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Noise Feasibility Study
Proposed Mixed Use Development
16114 Airport Road
Caledon, Ontario

Prepared for:

Shacca Caledon Holding Inc.
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Prepared by

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November 26, 2020

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1 Introduction and Summary

HGC Engineering was retained by Shacca Caledon Holdings Inc. to perform a Noise Feasibility Study for a proposed mixed use development to be located at 16114 Airport Road in Caledon, Ontario. The analysis includes an assessment of traffic noise on the future residential uses and the impact of noise from the anticipated rooftop mechanical equipment associated with future commercial uses at proposed residences. This study follows the Ministry of the Environment, Conservation and Parks (MECP) guidelines with regard to noise impact.

This study is being updated to reflect the latest development concept plan prepared by Glen Schnarr & Associates Inc. dated September 9, 2020 and the grading plan prepared by Trafalgar Engineering dated September 29, 2020.

Road traffic data for Airport Road was obtained from the Region of Peel. The data was used to predict future sound levels at the proposed residences. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the Town of Caledon.

Future road traffic sound levels will exceed MECP guidelines at the closest proposed residences to Airport Road and feasible means exist to reduce the impact to within acceptable limits. Acoustic barriers are required for the rear yards of dwellings units with flanking exposure to Airport Road. Forced-air ventilation systems with ducts sized to accommodate the future installation for central air conditioning by the occupant are required for dwellings with some exposure to Airport Road. Warning clauses are also recommended in order to inform future owner/tenants of the sound level excesses and the proximity to future commercial uses.

An analysis was also conducted to determine the potential impact of noise associated with the proposed commercial buildings on the proposed residences on the development site. The analysis is based on a review of the latest development concept plan prepared by Glen Schnarr & Associates Inc. dated September 9, 2020, site visit and aerial photo. Detailed information regarding the type of rooftop units was not known at the time of the study, but reasonable estimates of the size and tonnage have been estimated based on experience with similar projects. Manufacturer’s sound data was used in the analysis to predict sound levels associated with the commercial buildings on the

adjacent sensitive receptors.

A computer model of the area was created, using acoustic modelling software, in order to predict the sound levels at the locations of adjacent sensitive proposed residential receptors. The results indicate that the sound emissions from the commercial buildings will be below the MECP sound level limits. When detailed roof plans and building elevations are available, the sound levels of the commercial buildings should be verified such that sound levels are met at the adjacent receptors.

2 Site Description and Sources of Sound

Figure 1 shows a key plan which identifies the location of the proposed mixed use development. The proposed mixed use development is located west of Airport Road and north of Walkers Road, specifically at 16114 Airport Road in Caledon, Ontario. Figure 2 shows the development concept plan prepared by Glen Schnarr & Associates Inc. dated September 9, 2020. The prediction locations are also shown in Figure 2 for reference purposes. The proposed development will include a combination of 32 residential units, one heritage house to be converted into a retail building and one proposed commercial building.

A site visit was performed in July 2016 and August 2019 to investigate the site and the surrounding land uses. Most of the subject site is currently vacant. There is one 2-storey existing heritage building on the site which will be converted into a retail building. Most of the surrounding lands are existing residential uses. Road traffic on Airport Road is the dominant noise source. There are no stationary sources of sound associated with these land uses as noted during the site visit.

For the purposes of this study, critical receptor locations were identified as the most potentially impacted future residences on the subject site. These receptors are labelled R1 through R7 on Figures 4 and 5.

For a commercial development of this nature, the sources of sound of greatest potential concern are the rooftop mechanical equipment. The rooftop HVAC units have not yet been selected. Reasonable estimates were used in the analysis along with the manufacturer’s sound level data obtained from HGC Engineering project files. Figure 4 and 5 shows the location of each assumed rooftop

mechanical unit as used in the calculations. Reasonable operational considerations are described further below.

3 Sound Level Criteria

3.1 Criteria Governing Road Traffic Noise

Guidelines for acceptable levels of road traffic 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 Road Traffic Noise Criteria (dBA)

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

Daytime refers to the period between 07:00 and 23:00, while night-time refers to the 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. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

The MECP guidelines 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 recommended to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. The Town of Caledon requires 55 dBA in the OLA's. If higher sound levels are to be achieved in the OLA's, it is the proponent's responsibility to delegate Council to seek relief from the 55 dBA requirement for the amenity areas. The maximum acoustic fence height is 2.4 m. The remainder of the acoustic barrier height can be made up with an earth berm.

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 (60 dBA or more in Region of Peel) or daytime sound levels outside bedroom or living/dining room window exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning by the occupant 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 excesses are also required when nighttime sound levels exceed 50 dBA at the plane of bedroom or living/dining room window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of bedroom or living/dining room window due to road traffic.

3.2 Criteria Governing Stationary Noise Sources

In Ontario, the guidelines of the Ontario Ministry of the Environment (MECP) form the basis of environmental noise assessment. MECP publication NPC-300, *Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning"*, release date October 21, 2013 provides criteria for assessing the noise impact of the proposed commercial facility. The term Stationary Source is used to designate all noise sources at the site including mechanical equipment, conveyances, such as trucks when they are moving within the site boundaries. The MECP guidelines assess the noise impact of fluctuating sounds on an hourly energy equivalent (average) sound level basis, rather than on short-duration maximum sound levels. Hourly equivalent sound levels are denoted as the $L_{EQ\text{-}1hr}$.

The criteria are based on the background sound level at sensitive points of reception (which are typically residences) in the quietest hour that the source can be in operation. Background sound includes sound from road traffic and natural sounds, but excludes the sources under assessment. For relatively quiet areas where background sound may fall to low levels during some hours, NPC-300

stipulates various minimum limits. In Class 1 areas, these limits are 50 dBA for daytime (07:00 to 23:00) and 45 dBA at night (23:00 to 07:00).

The MECP guidelines stipulate that the sound level impact during a "predicable worst case hour" be considered. This is defined to be an hour when a typically busy "planned and predictable mode of operation" occurs at the subject facility coincident with a period of minimal background sound.

The decision to include the sound from trucks in an assessment under MECP noise guidelines depends on the volume of trucking, and the nature of the facility. Occasional deliveries to retail stores and convenience stores are exempt, for example, but heavy trucking at a warehouse or busy shipping/receiving docks at an industry must generally be assessed. The likely activities at the proposed retail/commercial buildings may include the occasional movement of customer vehicles on the property and the infrequent delivery of goods by courier vans. Garbage collection is not considered to be a significant noise source in the MECP guidelines. It is not expected that there will be significant tractor trailer truck traffic associated with the retail/commercial units and these have not been included in the analysis.

3.3 Sound Level Criteria at the Residential Receptors

Typical ambient sound levels can be determined through prediction of road traffic volumes in areas where traffic sound is dominant. Where it can be demonstrated that the hourly ambient sound levels are greater than the exclusionary minimum limits listed above, the criterion becomes the lowest predicted one-hour L_{EQ} sound level during each respective period. At locations where the ambient sound levels are low, the exclusionary minimum criteria of 50/45 apply.

