HGC ENGINEERING

**Howe Gastmeier Chapnik Limited**
2000 Argentia Road, Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7
t: 905.826.4044

# Noise Feasibility Study
# Proposed Residential Development
# 1489 Hurontario Street
# Mississauga, Ontario

Prepared for:

Twin Townhomes Inc.
63 Veronica Drive
Mississauga, ON
L5G 2B1

Prepared by

E. Jaklic, BEng

Reviewed by


Victor Garcia, PEng

August 1, 2024

HGC Project No: 02100120

# VERSION CONTROL

Noise Feasibility Study,
1489 Hurontario Street,
Mississauga, Ontario.

| Ver. | Date | Version Description / Changelog | Prepared By |
|---|---|---|---|
| 1.0 | September 10, 2021 | Noise Feasibility Study in support of the approvals process | P. Walsh |
| 2.0 | August 1, 2024 | Updated Noise Feasibility Study in support of the approvals process | E. Jaklic |

## Limitations

This document was prepared solely for the addressed party and titled project or named part thereof, and should not be relied upon or used for any other project without obtaining prior written authorization from HGC Engineering. HGC Engineering accepts no responsibility or liability for any consequence of this document being used for a purpose other than for which it was commissioned. Any person or party using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm their agreement to indemnify HGC Engineering for all loss or damage resulting therefrom. HGC Engineering accepts no responsibility or liability for this document to any person or party other than the party by whom it was commissioned.

Any conclusions and/or recommendations herein reflect the judgment of HGC Engineering based on information available at the time of preparation, and were developed in good faith on information provided by others, as noted in the report, which has been assumed to be factual and accurate. Changed conditions or information occurring or becoming known after the date of this report could affect the results and conclusions presented.

# Table of Contents

# 1 Introduction & Summary

HGC Engineering was retained by Twin Townhomes Inc. to conduct a Noise Feasibility Study for a proposed residential development located at 1489 Hurontario Street, Mississauga, Ontario. The proposed development will include one block of 3-storey townhouse units. The study is required by the Municipality as part of the planning and approvals process.

This report has been updated to include an updated site plan prepared by RN Design and dated January 19, 2024.

The primary source of noise impacting the site was determined to be road traffic on Hurontario Street. Relevant road traffic data was obtained from the City of Mississauga and was used to predict future traffic sound levels at the locations of the proposed residential dwelling facades 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 City to develop noise control recommendations.

The sound level predictions indicate that the future road traffic sound levels will exceed MECP guidelines at the proposed dwellings. Air conditioning is required for Unit 1, the dwelling adjacent to Hurontario Street. Forced air ventilation with ducts sized for the future installation of air conditioning units by the occupant is required for all the remaining townhouse units. Upgraded building and glazing constructions are required for Unit 1. An acoustic barrier is required for the rear yard of Unit 1. Associated acoustical requirements are specified in this report. Warning clauses are recommended to inform future residents of the road traffic noise impacts and to address sound level excesses.

An analysis was also conducted to determine the potential impact of noise from condenser units on the porches or rear yards of the proposed residential buildings on other proposed sensitive receptors. The model number of the proposed mechanical units were assumed according to information obtained from similar past projects in the area. A computer model of the area was created, using acoustic modelling software, in order to predict the sound levels due to air conditioning equipment at the locations of the proposed dwelling units. The results indicate that the sound emissions from proposed condenser units on other proposed residential receptors in the development and at the

existing residential receptors will be below the MECP minimum exclusionary sound level limits. Physical mitigation measures are not required for the condenser units associated with the proposed dwelling units.

# 2 Site Description & Noise Sources

The key plan for the development is attached as Figure 1. The site is located at 1489 Hurontario Street. Figure 2 is the latest concept plan prepared by RN Design dated January 19, 2024. Predictions for future sound levels were calculated at various prediction locations around the site, as indicated on Figure 2. The proposed development will consist of one block of 3-storey townhouses fronting onto Pinewood Trail.

The acoustical environment surrounding the site is urban in nature. Hurontario Street has a gradient of less than 2% and is thus considered to be relatively flat. The proposed site is primarily surrounded by residential and office uses. Hurontario Street is a 4-lane road (two lanes in each direction). Road traffic on Hurontario Street was confirmed to be the primary source of sound impacting the site. The Queen Elizabeth Way (QEW) is more than 500 metres to the north of the proposed development site, and thus was not considered for this study. There were no other significant sources of stationary noise noted within 500 metres of the subject site. A noise warning clause is recommended in Section 5.4 to notify future residents of the existing office uses in the area to the north and south of the site.

