or deck inclusive of stairs** located at and accessible from the first storey or below the first storey into the required **front yard and exterios side yards**	1.5 m	2.0 m	1.42 m	1.52 m	1.52 m	1.58 m	1.58 m	1.94 m	1.42 m	1.52 m	1.52 m	1.58 m	1.58 m	1.94 m	2.14 m	2.14 m	2.14 m	2.14 m
Maximum encroachment of an **awning, window, chimney, pilaster or corbel, window well, and stairs with a maximum of three risers,** into the required **front and exteior side yards**	0.6 m	1.0 m	-	-	-	-	-	-	-	-	-	-	-	-	0.93 m	-	-	0.93 m
Minimum setback of a townhouse dwelling to a CLC – visitor parking space	3.3 m	1.9 m	1.96 m	-	-	-	-	-	-	-	-	-	-	-				
ATTACHED GARAGE, PARKING AND DRIVEWAY																		
Maximum driveway width	3.0 m	6.0 m	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	6.0 m	6.0 m	6.0 m	6.0 m

1444
1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

Project North

N

KFA architects + planners inc.

Project No: 16071

Scale:

Date: 2017/04/05

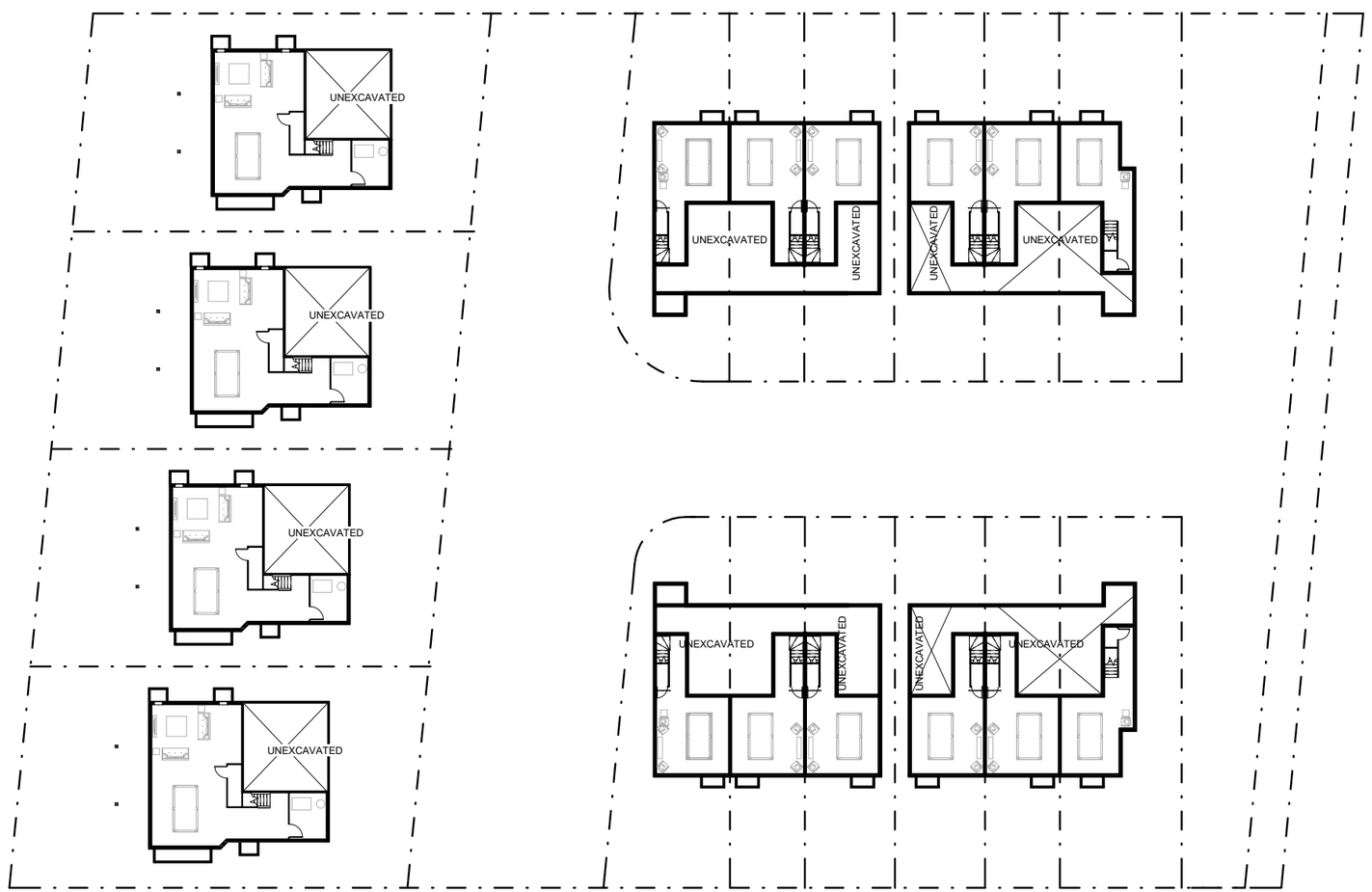
Drawn by: Author

Drawing Title

Development Statistics & Zoning Table

Drawing Number

A004



1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North

N

KFA architects + planners inc.

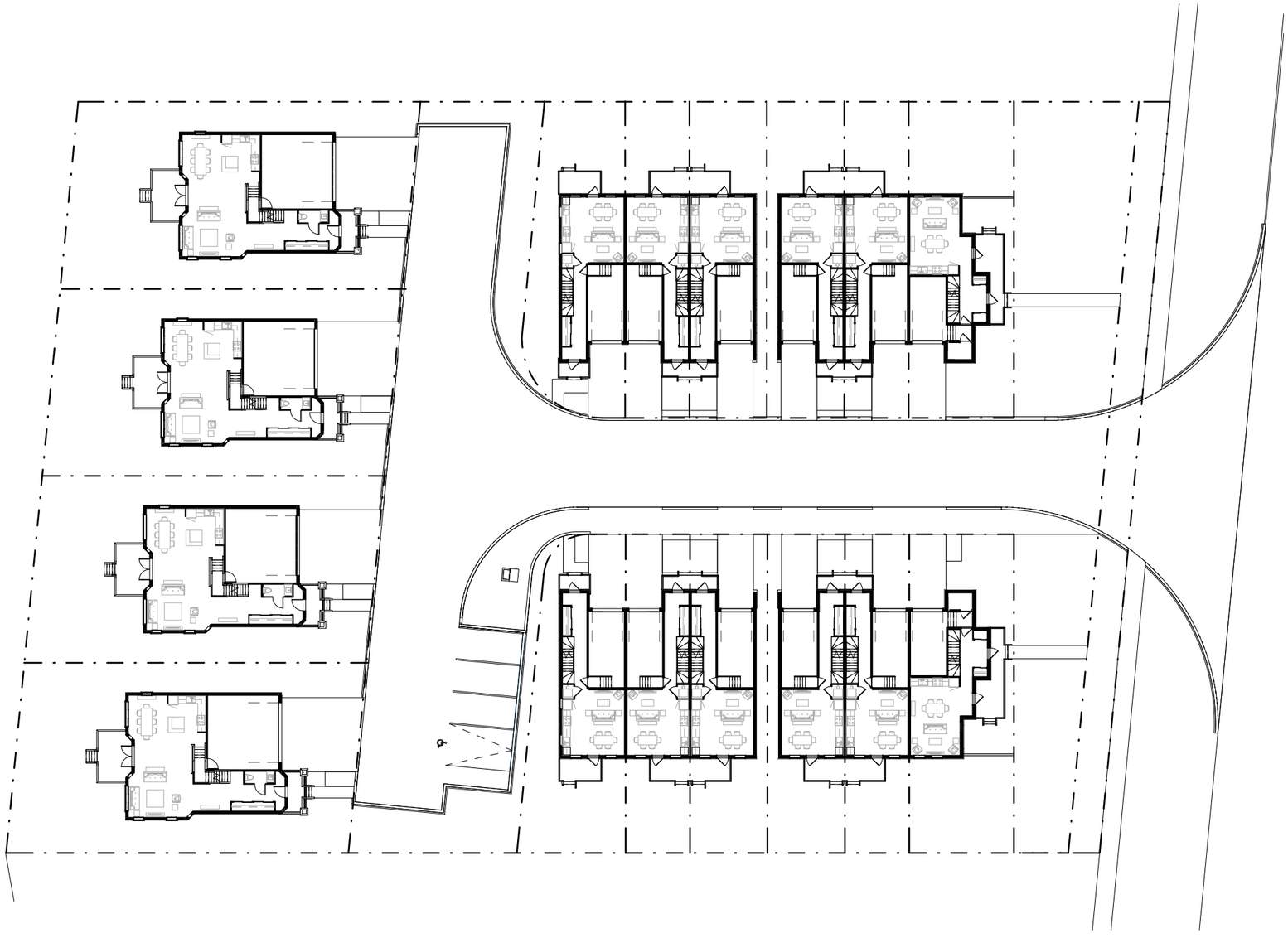
Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	RVW