Background sound in the vicinity of the subject development is dominated by road traffic on Airport Road. It is therefore appropriate to predict hourly background sound from road traffic volumes in order to determine applicable limits for impact of stationary noise sources. However, hourly daytime traffic data was not available for Airport Road, thus the MECP minimum exclusionary limits were used as the criteria at the sensitive receptors.

Table II: Recommended Noise Level Criteria at Receptors [dBA]

Receptor	Day	Night
R1 – R7 (Proposed 3 Storey Houses)	50	45

The limits apply at any point on the residential property, and outside the residential windows.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Traffic data for Airport Road was obtained from the Region of Peel in the form of ultimate Annual Average Daily Traffic (AADT) data, and is provided in Appendix A. Commercial percentages were provided for daytime and nighttime separately. An average of the percentages were used in the analysis. A commercial vehicle percentage was split into 2.5% medium trucks and 1.67% heavy trucks. A day/night split of 76%/24% was used in the analysis along with a posted speed limit of 50 kph for the roadway in the area of the proposed development.

Table III: Ultimate Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Airport Road	Daytime	23 597	616	411	24 624
	Nighttime	7 452	194	130	7 776
	Total	**31 049**	**810**	**541**	**32 400**

4.2 Road 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 B.

Predictions of the traffic sound levels were made at various representative dwelling units. Sound levels were predicted at the façade during the daytime and nighttime hours to investigate ventilation requirements. Sound levels were also predicted in the rear yard outdoor living areas to investigate acoustic barriers. The grading plan was used to calculated acoustic barrier requirements. The results of these predictions are summarized in Table IV. The acoustic requirements may be subject to modifications if the site plan is changed significantly.

Table IV: Predicted Traffic Sound Levels [dBA]

Prediction Location	Block	Description	Outdoor Living Area $L_{EQ-16\ hr}$	Daytime – at the Façade $L_{EQ-16\ hr}$	Night-time – at the Facade $L_{EQ-8\ hr}$
[A]	1	Units flanking onto Airport Road	60	62	60
[B]	1	Units with some exposure to Airport Road	55	55	53
[C]	1	Units with some exposure to Airport Road	<55	<55	50
[D]	2	Units flanking onto Airport Road	60	62	60
[E]	2	Units with some exposure to Airport Road	55	57	55
[F]	2	Units with some exposure to Airport Road	<55	55	52
[G]	3	Units with some exposure to Airport Road	<55	52	50
[H]	--	Park Area	<55	--	--

5 Discussion and Recommendations

The predictions indicate that traffic sound levels are expected to exceed MECP limits during the daytime and nighttime hours at some of the dwelling units with exposure to Airport Road. The following discussion and recommendations are provided.

5.1 Outdoor Living Areas

The predicted sound levels in the rear yards of the dwelling units flanking onto Airport Road (prediction locations [A] and [D]) will be up to 60 dBA, 5 dBA in excess of the MECP's limit of 55 dBA. Physical mitigation is recommended. A 0.8 m high acoustic barrier atop the retaining wall indicated around the rear yard of the dwelling unit flanking onto Airport Road of Block 1 (Prediction Location [A]) will reduce the sound levels to 55 dBA. The acoustic barrier around the rear yard of this dwelling unit should connect with the existing acoustic barrier at the rear yard of the dwelling unit to the north. A 1.8 m high acoustic barrier atop the retaining wall indicated around the rear yard of the dwelling unit flanking onto Airport Road of Block 2 (Prediction Location [D]) will reduce the sound levels to 55 dBA. This is acceptable to the MECP, with the use of a noise warning clause if it

is acceptable to the municipality. The mitigated and unmitigated sound levels in these rear yards are shown in Table V below.

Table V: Mitigated and Unmitigated Sound Levels in Rear Yards[dBA]

Prediction Location	Description	Unmitigated Outdoor Living Area, $L_{EQ\text{-}16\ hr}$	Mitigated Outdoor Living Area, $L_{EQ\text{-}16\ hr}$
[A]	Units flanking onto Airport Road	60	55
[D]	Units flanking onto Airport Road	60	55

The location of the acoustic barriers is shown in Figure 3. For the remaining dwelling units, the sound levels will be 55 dBA or less, and further physical mitigation is not required. With a 0.8 m and 1.8 m high acoustic barrier along the side and rear yard of dwelling units flanking onto Airport Road of Blocks 1 and 2 (prediction location [A] and [D]), respectively, the sound levels in the rear years of the adjacent units further away from Airport Road will be less than 55 dBA. Further physical mitigation will not be required.

As a general note, acoustic barriers may be a combination of an acoustic wall and an earth berm. 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. The heights and extents of the barriers should be chosen to reduce the sound levels in the OLA's to below 60 dBA and as close to 55 dBA as is technically, administratively and economically feasible, subject to the approval of the municipality respecting any applicable fence height by-laws.

Details of the acoustic barrier typically used in the Town of Caledon are included in Appendix D.

5.2 Indoor Living Areas and Ventilation Requirements

Provision for Central Air Conditioning

The predicted future nighttime sound levels outside the plane of the bedroom windows will be between 51 and 60 dBA for the dwelling units closest to Airport Road (Prediction Locations [A], [B], [E], and [F]). To address these excesses, the MECP guidelines recommend that these dwelling units 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. 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 these units. Figure 3 shows the units requiring forced air ventilation systems.

5.3 Building Facade Constructions

The dwelling units within the development will have daytime and nighttime sound levels at the top storey façade that are less than 65 and 60 dBA respectively. For these units, any exterior wall, and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the dwelling units.

5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for the proposed residential buildings with anticipated traffic sound level excesses.

Suggested wording for future dwellings with sound levels exceeding the MECP criteria by less than 5 dBA is given below.

Type A:

> Purchasers are advised that noise levels due to increasing road traffic may continue to be of concern, occasionally interfering with some activities of the dwelling occupants.

Suggested wording for future dwellings with sound levels exceeding the MECP criteria by more than 5 dBA is given below.

Type B:

> Purchasers/tenants are advised that despite the inclusion of noise control features in this development area and within the buildings units, noise levels from increasing road traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise levels exceeds the Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria.

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

Type C:

> This dwelling unit has been fitted with a forced air heating system and the ducting etc., sized to accommodate a central air conditioning unit. Air conditioning may be installed at the owner's option and cost.

Suitable wording for dwelling units with physical mitigation installed around the rear yards is given below.

Type D:

> The acoustical berm and/or barrier as installed, shall be maintained and repaired by the owner. Any maintenance, repair or replacement shall be with the same material, or 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.

6 Assessment of Stationary Noise Sources

Source sound levels for the assumed rooftop equipment on the roof of the commercial buildings and assumed operational information (outlined below) were used as input to a predictive computer model (*Cadna-A version 2020 (MR1), build: 177.5010*), in order to estimate the sound levels from the future commercial buildings at the adjacent sensitive receptors. Cadna-A is a computer implementation of ISO Standard 9613-2.2, "Acoustics – Attenuation of Sound During Propagation Outdoors", which takes into account attenuation due to distance (geometrical spreading), shielding by intervening structures (such as buildings and bush), air attenuation and ground absorption.