There is a proposed future Light Rail Transit (LRT) system along the centre of Hurontario Street. Information regarding the Hurontario-Main LRT line was obtained from the report prepared for SNC-Lavalin Inc. in support of Transit Project Assessment Process (TPAP) by J.E. Coulter Associates Ltd. The report states that the LRT line will run along the Hurontario and Main Street corridor, beginning at the Port Credit GO Station and ending at the Brampton GO Transit Station. The findings of the report prepared by J.E. Coulter Associates Limited for the future Hurontario-Main Street LRT indicate that there will be no noticeable change in the sound levels along most parts of the corridor and that the contribution of the LRT in relation to the overall sound level from cars and buses is negligible.

# 3 Noise Level Criteria

## 3.1 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]**

| Space | Daytime $L_{EQ}$ (16 hour) Road | Nighttime $L_{EQ}$(8 hour) Road |
|---|---|---|
| Outdoor Living Areas | 55 dBA | -- |
| Inside Living/Dining Rooms | 45 dBA | 45 dBA |
| Inside Bedrooms | 45 dBA | 40 dBA |

Daytime refers to the period between 07:00 and 23:00, while nighttime 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, and accordingly the noise criteria are not applicable there.

The MECP guidelines allow the daytime sound levels in OLA 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.

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/living/dining room window due to road traffic.

# 4 Traffic Noise Assessment

## 4.1 Road Traffic Data

Road traffic information for Hurontario Street was obtained from the City of Mississauga, in the form of Ultimate Average Annual Daily Traffic (AADT) values and is provided in Appendix A. An ultimate AADT of 50 700 vehicles per day, along with a posted speed limit of 50 km/h, was applied to Hurontario Street. A day/night split of 90/10 was used for the roadway. A commercial vehicle percentage of 5%, split into 2.75% and 2.25% for medium and heavy trucks respectively, was used in the analysis. Table II summarizes the traffic volume data used in this study.

**Table II: Predicted Road Traffic Data to 2034**

| Road Name | | Cars | Medium Trucks | Heavy Trucks | Total |
|---|---|---|---|---|---|
| **Hurontario Street** *(Ultimate)* | Daytime | 43 349 | 1 255 | 1 027 | 45 630 |
| | Nighttime | 4 817 | 139 | 114 | 5 070 |
| | **Total** | **48 165** | **1 394** | **1 141** | **50 700** |

## 4.2 Road Traffic Noise Predictions

To assess the levels of road traffic noise which would 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 on the traffic sound levels were chosen around the proposed residential building to obtain an appropriate representation of future sound levels at various façades. Sound levels were predicted at the façades of the proposed townhouse units daytime and nighttime hours to investigate ventilation and façade construction requirements. The results of these predictions are summarized in Table III.

**Table III: Predicted Road Traffic Sound Levels [dBA], Without Mitigation**

| Prediction Location | Description | Daytime - at Façade $L_{EQ(16)}$ | Nighttime - at Façade $L_{EQ(8)}$ | Daytime - at OLA $L_{EQ(16)}$ |
|---|---|---|---|---|
| A | Unit 1, west façade | 67 | 61 | 63 |
| B | Unit 2, north façade | 62 | 56 | 61 |
| C | Unit 8, north façade | 57 | 51 | 56 |

# 5 Traffic Noise Recommendations

The sound level predictions indicate that the future sound levels will exceed the MECP guidelines at the façades of the proposed development. Recommendations to address these excesses are discussed in the following sections.

## 5.1 Outdoor Living Areas

Each of the townhouse units will have a rear yard located directly outside the north façade of the townhouse unit.

Unmitigated road traffic noise at the north façade of the development is predicted to exceed the 55 dBA limit. The predicted sound level in the closest rear yard to Hurontario Street (Unit 1) will be 8 dBA in excess of the MECP's limit of 55 dBA. An acoustic barrier is required for the rear yard.

Table IV provides the acoustic barrier heights to achieve sound levels from 55 dBA to 60 dBA.