Drawing Title

Basement

Drawing Number

A100



1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North

N

KFA architects + planners inc.

Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	Author

Drawing Title

Level 1

Drawing Number

A101

1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North

N

KFA architects + planners inc.

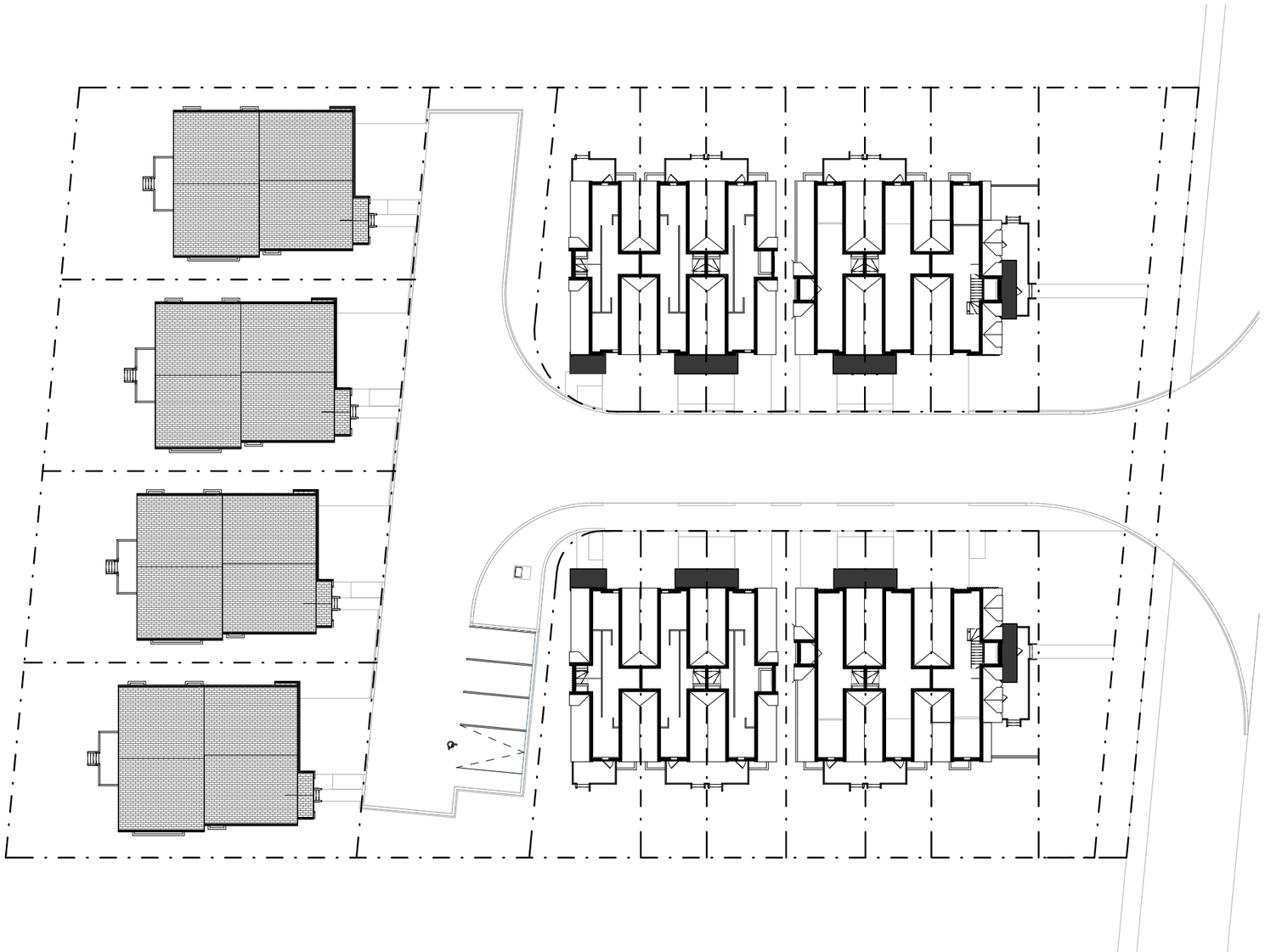
Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	Author

Drawing Title

Level 2

Drawing Number

A102



1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North

N

KFA architects + planners inc.