The details of the rooftop units were not known at the time of this report. There may be up to 5 rooftop HVAC units on the 2-storey commercial building (converted heritage building) and 10 rooftop HVAC units on the 1-storey retail/commercial building. Future equipment on the roof of the proposed commercial buildings are also shown as crosses in Figures 4 and 5.

The following information and assumptions were used in the analysis:

- The 1-storey retail/commercial building will be 5.0 m in height and 2-storey retail building will be 8.0 m in height.
- Up to 10 rooftop HVAC units may be located on the roof of 1-storey retail/commercial building and up to 5 rooftop HVAC units may be located on the roof of 2-storey building. The rooftop equipment is assumed to be Carrier units (48PG-6, 6 tonnes each) with a sound power level of 80 dBA. Sound data for the Carrier units is attached in Appendix C. The HVAC units are assumed to be 1.5 m in height above the roof.
- Typical hours of operation for the retail/commercial buildings may be 9 am to 9 pm Monday to Friday and possibly Saturday from 10 am to 6 pm and Sunday 12 to 5 pm.
- All rooftop equipment is assumed to be operating continuously at full capacity during daytime hours and 50% duty cycle during nighttime hours.

The calculations consider the acoustical effects of distance and shielding by the building itself. The unmitigated sound levels due to the modelled rooftop mechanical equipment at the closest sensitive receptors (R1 to R7) are summarized in the following table.

Table VI: Predicted Sound Levels from the Proposed Commercial Buildings at Adjacent Sensitive Receptors [dBA], Without Mitigation

Receptor	Day	Night
R1 – Proposed 3 Storey Dwelling Unit	35	32
R2 – Proposed 3 Storey Dwelling Unit	38	35
R3 – Proposed 3 Storey Dwelling Unit	37	34
R4 – Proposed 3 Storey Dwelling Unit	35	32
R5 – Proposed 3 Storey Dwelling Unit	35	32
R6 – Proposed 3 Storey Dwelling Unit	34	31
R7 – Proposed 3 Storey Dwelling Unit	34	31

Note:
The sound level predictions at the windows were performed at 7.5 m above the grade for the third storey residences.

The predicted sound levels due to operation of rooftop mechanical equipment will be within the MECP's minimum exclusionary limits without any noise mitigation measures at the sensitive receptors during the daytime and nighttime hours.

6.1 Noise Control Recommendations

To address the proximity of the commercial buildings on the development site, the following recommendations are provided.

1. Additional Warning Clause

An additional warning clause (to those recommended in Section 5.4 to address road traffic noise) is recommended to notify future residents of the presence of the proposed retail/commercial buildings and is provided below.

Type C:

> Purchasers are advised of the proximity of adjacent commercial, retail and office facilities, the sound from which may at times be audible.

7 Summary and Recommendations

Sound levels due to road traffic will exceed MECP guidelines at the proposed mixed use development. The following recommendations are provided with regard to noise mitigation.

For Transportation noise sources

1. Acoustic barriers are recommended for the rear yards of the units flanking onto Airport Road.

2. Forced air ventilation systems with ductwork sized for future installation of central air conditioning by the occupant will be required for dwelling units with some exposure to Airport Road. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.

For Stationary noise sources

1. The mechanical equipment selections and the source sound level specifications for the HVAC units must conform to the recommendations and assumptions contained in this report.

2. When further details of roof plans and the mechanical equipment selections are available for each commercial building, an acoustical engineer should verify that the source sound level specifications and locations for the HVAC units conform to the assumptions made in this report and that acceptable sound levels will result at all offsite residential receptors.

3. If additional rooftop mechanical units associated with a specific tenancy or refrigerated trucks for deliveries are to be used, a further noise analysis should be performed to determine their impact at off-site residential receptors, which may result in the requirement for rooftop acoustic screens, parapets or wing walls or enclosed loading areas.

8 Implementation

To ensure that the noise control recommendations outlined above are properly included in the building design and properly implemented in the final construction, it is recommended that:

1) Prior to the issuance of occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to provide acoustical engineering services in the Province of Ontario to certify that the noise control measures for the dwellings units have been properly incorporated, installed and constructed.

Figure 1: Key Plan

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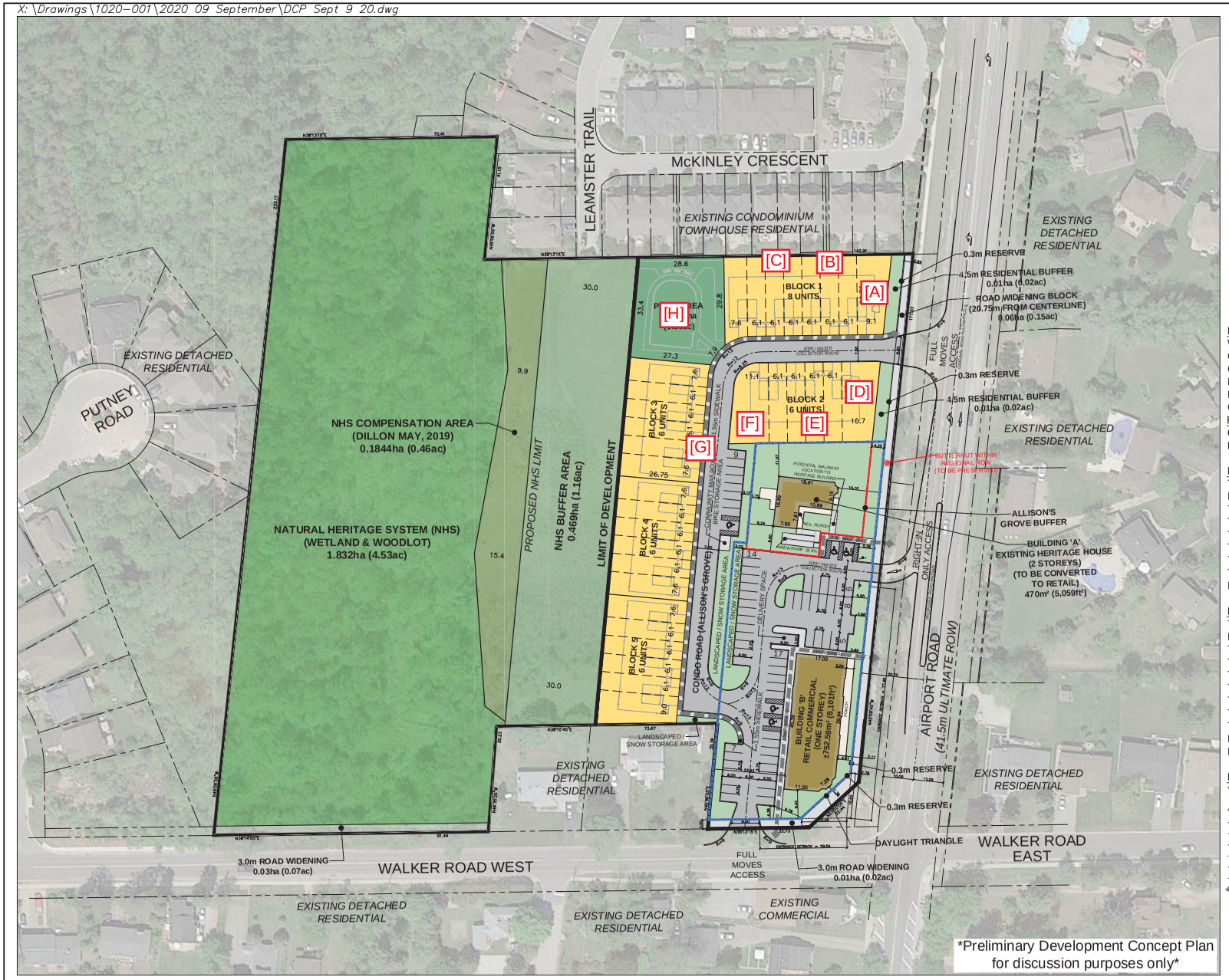