**Table IV: Acoustic Barrier Heights to Achieve Various Sound Levels, $L_{EQ}$ [dBA]**

| Prediction Location | Description | Acoustic Barrier Height [m] | | | | | |
|---|---|---|---|---|---|---|---|
| | | 55 dBA | 56 dBA | 57 dBA | 58 dBA | 59 dBA | 60 dBA |
| [$A_{OLA}$] | Rear yard adjacent to Hurontario Street | 2.8 | 2.6 | 2.4 | 2.2 | 2.0 | 2.0 |

A 2.8 m high acoustic barrier is required to achieve 55 dBA in the closest rear yard to Hurontario Street. Alternatively, a 2.4 m high acoustic barrier will reduce the sound level to 57 dBA and is recommended. When grading information is available, the acoustic barrier height should be refined.

With the 2.4 m barrier implemented at location [$A_{OLA}$], the sound prediction in the OLA of prediction location [B] is reduced to 56 dBA. Thus, the barrier will provide sufficient mitigation for the townhouse block and further mitigation for the remaining rear yards is not required. A noise warning clause is required in the property and tenancy agreements for all the lots in the development. The location and extent of the required acoustic barrier is shown in Figure 3.

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.

## 5.2 Indoor Living Areas & Ventilation Requirements

The predicted future sound levels at the west façade of Unit 1 will be greater than 65 dBA and 60 dBA during daytime and nighttime hours, respectively. To address this excess, the MECP guidelines recommend that the unit be equipped with air conditioning systems, so that the windows can remain closed.

The predicted future sound levels at the façades of units 2 through 9 of the proposed building will be greater than 55 dBA and less than 65 dBA during the daytime and/or greater than 50 dBA and less

than 60 dBA during the nighttime hours. To address these excesses, the MECP guidelines require forced air ventilation with duct sized to accommodate the future installation of air conditioning at the occupant's discretion. Associated warning clauses are also recommended.

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-216 and NPC-300, as applicable. The guidelines also recommend warning clauses for all units with ventilation requirements. Inclusion of any forced ventilation or central air conditioning will meet and exceed the requirements outlined by the MECP. Ventilation requirements are shown on Figure 3.

## 5.3 Building Façade Constructions

Future sound level predictions on the west façade of Unit 1, adjacent to Hurontario Street, will exceed 65 dBA during the daytime hours and 60 dBA during the nighttime hours. MECP guidelines recommend that the windows, walls, and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Calculations were performed to determine the building envelope constructions likely to be required to maintain indoor sound levels within MECP guidelines. The calculation methods used were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the plane of the room, and the anticipated area ratios of the facade components (windows and walls) and the floor area of the room calculated from the elevation and floor plans.

Assuming a window to floor ratio of 50% for bedrooms/living/dining rooms, any double-glazed window construction with a sound transmission class (STC) rating of 30 will provide adequate sound insulation for the dwelling units adjacent to Hurontario Street.

***Further Analysis***

When detailed floor plans and building elevations are available for the single detached dwelling closest to Hurontario Street, the glazing STC should be confirmed.

***Remaining Dwellings***

For the remaining townhouse units (Units 2 – 9), any building construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide sufficient acoustical insulation for the interior spaces.

## 5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all units with anticipated road traffic sound level. Examples are provided below.

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 Ministry of the Environment, Conservation and Parks' noise criteria.

Type B:

> 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 on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of 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., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-300.)

Suitable wording for future dwellings requiring central air conditioning systems is given below.

Type D:

> This dwelling unit has been supplied with a central air conditioning system which 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.

Suitable wording for informing future residents of the adjacent commercial facilities and that sounds from these facilities may at times be audible.

Type E:

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

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

# 6 Stationary Noise Assessment

The Ministry of the Environment, Conservation and Parks (MECP) provides guidelines for the assessment of stationary noise sources. NPC-300 "Environment Noise Guideline Stationary and Transportation sources – Approval and Planning" referenced with regard to traffic noise is also intended for use in the planning of noise sensitive land uses adjacent to residential buildings.

As indicated in NPC-300, *residential air conditioning devices including air conditioners and heat pumps* are *Sources not considered as stationary sources*. Nevertheless, the following assessment has been completed as requested in the DARC comments.