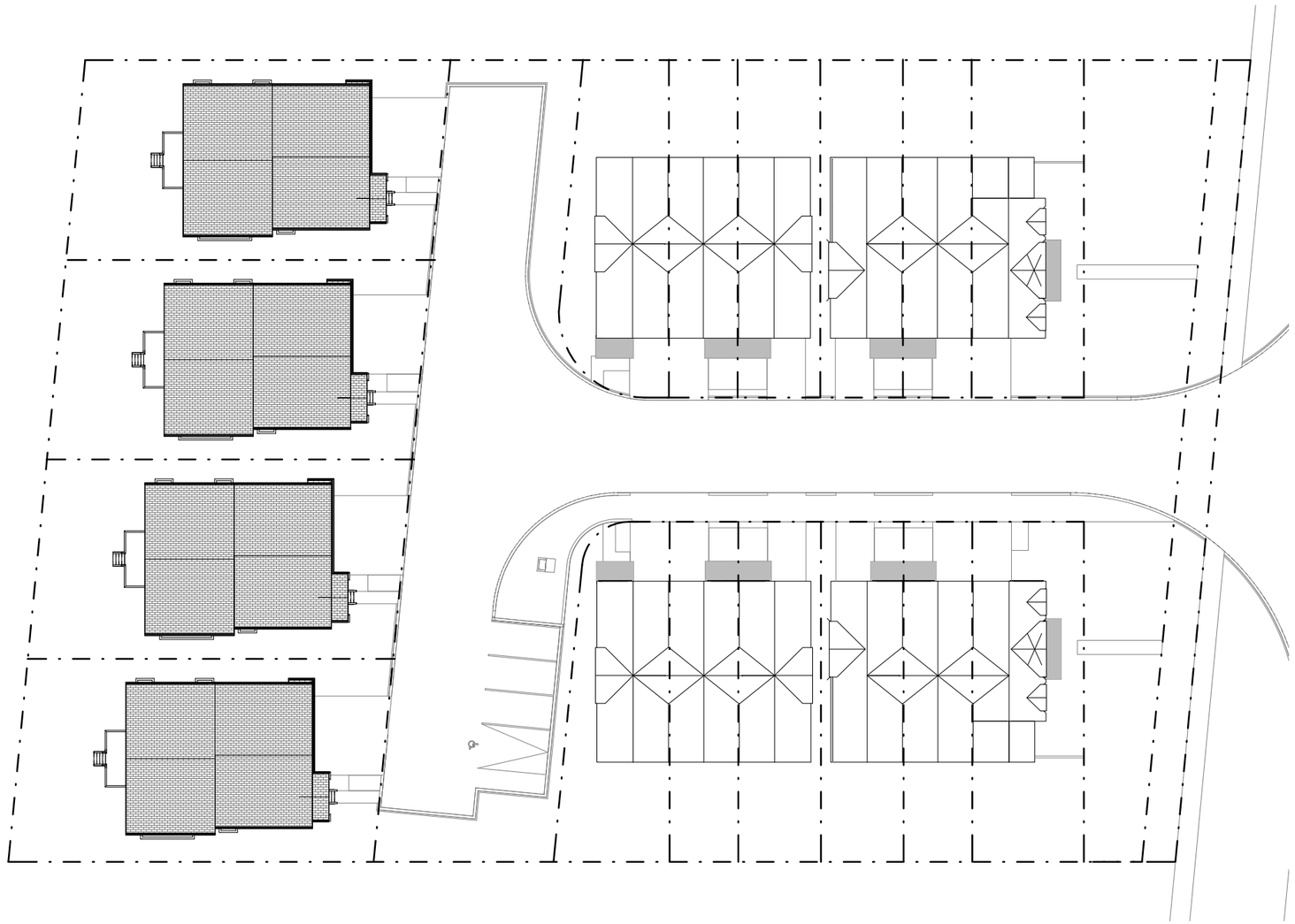
Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	Author

Drawing Title

Level 3

Drawing Number

A103



1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

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

Project North

N

KFA architects + planners inc.