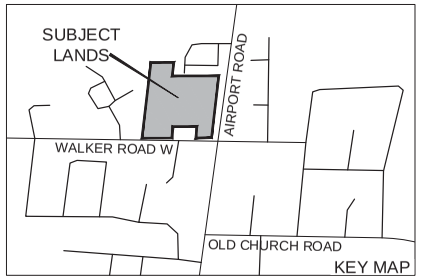

DEVELOPMENT CONCEPT PLAN
SHACCA CALEDON HOLDINGS INC.

16114 AIRPORT ROAD
PART 1, PLAN OF PART OF LOT 4, CONCESSION 6, E.H.S.
TOWN OF CALEDON, REGION OF PEEL

Development Statistics - Total Site

Wetland / Woodlot	1.832ha (4.53ac)
Compensation Area:	0.1844ha (0.46ac)
Compensation Area Buffer:	0.469ha (1.16ac)
Potential Park:	0.1037ha (0.26ac)
Net Residential Area^:	0.842ha (2.08ac)
Commercial Area:	0.555ha (1.37ac)
Road Widening & 0.3m Reserve:	0.10ha (0.25ac)
Gross Site Area:	**4.09ha (10.11ac)**
Net Site Area*:	**1.50ha (3.71ac)**

Development Statistics - 6.1m Condo Townhouse Residential

Total Units:	32 Units
Net Residential Density:	32 Units / 0.842ha = 38.0UPH
Total Visitor Parking:	9 Spaces (0.28 per unit)
Total Landscaped / Snow Storage:	361m²
Total Hard Surface (HS) Area:	1,836m²
Total Snow Storage % of HS Area:	19.7%
Total Parkland Dedication required:	0.042ha (5%)
Total Parkland Dedication provided:	0.1037ha (12%)
Building Coverage:	35.7%

Development Statistics - Retail Commercial (Buildings A & B)

Total GFA:	1,222.59m² (13,160ft²)
Building Coverage:	17.8%
Total Landscaped / Snow Storage:	620m²
Total Hard Surface (HS) Area:	2,580m²
Total Snow Storage % of HS Area:	24.0%
Total Parking Required:	62 Spaces *(1 space per 20m²)*
Total Parking Provided:	59 Spaces
Total Barrier Free Parking Required:	3 *(2 Type 'A' ; 1 Type 'B')*
Total Barrier Free Parking Provided:	4 *(2 Type 'A' ; 2 Type 'B')*
Delivery Spaces Required:	1
Delivery Spaces Provided:	1

Notes:

*	Net Site Area only includes: Net Residential Area, Commercial & Potential Park
^	Net Residential Area includes 4.5m Residential Buffers
-	Typical Parking Space: 2.75m x 6.0m
-	Typical Type 'A' Barrier Free Space: 3.4m x 6.0m
-	Typical Type 'B' Barrier Free Space: 2.75m x 6.0m
-	Typical Barrier Free Aisle: 1.5m x 6.0m
-	Typical Delivery Space: 3.5m x 9.0m
-	Wetland / Woodlot constraint information provided by Dillon Consulting
⇔	Denotes pedestrian circulation

Scale 1:1250
September 9, 2020

GSAI
Glen Schnarr & Associates Inc.

Figure 2: Proposed Concept Plan Showing Prediction Locations

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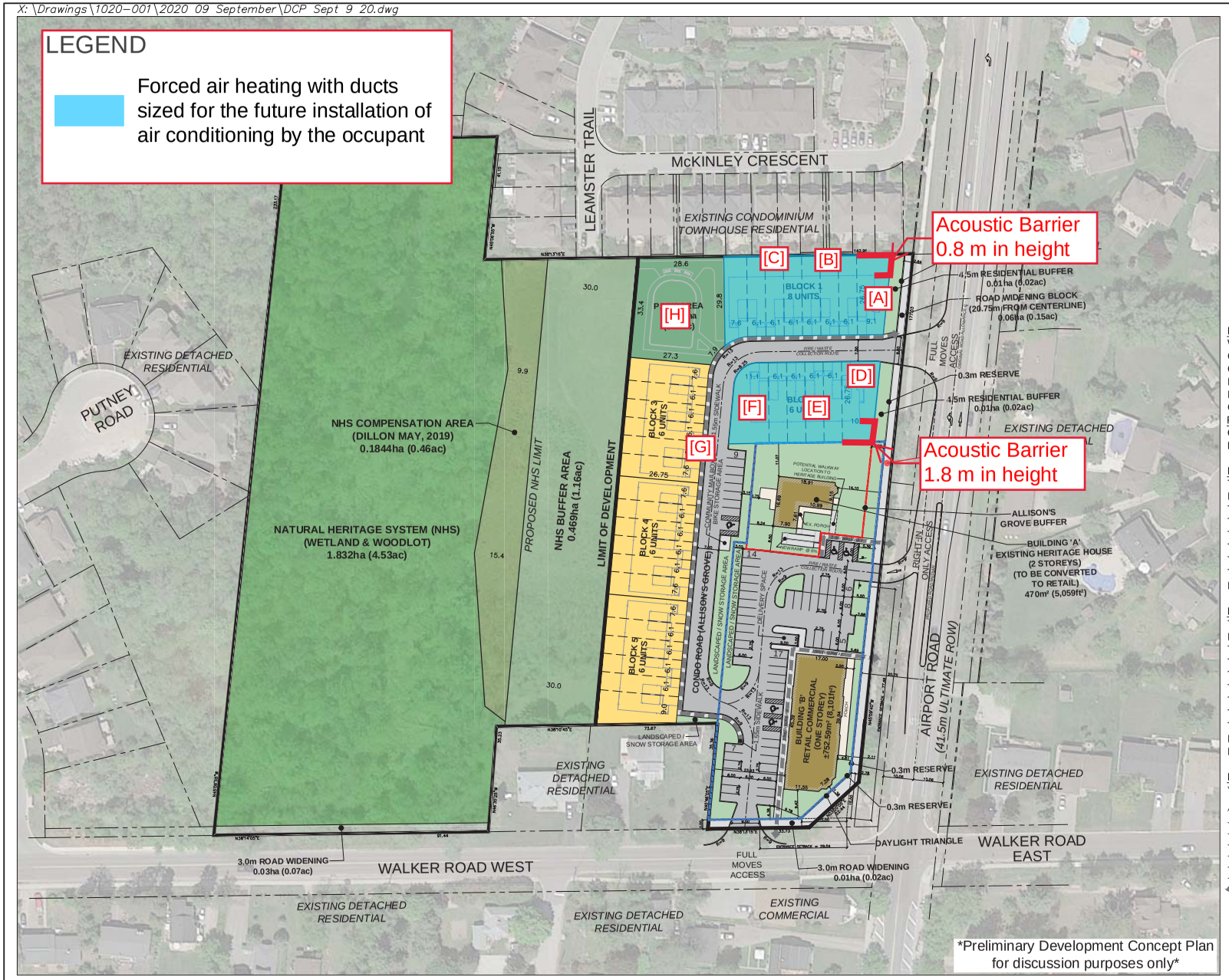
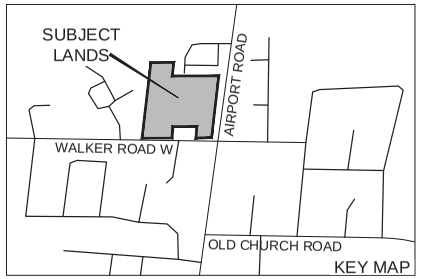