The proposed dwelling units may be serviced by condenser units on the front porches or in the rear yard OLA's. The model numbers of the proposed condenser units (CU) were obtained from recent HGC Engineering project files for similar projects in the area.

Criteria included in NPC-300 has been used to compare the condenser unit sound levels. 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. The subject site is located in a Class 1 area. In Class 1 areas, the limits are 50 dBA during the day (07:00 to 23:00) and 45 dBA at night (23:00 to 07:00). These conservative criteria were used in this analysis.

Source sound levels for the condenser units and assumed operational information (outlined below) were used as input to a predictive computer model (*Cadna-A version 2023 MR 2 (64 bit) (build*

*201.5366),* in order to estimate the sound levels from the condenser units on adjacent sensitive receptors. The computer model is based on the methods from ISO Standard 9613-2.2, "Acoustic – Attenuation of Sound During Propagation Outdoors", which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures. Assumptions regarding the operating duty cycles of the equipment (100% during the daytime and 50% during the night-time) were included based on our experience with other projects.

## 6.1 Assessment of Condenser Units Associated with the Dwelling Units and their Impact on Neighbouring Sensitive Receptors

Sound power levels for proposed mechanical equipment in the rear yards or on the front porches were estimated based on manufacturer's data for model numbers included in similar past projects in the area. Condenser units with the following sound data were applied in the analysis.

**Table V: Source Sound Power Levels [dB re 10-12 W]**

| HVAC Unit | Octave Band Centre Frequency [Hz] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Carrier 24AHA424 | -- | 51 | 59 | 61 | 60 | 57 | 51 | 42 |

The results of this assessment indicate a sound level of 45 dBA during the daytime and 42 dBA during the nighttime at the closest neighbouring sensitive receptors. These predicted sound levels are less than the MECP minimum exclusionary limit of 50 dBA during the daytime hours and 45 dBA during the nighttime hours, based on this typical worst-case operating scenario.

It is concluded that sound from proposed condenser units is anticipated to comply with the MECP guidelines at the proposed neighbouring sensitive receptors and noise mitigation measures are not required. If the condenser units ae located in the rear yards, a privacy screen between the townhouse units and the single detached dwelling will provide additional screening.

# 7 Summary & Recommendations

The following list and Table IV summarize the recommendations made in this report. The reader is referred to previous sections of the report where these recommendations are applied and discussed in more detail.

1. Central air conditioning is required for Unit 1 of the townhouse block. The location, installation and sound rating of the outdoor condensing units must be compliant with MECP Guideline NPC-216 and NPC-300, as applicable.

2. Forced air ventilations systems with ducts large enough to facilitate potential installation of central air conditioning at the occupant's discretion is required for Units 2 through 9 of the townhouse block.

3. An acoustic barrier is required for the rear yard of Unit 1 adjacent to Hurontario Street. When grading information is available, the acoustic barrier heights should be refined.

4. Upgraded glazing construction is needed for the closest dwelling unit adjacent to Hurontario Street. When detailed floor plans and building elevations are available, the drawings should be reviewed to refine window glazing requirements. Any building construction and meeting the minimum requirements of the OBC will provide adequate sound insulation for the remaining dwelling unit in the townhouse block.

5. Noise warning clauses to inform the occupants of the sound level excesses should be placed in the property and tenancy agreements and offers of purchase and sale.

**Table VI: Summary of Noise Control Requirements and Noise Warning Clauses**

| Unit No. | Acoustic Barrier | Ventilation Requirements* | Type of Warning Clause | Required Minimum STC for glazing |
|---|---|---|---|---|
| 1 | ✓ | Central A/C | B, D, E | #STC-30 |
| 2 - 9 | -- | Forced Air Ventilation | A, C, E | OBC |

Notes:
✓ Refer to Section 5.1
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300 as applicable.
# When detailed floor plans and building elevations are available, the drawings should be reviewed to refine the window glazing requirements

## 7.1 Implementation

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

1. 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.