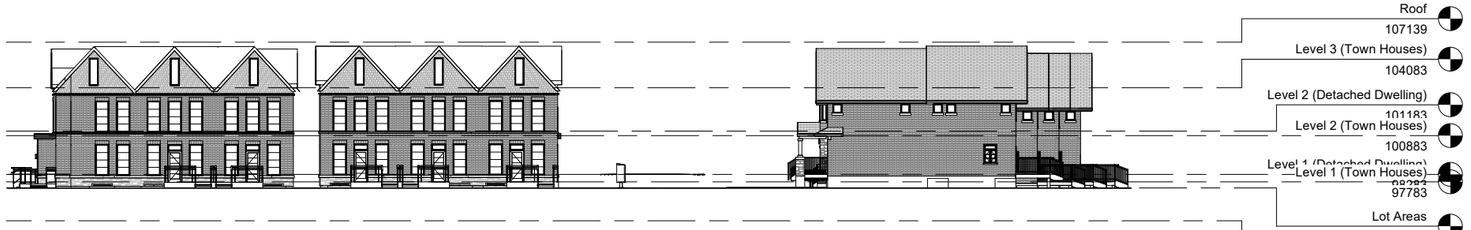
Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	Author

Drawing Title

Roof Plan

Drawing Number

A104



1 North Elevation
1 : 200

2 South Elevation
1 : 200

3 East Elevation
1 : 200

4 West Elevation
1 : 200

1444 - 1458

1444-1458 CAWTHRA ROAD
MISSISSAUGA, ON

Project North
N

KFA architects + planners inc.

Project No:	16071
Scale:	1 : 200
Date:	2017/04/05
Drawn by:	Author

Drawing Title

Elevations

Drawing Number

A301

APPENDIX B

Road Traffic Data

January 24, 2018

Joyce Guo
Project Consultant
HGC Engineering
2000 Argentia Road, Plaza One, Suite 203, Mississauga, ON, L5N 1P7

Re: Ultimate Traffic Request – Cawthra Rd at Arbor Rd

Joyce:

Per your request, we are providing the following traffic data.

Cawthra Rd 0.1 km N of Arbor St:

	Existing	Planned
24 Hour Traffic Volume	28,813	32,400
# of Lanes	4	4
Day/Night Split	90/10	90/10
Day Trucks (% of Total Volume)	0.59% Medium 2.58% Heavy	0.59% Medium 2.58% Heavy
Night Trucks (% of Total Volume)	0.82% Medium 1.39% Heavy	0.82% Medium 1.39% Heavy
Right-of-Way Width	36 meters	
Posted Speed Limit	50 km/h	

If you require further assistance, please contact me at (905) 791-7800 ext. 4810.

Regards,

Kaili Wang
Transportation Planning Engineering
Transportation Division, Public Works, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor, Brampton, ON, L6T 4B9
E: kaili.wang@peelregion.ca • W: 905-791-7800 x4810