DEVELOPMENT CONCEPT PLAN
SHACCA CALEDON HOLDINGS INC.

16114 AIRPORT ROAD
PART 1, PLAN OF PART OF LOT 4, CONCESSION 6, E.H.S.
TOWN OF CALEDON, REGION OF PEEL

Development Statistics - Total Site

Wetland / Woodlot	1.832ha (4.53ac)
Compensation Area:	0.1844ha (0.46ac)
Compensation Area Buffer:	0.469ha (1.16ac)
Potential Park:	0.1037ha (0.26ac)
Net Residential Area^:	0.842ha (2.08ac)
Commercial Area:	0.555ha (1.37ac)
Road Widening & 0.3m Reserve:	0.10ha (0.25ac)
Gross Site Area:	**4.09ha (10.11ac)**
Net Site Area*:	**1.50ha (3.71ac)**

Development Statistics - 6.1m Condo Townhouse Residential

Total Units:	32 Units
Net Residential Density:	32 Units / 0.842ha = 38.0UPH
Total Visitor Parking:	9 Spaces (0.28 per unit)
Total Landscaped / Snow Storage:	361m²
Total Hard Surface (HS) Area:	1,836m²
Total Snow Storage % of HS Area:	19.7%
Total Parkland Dedication required:	0.042ha (5%)
Total Parkland Dedication provided:	0.1037ha (12%)
Building Coverage:	35.7%

Development Statistics - Retail Commercial (Buildings A & B)

Total GFA:	1,222.59m² (13,160ft²)
Building Coverage:	17.8%
Total Landscaped / Snow Storage:	620m²
Total Hard Surface (HS) Area:	2,580m²
Total Snow Storage % of HS Area:	24.0%
Total Parking Required:	62 Spaces *(1 space per 20m²)*
Total Parking Provided:	59 Spaces
Total Barrier Free Parking Required:	3 *(2 Type 'A' ; 1 Type 'B')*
Total Barrier Free Parking Provided:	4 *(2 Type 'A' ; 2 Type 'B')*
Delivery Spaces Required:	1
Delivery Spaces Provided:	1

Notes:

* Net Site Area only includes: Net Residential Area, Commercial & Potential Park
^ Net Residential Area includes 4.5m Residential Buffers
- Typical Parking Space: 2.75m x 6.0m
- Typical Type 'A' Barrier Free Space: 3.4m x 6.0m
- Typical Type 'B' Barrier Free Space: 2.75m x 6.0m
- Typical Barrier Free Aisle: 1.5m x 6.0m
- Typical Delivery Space: 3.5m x 9.0m
- Wetland / Woodlot constraint information provided by Dillon Consulting
- Denotes pedestrian circulation

Scale 1:1250
September 9, 2020

GSAI Glen Schnarr & Associates Inc.