2. 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

PRELIMINARY

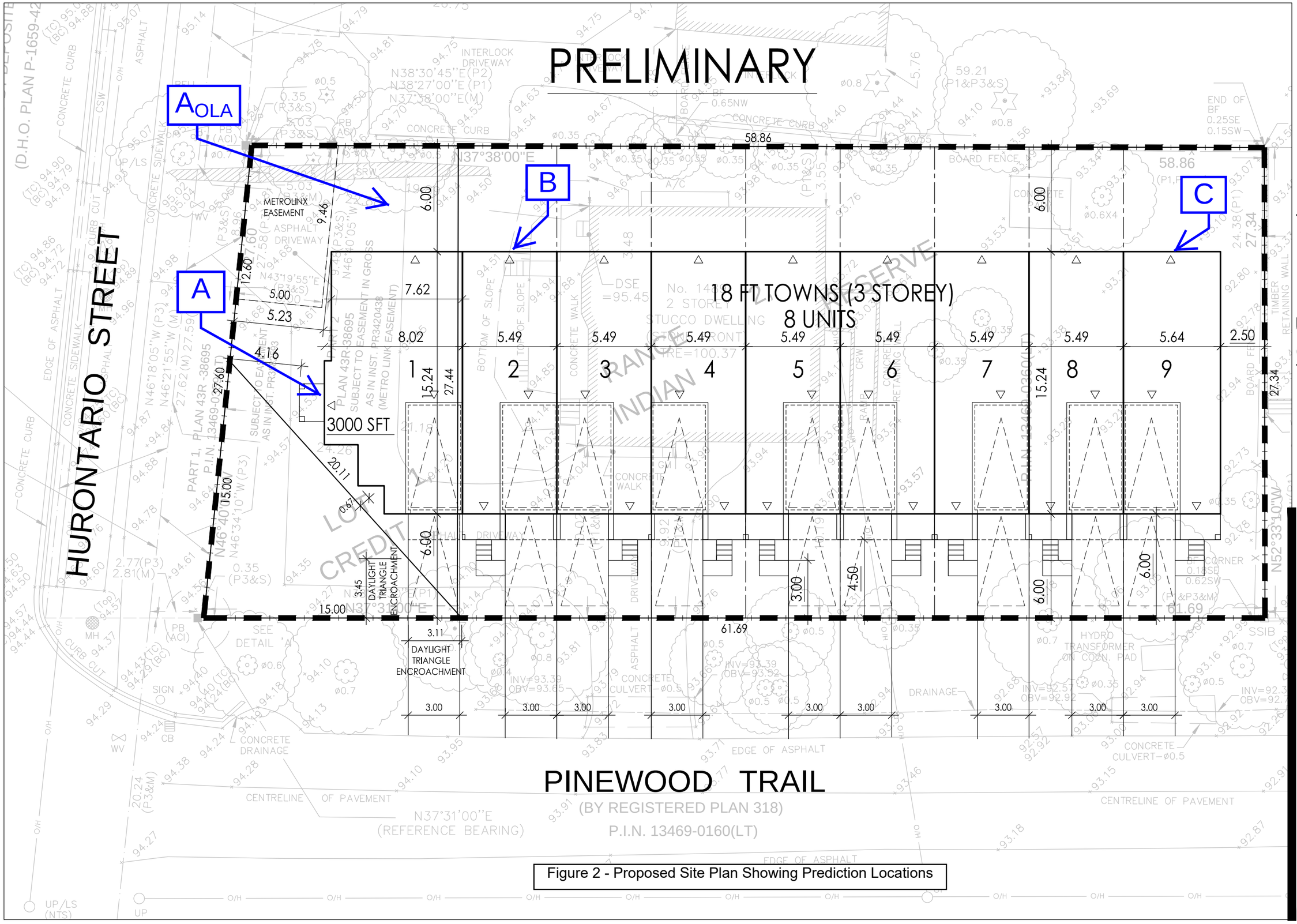


Figure 2 - Proposed Site Plan Showing Prediction Locations

## STATS

TOWNS -9

UNIT GFA(APPRX.)