APPENDIX C

Sample STAMSON Output

```
STAMSON 5.0        NORMAL REPORT        Date: 25-09-2018 16:07:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with flanking exposure to Cawthra Road,
Prediction Location [A].

Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  27.00 / 27.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 63.96 + 0.00) = 63.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.50  68.97   0.00  -3.83  -1.18   0.00   0.00   0.00
63.96
-------------------------------------------------------------------------
---

Segment Leq : 63.96 dBA
```

```
Total Leq All Segments: 63.96 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 57.44 + 0.00) = 57.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.50  62.45   0.00  -3.83  -1.18   0.00   0.00   0.00
57.44
-------------------------------------------------------------------------
---

Segment Leq : 57.44 dBA

Total Leq All Segments: 57.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.96
                           (NIGHT): 57.44
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 09:45:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with some exposure to Cawthra Road,
Prediction Location [B].

Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  33.00 / 33.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 59.64 + 0.00) = 59.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
     0     90   0.50  68.97   0.00  -5.14  -4.19   0.00   0.00   0.00
59.64
-------------------------------------------------------------------------
---

Segment Leq : 59.64 dBA
```

```
Total Leq All Segments: 59.64 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 53.12 + 0.00) = 53.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
     0     90   0.50  62.45   0.00  -5.14  -4.19   0.00   0.00   0.00
53.12
-------------------------------------------------------------------------
---

Segment Leq : 53.12 dBA

Total Leq All Segments: 53.12 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.64
                           (NIGHT): 53.12
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:45:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with some exposure to Cawthra Road,
Prediction Location [C].

Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  56.00 / 56.00  m
Receiver height           :   6.35 / 6.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 56.04 + 0.00) = 56.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
     0     90   0.52  68.97   0.00  -8.70  -4.23   0.00   0.00   0.00
56.04
-------------------------------------------------------------------------
---

Segment Leq : 56.04 dBA
```

```
Total Leq All Segments: 56.04 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 49.52 + 0.00) = 49.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
     0     90   0.52  62.45   0.00  -8.70  -4.23   0.00   0.00   0.00
49.52
-------------------------------------------------------------------------
---

Segment Leq : 49.52 dBA

Total Leq All Segments: 49.52 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.04
                           (NIGHT): 49.52
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:31:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with flanking exposure to Cawthra Road,
Prediction Location [D].


Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   6.35 / 6.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 64.38 + 0.00) = 64.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.52  68.97   0.00  -3.38  -1.21   0.00   0.00   0.00
64.38
-------------------------------------------------------------------------
---

Segment Leq : 64.38 dBA
```

```
Total Leq All Segments: 64.38 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 57.86 + 0.00) = 57.86 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.52  62.45   0.00  -3.38  -1.21   0.00   0.00   0.00
57.86
-------------------------------------------------------------------------
---

Segment Leq : 57.86 dBA

Total Leq All Segments: 57.86 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.38
                          (NIGHT): 57.86
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:32:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: e.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with some exposure to Cawthra Road,
Prediction Location [E].

Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   6.35 / 6.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-----------------------------------

Source height = 1.27 m

ROAD (0.00 + 60.17 + 0.00) = 60.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.52  68.97   0.00  -4.58  -4.23   0.00   0.00   0.00
60.17
-------------------------------------------------------------------------
---

Segment Leq : 60.17 dBA
```

```
Total Leq All Segments: 60.17 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 53.65 + 0.00) = 53.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.52  62.45   0.00  -4.58  -4.23   0.00   0.00   0.00
53.65
-------------------------------------------------------------------------
---

Segment Leq : 53.65 dBA

Total Leq All Segments: 53.65 Dba

TOTAL Leq FROM ALL SOURCES (DAY): 60.17
                           (NIGHT): 53.65
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:32:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: f.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with some exposure to Cawthra Road,
Prediction Location [F].

Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  52.00 / 52.00  m
Receiver height           :   6.35 / 6.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 56.53 + 0.00) = 56.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.52  68.97   0.00  -8.21  -4.23   0.00   0.00   0.00
56.53
-------------------------------------------------------------------------
---

Segment Leq : 56.53 dBA
```

```
Total Leq All Segments: 56.53 dBA
Results segment # 1: Cawthra Rd (night)
--------------------------------------

Source height = 1.27 m

ROAD (0.00 + 50.01 + 0.00) = 50.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.52  62.45   0.00  -8.21  -4.23   0.00   0.00   0.00
50.01
-------------------------------------------------------------------------
---

Segment Leq : 50.01 dBA

Total Leq All Segments: 50.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.53
                           (NIGHT): 50.01
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:33:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: g.te                 Time Period: Day/Night 16/8 hours
Description: Predicted future daytime and nighttime sound levels at the
façade of the townhouse unit with some exposure to Cawthra Road,
Prediction Location [G].


Road data, segment # 1: Cawthra Rd (day/night)