Figure 3: Proposed Concept Plan Showing Barrier and Ventilation Requirements

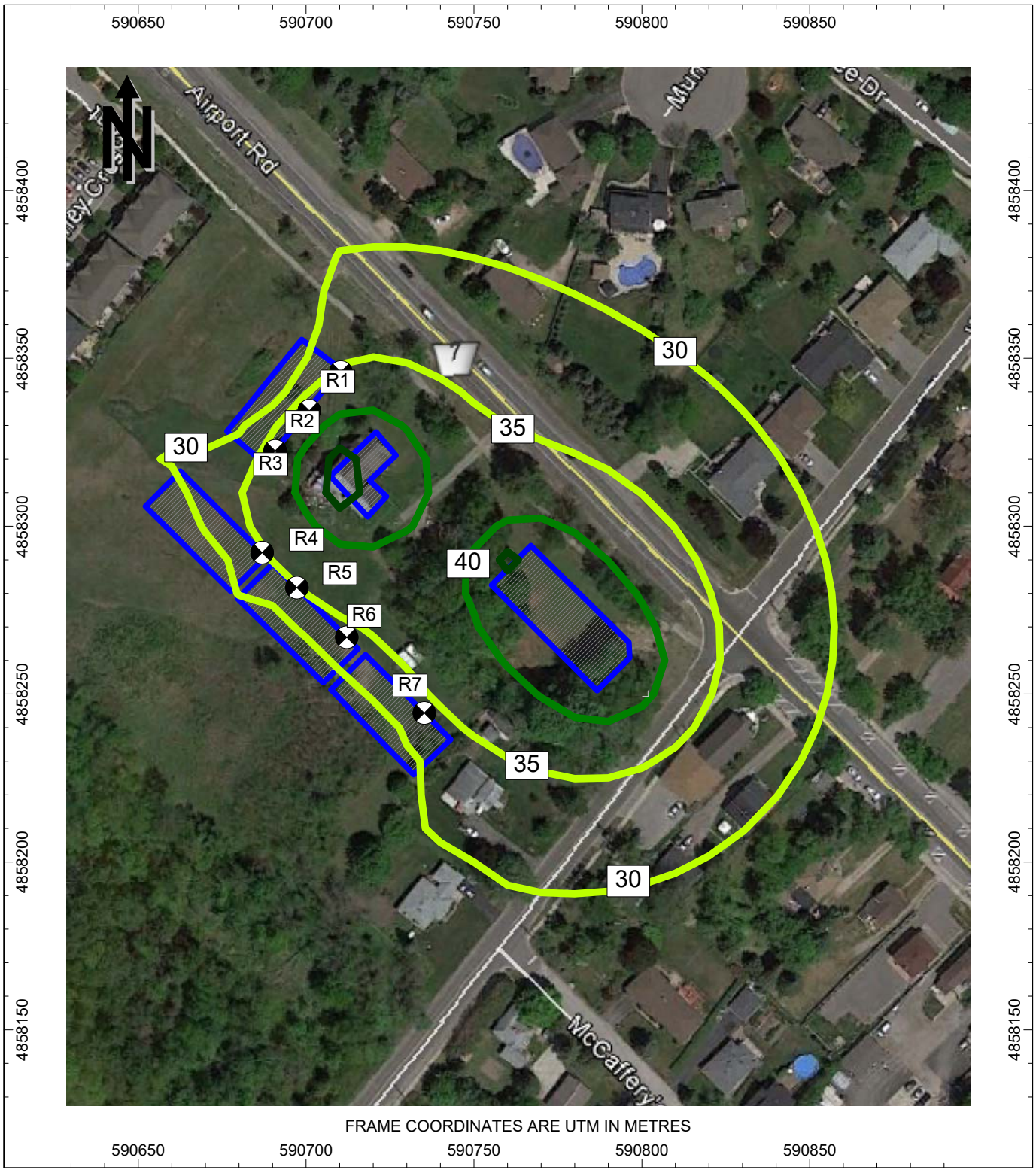


Figure 4: Predicted Daytime Sound Level Contours at 7.5 m Height, dBA

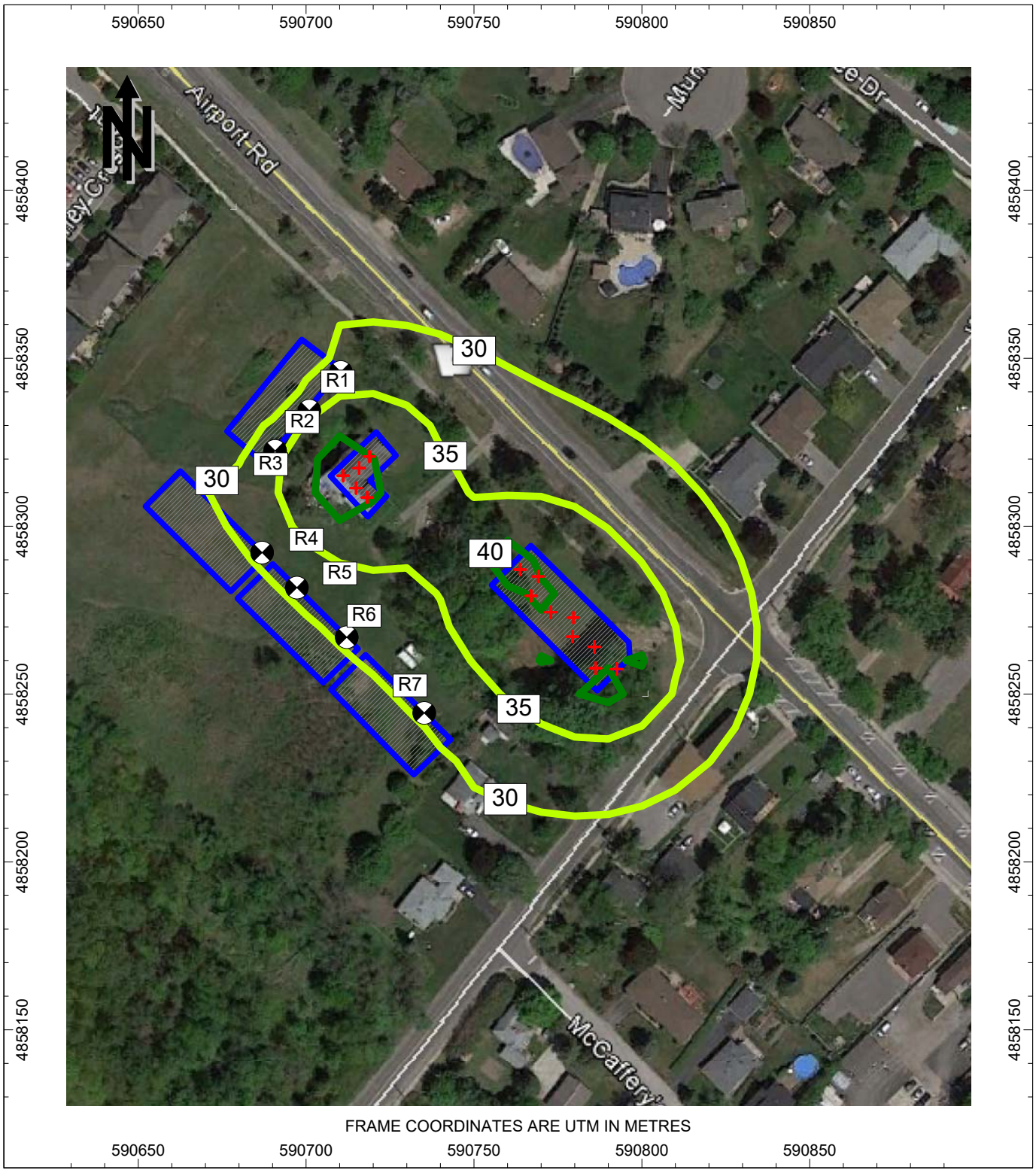


Figure 5: Predicted Nighttime Sound Level Contours at 7.5 m Height, dBA

APPENDIX A

Road Traffic Data

August 2, 2016

Rajjot Arora
HGC Engineering
Re: Road Traffic Data Request
16114 Airport Road
Town of Caledon

Rajjot:

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

	Existing	Planned
24 Hour Traffic Volume	9,375	32,400
# of Lanes	2	5
Day/Night Split	76%/24%	76%/24%
Day Trucks (% of Total Volume)	1.55% Medium 1.68% Heavy	1.55% Medium 1.68% Heavy
Night Trucks (% of Total Volume)	2.50% Medium 1.67% Heavy	2.50% Medium 1.67% Heavy
Right-of-Way Width	36 metres	
Posted Speed Limit	50 km/h	

If you require further assistance, please contact me at (905) 791-7800 ext. 4549.