CORNER - 3000 SFT
TOWN - 2425 SFT

JAN. 19-2024

client
Milani Group

project
Port Credit
Mississauga

title
CONCEPT -1
(18FT TOWNS +
SINGLE )

project #
20064

scale
1:200

RN DESIGN


WWW.RNDESIGN.COM
Tel: 905-738-3177
WWW.THEPLUSGROUP.CA



File: D:\RN 2020 Projects\20064\Site Planning\Architectural (RN)\Site Plan\20064-SP100.dwg Plotted: Jul 04, 2024 By: RaviP

PRELIMINARY

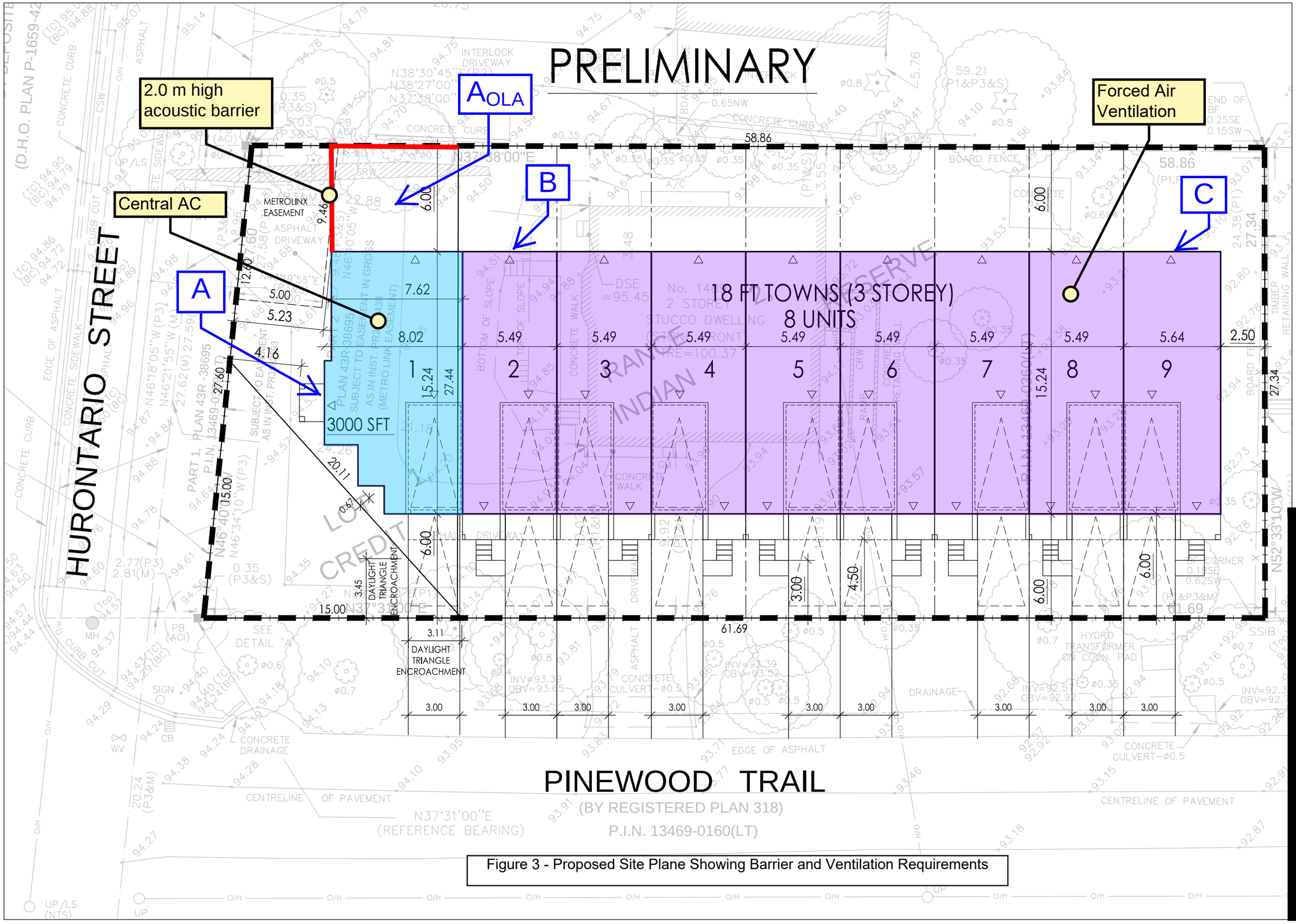


Figure 3 - Proposed Site Plane Showing Barrier and Ventilation Requirements

## STATS

TOWNS -9

UNIT GFA(APPRX.)