-----------------------------------------------
Car traffic volume  : 28236/3137  veh/TimePeriod  *
Medium truck volume :   172/19    veh/TimePeriod  *
Heavy truck volume  :   752/84    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  32400
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   0.59
    Heavy Truck  % of Total Volume     :   2.58
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Cawthra Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  79.00 / 79.00  m
Receiver height           :   6.35 / 6.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd (day)
-------------------------------------

Source height = 1.27 m

ROAD (0.00 + 54.38 + 0.00) = 54.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.52  68.97   0.00 -10.98  -1.21   0.00  -2.40   0.00
54.38
-------------------------------------------------------------------------
---
```

```
Segment Leq : 54.38 dBA

Total Leq All Segments: 54.38 dBA

Results segment # 1: Cawthra Rd (night)
---------------------------------------

Source height = 1.27 m

ROAD (0.00 + 47.86 + 0.00) = 47.86 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.52  62.45   0.00 -10.98  -1.21   0.00  -2.40   0.00
47.86
-------------------------------------------------------------------------
---

Segment Leq : 47.86 dBA

Total Leq All Segments: 47.86 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.38
                           (NIGHT): 47.86
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:34:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: oa.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with flanking exposure to Cawthra Road, Prediction
Location [A].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -90.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  29.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 61.93 + 0.00) = 61.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     45   0.66  68.97   0.00  -4.75  -2.29   0.00   0.00   0.00
61.93
-------------------------------------------------------------------------
---

Segment Leq : 61.93 dBA

Total Leq All Segments: 61.93 dBA

TOTAL Leq FROM ALL SOURCES:       61.93
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:35:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ob.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with some exposure to Cawthra Road, Prediction
Location [B].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -90.00 deg   20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 59.35 + 0.00) = 59.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     20   0.66  68.97   0.00  -6.31  -3.31   0.00   0.00   0.00
59.35
-------------------------------------------------------------------------
---

Segment Leq : 59.35 dBA

Total Leq All Segments: 59.35 dBA

TOTAL Leq FROM ALL SOURCES:       59.35
```

```
 STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:35:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: oc.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with some exposure to Cawthra Road, Prediction
Location [C].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -90.00 deg   12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  59.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 55.37 + 0.00) = 55.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     12   0.66  68.97   0.00  -9.87  -3.73   0.00   0.00   0.00
55.37
-------------------------------------------------------------------------
---

Segment Leq : 55.37 dBA

Total Leq All Segments: 55.37 dB

TOTAL Leq FROM ALL SOURCES:       55.37
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:36:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: od.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with flanking exposure to Cawthra Road, Prediction
Location [D].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -45.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  28.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 62.18 + 0.00) = 62.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -45     90   0.66  68.97   0.00  -4.50  -2.29   0.00   0.00   0.00
62.18
-------------------------------------------------------------------------
---

Segment Leq : 62.18 dBA

Total Leq All Segments: 62.18 dBA

TOTAL Leq FROM ALL SOURCES:       62.18
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:36:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: oe.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with some exposure to Cawthra Road, Prediction
Location [E].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -12.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 59.78 + 0.00) = 59.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -12     90   0.66  68.97   0.00  -5.46  -3.73   0.00   0.00   0.00
59.78
-------------------------------------------------------------------------
---

Segment Leq : 59.78 dBA

Total Leq All Segments: 59.78 dBA

TOTAL Leq FROM ALL SOURCES:       59.78
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:36:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: of.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with some exposure to Cawthra Road, Prediction
Location [F].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           :  -5.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  56.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 55.33 + 0.00) = 55.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
    -5     90   0.66  68.97   0.00  -9.50  -4.14   0.00   0.00   0.00
55.33
-------------------------------------------------------------------------
---

Segment Leq : 55.33 dBA

Total Leq All Segments: 55.33 dBA

TOTAL Leq FROM ALL SOURCES:       55.33
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-03-2019 10:37:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: og.te                Time Period: 16 hours
Description: Predicted future daytime sound levels at the rear yard of
the townhouse unit with some exposure to Cawthra Road, Prediction
Location [G].

Road data, segment # 1: Cawthra Rd
----------------------------------
Car traffic volume  : 28236 veh/TimePeriod  *
Medium truck volume :   172 veh/TimePeriod  *
Heavy truck volume  :   752 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Cawthra Rd
--------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  97.50 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cawthra Rd
-------------------------------

Source height = 1.27 m

ROAD (0.00 + 54.02 + 0.00) = 54.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.66  68.97   0.00 -13.49  -1.46   0.00   0.00   0.00
54.02
-------------------------------------------------------------------------
---
p
Segment Leq : 54.02 dBA

Total Leq All Segments: 54.02 dBA

TOTAL Leq FROM ALL SOURCES:       54.02
```