Regards,

Gordon Hui, EIT
Planner, Transportation Planning Engineering
Transportation Division, Public Works, Region of Peel

10 Peel Centre Drive, Suite B, 4th Floor, Brampton, ON, L6T 4B9
E: Gordon.hui@peelregion.ca • W: 905-791-7800 x4549 • C: 416-845-5172

APPENDIX B

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 30-08-2019 11:57:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: loca.te Time Period: Day/Night 16/8 hours
Description: **Predicted daytime and nighttime sound levels at the top storey façades of the proposed dwelling units, prediction location [A].**

Road data, segment # 1: Airport (day/night)

Car traffic volume : 23597/7452 veh/TimePeriod *
Medium truck volume : 616/194 veh/TimePeriod *
Heavy truck volume : 411/130 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 : 2.50
Heavy Truck % of Total Volume : 1.67
Day (16 hrs) % of Total Volume : 76.00

Data for Segment # 1: Airport (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 : 30.00 / 30.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Airport (day)

Source height = 1.14 m

ROAD (0.00 + 62.08 + 0.00) = 62.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.49	67.72	0.00	-4.49	-1.16	0.00	0.00	0.00	62.08

Segment Leq : 62.08 dBA

Total Leq All Segments: 62.08 dBA

```
Results segment # 1: Airport (night)
------------------------------------

Source height = 1.14 m

ROAD (0.00 + 60.08 + 0.00) = 60.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.49  65.73   0.00  -4.49  -1.16   0.00   0.00   0.00
60.08
-------------------------------------------------------------------------
---

Segment Leq : 60.08 dBA

Total Leq All Segments: 60.08 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.08
                           (NIGHT): 60.08
```

```
STAMSON 5.0        NORMAL REPORT        Date: 05-10-2020 09:38:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: olaa.te              Time Period: 16 hours
Description: Daytime sound level in the flanking OLA, prediction location
[A], with mitigation.

Road data, segment # 1: Airport
------------------------------
Car traffic volume  : 23597 veh/TimePeriod  *
Medium truck volume :   616 veh/TimePeriod  *
Heavy truck volume  :   411 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Airport
------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  33.00 m
Receiver height           :   1.50 m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   0.80 m
Barrier receiver distance :   7.50 m
Source elevation          : 295.50 m
Receiver elevation        : 295.00 m
Barrier elevation         : 296.22 m
Reference angle           :   0.00

Road data, segment # 2: Airport
------------------------------
Car traffic volume  : 23597 veh/TimePeriod  *
Medium truck volume :   616 veh/TimePeriod  *
Heavy truck volume  :   411 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Airport
------------------------------
Angle1   Angle2           : -10.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  33.00 m
Receiver height           :   1.50 m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 45.00 deg
```

```
Barrier height            :   0.80 m
Barrier receiver distance :   7.50 m
Source elevation          : 295.50 m
Receiver elevation        : 295.00 m
Barrier elevation         : 295.76 m
Reference angle           :   0.00

Results segment # 1: Airport
----------------------------

Source height = 1.14 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.14 !        1.50 !        0.31 !       296.53

ROAD (0.00 + 51.44 + 0.00) = 51.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
---
   -90    -10   0.62  67.72   0.00  -5.56  -5.12   0.00   0.00  -5.60
51.44
-------------------------------------------------------------------------------
---

Segment Leq : 51.44 dBA

Results segment # 2: Airport
----------------------------

Source height = 1.14 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.14 !        1.50 !        0.77 !       296.53

ROAD (0.00 + 51.77 + 0.00) = 51.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
---
   -10     45   0.62  67.72   0.00  -5.56  -5.39   0.00   0.00  -5.00
51.77
-------------------------------------------------------------------------------
---

Segment Leq : 51.77 dBA
```

```
Total Leq All Segments: 54.62 dBA

TOTAL Leq FROM ALL SOURCES:       54.62
```

APPENDIX C

Manufacturer's Sound Data

48PG03–14
Ultra High Efficiency Single Package Gas Heating/Electric Cooling Commercial Rooftop Units with PURON® (R–410A) Refrigerant
2 to 12.5 Nominal Tons

Carrier
turn to the experts

Product Data

CENTURION

DEALER DESIGN AWARDS
theNEWS | GOLD

BUILDINGS magazine
Editors' Choice
TOP 100 PRODUCTS
2005

Puron
the environmentally sound refrigerant

Printed in U.S.A. Edition Date: 09/10

Catalog No:48PG–06PD

Replaces: 48PG–5PD

OPERATION AIR QUANTITY LIMITS

48PG03-14 Vertical and Horizontal Units

UNIT 48PG	COOLING (cfm)		HEATING (cfm)*	
	Min	Max	Min	Max
03	600	1000	600	1680
04 (Low Heat)	900	1500	600	1680
04 (Med Heat)	900	1500	940	2810
04 (High Heat)	900	1500	1130	2820
05 (Low Heat)	1200	2000	600	1680
05 (Med Heat)	1200	2000	940	2810
05 (High Heat)	1200	2000	1130	2820
06 (Low Heat)	1500	2500	940	2810
06 (Med Heat)	1500	2500	1130	2820
06 (High Heat)	1500	2500	1510	2520
07 (Low Heat)	1800	3000	940	2810
07 (Med Heat)	1800	3000	1130	2820
07 (High Heat)	1800	3000	1510	2520
08 (Low Heat)	2250	3750	2060	5160
08 (Med Heat)	2250	3750	2110	6870
08 (High Heat)	2250	3750	2450	4900
09 (Low Heat)	2550	4250	2060	5160
09 (Med Heat)	2550	4250	2110	6870
09 (High Heat)	2550	4250	2450	4900
12 (Low Heat)	3000	5000	2110	6870
12 (Med Heat)	3000	5000	2450	4900
12 (High Heat)	3000	5000	3150	6300
14 (Low Heat)	3750	6250	2110	6870
14 (Med Heat)	3750	6250	2450	4900
14 (High Heat)	3750	6250	3150	6300

*Consult tables on pages 8 and 9 if using a stainless steel heat exchanger.

Outdoor Sound Power (Total Unit)

UNIT 48PG	A−WEIGHTED* (dB)	OCTAVE BAND LEVELS dB							
		63	125	250	500	1000	2000	4000	8000
03	75.0	82.6	79.9	75.7	73.3	70.0	64.3	58.4	50.5
04	73.2	79.8	77.2	74.1	70.1	68.0	63.6	58.4	51.9
05	71.9	79.7	79.6	72.6	69.6	66.0	61.4	56.4	48.5
06	78.5	82.2	82.6	79.5	75.7	73.9	68.6	64.0	56.3
07	78.5	87.5	83.0	78.5	76.3	73.8	68.4	63.8	56.5
08	80.0	91.7	83.6	81.0	77.9	75.0	69.9	66.0	59.3
09	79.9	89.1	82.7	80.0	77.7	75.0	70.2	66.3	57.8
12	80.0	90.4	83.1	80.9	77.8	75.2	70.0	66.1	57.6
14	83.3	86.4	85.9	85.3	81.8	78.2	72.2	67.9	59.9

LEGEND

dB − Decibel

***** Sound Rating AHRI or tone Adjusted, A−Weighted Sound Power Level in dB. For sizes 03−12, the sound rating is in accordance with AHRI Standard 270−1995. For sizes 14, the sound rating is in accordance with AHRI 370−2010.