CORNER - 3000 SFT
TOWN - 2425 SFT

JAN. 19-2024

client
Milani Group

project
Port Credit
Mississauga

title
CONCEPT -1
(18FT TOWNS + SINGLE )

project #
20064

scale
1:200

RN DESIGN
WWW.RNDESIGN.COM
Tel: 905-738-3177
WWW.THEPLUSGROUP.CA

# Appendix A

Road Traffic Data

| | |
|---|---|
| Date: | 01-Mar-21 |

## REQUESTED BY:

| | |
|---|---|
| Name: | Patrick Walsh |
| Company: | HGC Engineering |

## PREPARED BY:

| | |
|---|---|
| Nam | Steven Guan |
| Tel#: | 905-615-3200 ext. 5933 |

# NOISE REPORT FOR PROPOSED DEVELOPMENT

**Location:** Hurontario Street - South of QEW (near 1489 Hurontario Street)

**ID** 505

## ON SITE TRAFFIC DATA

| Specific | Street Names | | | | |
|---|---|---|---|---|---|
| [redacted] | Hurontario Street | | | | |
| AADT: | 50,700 | | | | |
| # of Lanes: | 4 Lanes | | | | |
| % Trucks: | 5% | | | | |
| Medium/Heavy Trucks Ratio: | 55/45 | | | | |
| Day/Night Split: | 90/10 | | | | |
| Posted Speed Limit: | 50 km/h | | | | |
| Gradient Of Road: | <2% | | | | |
| Ultimate R.O.W: | 35 m | | | | |

**Comments:**

Ultimate Traffic Data Only (2041)

Ultimate Data is based on the proposed LRT project along Hurontario Street

The future lane configuration of Hurontario Street at this location will consist of 4 through lanes with 2 LRT lines along the center of the roadway

# Appendix B

Sample STAMSON Output

STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:35:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te Time Period: Day/Night 16/8 hours
Description: Location A West Facade No Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 23.80 / 23.80 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

ROAD (0.00 + 67.45 + 0.00) = 67.45 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.49 | 71.59 | 0.00 | -2.98 | -1.15 | 0.00 | 0.00 | 0.00 | 67.45 |

Segment Leq : 67.45 dBA

Total Leq All Segments: 67.45 dBA

Results segment # 1: Hurontario (night)
---

Source height = 1.22 m

ROAD (0.00 + 60.91 + 0.00) = 60.91 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.49 | 65.05 | 0.00 | -2.98 | -1.15 | 0.00 | 0.00 | 0.00 | 60.91 |

Segment Leq : 60.91 dBA

Total Leq All Segments: 60.91 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.45
(NIGHT): 60.91


STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:42:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te Time Period: Day/Night 16/8 hours
Description: Location B North Facade No Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 33.75 / 33.75 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.49 | 71.59 | 0.00 | -5.24 | -4.16 | 0.00 | 0.00 | 0.00 | 62.18 |

Segment Leq : 62.18 dBA

Total Leq All Segments: 62.18 dBA

Results segment # 1: Hurontario (night)
---

Source height = 1.22 m

ROAD (0.00 + 55.64 + 0.00) = 55.64 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.49 | 65.05 | 0.00 | -5.24 | -4.16 | 0.00 | 0.00 | 0.00 | 55.64 |

Segment Leq : 55.64 dBA

Total Leq All Segments: 55.64 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.18
(NIGHT): 55.64


STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:44:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c.te Time Period: Day/Night 16/8 hours
Description: Location C North Facade No Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 72.25 / 72.25 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

ROAD (0.00 + 57.26 + 0.00) = 57.26 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.49 | 71.59 | 0.00 | -10.16 | -4.16 | 0.00 | 0.00 | 0.00 | 57.26 |

Segment Leq : 57.26 dBA

Total Leq All Segments: 57.26 dBA

Results segment # 1: Hurontario (night)
---

Source height = 1.22 m

ROAD (0.00 + 50.73 + 0.00) = 50.73 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.49 | 65.05 | 0.00 | -10.16 | -4.16 | 0.00 | 0.00 | 0.00 | 50.73 |

Segment Leq : 50.73 dBA

Total Leq All Segments: 50.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.26
(NIGHT): 50.73

STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:53:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_ola.te Time Period: Day/Night 16/8 hours
Description: Location A_OLA No Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 27.25 / 27.25 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