APPENDIX D

Acoustic Barrier Details

HOMELAND VINYL FENCING MODEL F202 (or approved equal)

MATERIAL SPECIFICATIONS

Vinyl Covers

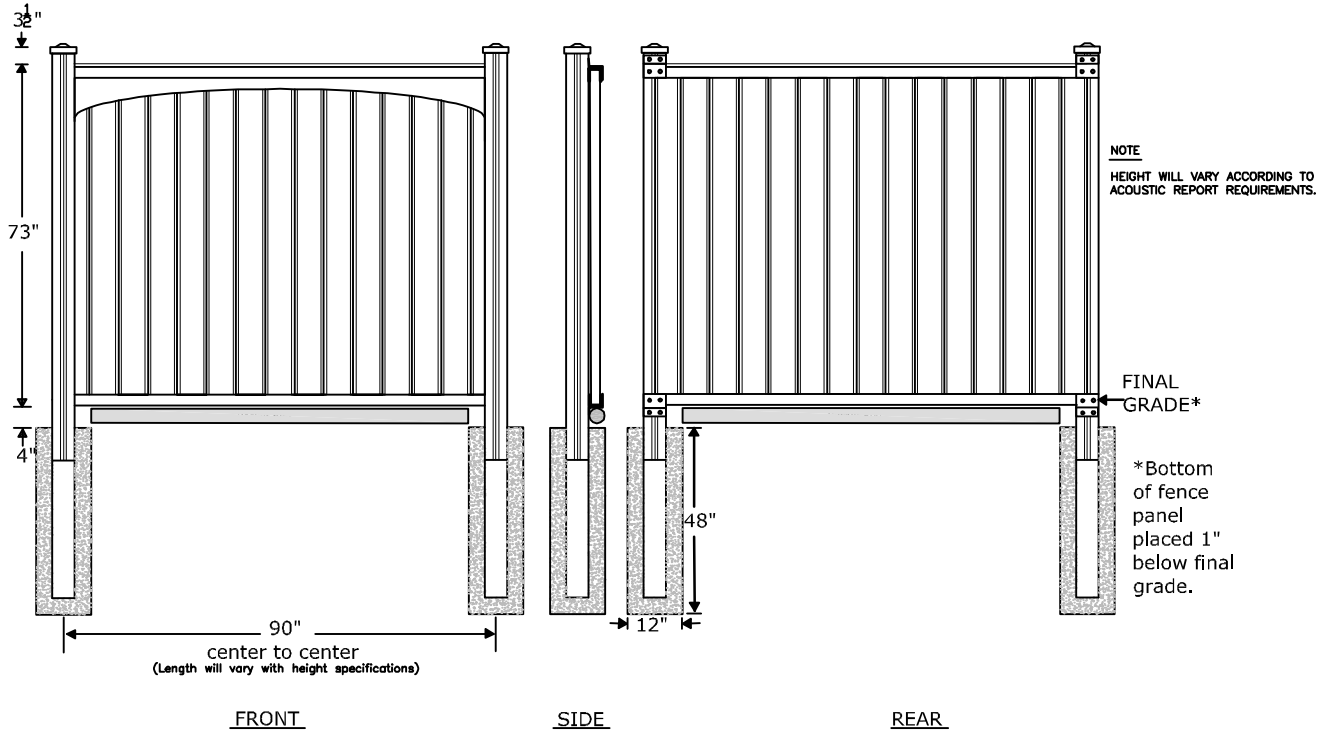
1. EXTERIOR GRADE RIGID VIRGIN PVC IS USED FOR ALL COVERS.
2. ASTM C672-92 SALT SCALING RESISTANCE (100% RESISTANT).
3. ASTM D4216 CELL CLASSIFICATION.
4. ASTM D792 SPECIFIC GRAVITY.
5. ASTM D2240 DUROMETER.
6. ASTM D638 TENSILE STRENGTH AND TENSILE MODULUS.
7. ASTM D790 FLEXURAL STRENCTH AND FLEXURAL MODULUS.
8. ASTM D4226 DROP WEIGHT IMPACT.
9. ASTM D256 NOTCHED IZOD IMPACT.
10. ASTM D648 HEAT DEFLECTION TEMPERATURE.
11. ASTM D696 COEFFICIENT OF LINEAR EXPANSION
12. CSA A440-M90 COLOUR HOLD.
13. UL94 FLAMMABILITY

Steel Panel

1. G90 COMMERCIAL QUALITY GALVANIZED STEEL SHEET. 4 POUNDS PER SQUARE FOOT DENSITY WITH VINYL COVER.
2. ASTM A653/A653M STANDARD SPECIFICATION FOR STEEL SHEET ZINC COATED (GALVANIZED) BY THE HOT DIP PROCESS.

Steel Post

1. G164 HSS GALVANIZED STEEL TUBE 3.5"x3.5"x1/8", 1/4", OR 3/8" THICK BASED ON FENCE HEIGHT REQUIRED.
2. ASTM A500 GRADE 'C' OR CSA G40.21 GRADE 50W STRUCTURAL QUALITY STEELS.
3. CSA G164-M92 HOT DIP GALVANIZING OF IRREGULARLY SHAPED ARTICLES.
4. CSA S16.1-94 LIMIT STATES DESIGN OF STEEL STRUCTURES



NOTES:
1. ALL MATERIALS, COMPONENTS AND WORKMANSHIP TO CONFORM TO LOCAL BY-LAWS.
2. THE SOIL BENEATH AND WITHIN AN 80"(2m) RADIUS OF ANY POST FOUNDATION SHALL BE CERTIFIED 95% S.P.D. PRIOR TO CONSTRUCTION.
3. CLASS OF CONCRETE SHALL BE 30 MPA AT 28 DAYS MINIMUM.
4. WATER CEMENT RATIO SHALL BE 0.5 MAXIMUM.
5. AIR CONTENT SHALL BE 5-8%.
6. CONCRETE FOR DRILLED FOUNDATIONS SHALL BE CAST AGAINST UNDISTURBED SOIL EXCEPT FOR THE TOP 24"(600mm) WHICH SHALL BE FORMED BY SONOTUBE.
7. THE CONCRETE SHALL BE ALLOWED TO CURE FOR 7 DAYS BEFORE THE FENCE PANELS ARE INSTALLED.
8. THE FENCE SHALL BE CONSTRUCTED TO THE HEIGHT AND ALIGNMENT AS APPROVED BY THE TOWN OF CALEDON.
9. THE FENCE SHALL BE EVENLY SLOPED TO ACCOMMODATE GRADE CHANGES. WHERE STEPPING IS REQUIRED, THE STEPPING SHALL OCCUR AT THE POSTS. THE STEPS BETWEEN PANELS SHALL BE AT EVEN INCREMENTS NO LESS THAN 2"(50mm) NOR GREATER THAN 6"(150mm) AT EACH POST, EXCEPT AS AUTHORIZED BY THE TOWN OF CALEDON. THE TOP OF THE FOUNDATION SHALL BE ADJUSTED BY MITERING THE TOP OF THE SONOTUBEBEFORE CONCRETE IS POURED.
10. A DOUBLE POST IS REQUIRED FOR ALL DIRECTION CHANGES GREATER THAN 20°.
11. FENCE TO BE LOCATED ON PRIVATE PROPERTY.

TOWN OF CALEDON

ACOUSTIC FENCE

NO.	REVISION	APR'D	DATE
2	STANDARD No. 906.02 NOW 601		JUNE 08
1	NOTES EDIT		MAR. 08

APR'D: C.C. DATE: JUNE 2004

DRAWN: SCALE: NTS

STANDARD No. 601