ROAD (0.00 + 62.82 + 0.00) = 62.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.66 | 71.59 | 0.00 | -4.30 | -4.47 | 0.00 | 0.00 | 0.00 | 62.82 |

Segment Leq : 62.82 dBA

Total Leq All Segments: 62.82 dBA

Results segment # 1: Hurontario (night)
---

Source height = 1.22 m

ROAD (0.00 + 56.28 + 0.00) = 56.28 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.66 | 65.05 | 0.00 | -4.30 | -4.47 | 0.00 | 0.00 | 0.00 | 56.28 |

Segment Leq : 56.28 dBA

Total Leq All Segments: 56.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.82
(NIGHT): 56.28


STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:59:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_ola.te Time Period: Day/Night 16/8 hours
Description: Location B_OLA No Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 33.75 / 33.75 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

ROAD (0.00 + 61.27 + 0.00) = 61.27 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.66 | 71.59 | 0.00 | -5.85 | -4.47 | 0.00 | 0.00 | 0.00 | 61.27 |

Segment Leq : 61.27 dBA

Total Leq All Segments: 61.27 dBA

Results segment # 1: Hurontario (night)
---

Source height = 1.22 m

ROAD (0.00 + 54.74 + 0.00) = 54.74 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 0 | 0.66 | 65.05 | 0.00 | -5.85 | -4.47 | 0.00 | 0.00 | 0.00 | 54.74 |

Segment Leq : 54.74 dBA

Total Leq All Segments: 54.74 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.27
(NIGHT): 54.74

STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:50:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_ola_m.te Time Period: Day/Night 16/8 hours
Description: Location A_OLA With Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (day/night)
---
Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.25 / 27.25 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 90.00 deg
Barrier height : 2.40 m
Barrier receiver distance : 3.80 / 3.80 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

Barrier height for grazing incidence
---
Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+--------------
       1.22 !        1.50 !        1.46 !         1.46

ROAD (0.00 + 57.14 + 0.00) = 57.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     90   0.52  71.59   0.00  -3.95  -2.12   0.00   0.00  -8.37  57.14
-------------------------------------------------------------------------------

Segment Leq : 57.14 dBA

Total Leq All Segments: 57.14 dBA

Results segment # 1: Hurontario (night)
---------------------------------------

Source height = 1.22 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.22 !        1.50 !        1.46 !         1.46

ROAD (0.00 + 50.61 + 0.00) = 50.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     90   0.52  65.05   0.00  -3.95  -2.12   0.00   0.00  -8.37  50.61
-------------------------------------------------------------------------------

Segment Leq : 50.61 dBA

Total Leq All Segments: 50.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.14
                          (NIGHT): 50.61
```

STAMSON 5.0 NORMAL REPORT Date: 01-08-2024 13:51:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_ola_m.te Time Period: Day/Night 16/8 hours
Description: Location B_OLA With Mitigation

Road data, segment # 1: Hurontario (day/night)
---
Car traffic volume : 43349/4817 veh/TimePeriod *
Medium truck volume : 1255/139 veh/TimePeriod *
Heavy truck volume : 1027/114 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 50700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (day/night)
---
Angle1 Angle2 : -12.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 33.75 / 33.75 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -12.00 deg Angle2 : 90.00 deg
Barrier height : 2.40 m
Barrier receiver distance : 10.40 / 10.40 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Hurontario (day)
---

Source height = 1.22 m

Barrier height for grazing incidence
---
Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+--------------
       1.22 !        1.50 !        1.42 !         1.42

ROAD (0.00 + 55.80 + 0.00) = 55.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -12     90   0.52  71.59   0.00  -5.37  -3.53   0.00   0.00  -6.90  55.80
-------------------------------------------------------------------------------

Segment Leq : 55.80 dBA

Total Leq All Segments: 55.80 dBA

Results segment # 1: Hurontario (night)
---------------------------------------

Source height = 1.22 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.22 !        1.50 !        1.42 !         1.42

ROAD (0.00 + 49.26 + 0.00) = 49.26 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -12     90   0.52  65.05   0.00  -5.37  -3.53   0.00   0.00  -6.90  49.26
-------------------------------------------------------------------------------

Segment Leq : 49.26 dBA

Total Leq All Segments: 49.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.80
                          (NIGHT): 49.26
```