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ENVIRONMENTAL NOISE ASSESSMENT

202 BROCK STREET EAST
PROPOSED RESIDENTIAL DEVELOPMENT
PT LTS 51 & 52, PL H50061 & PT W 1/2 LT 30,
CONCESSION 7, PT 1, 40R4323

TOWNSHIP OF UXBRIDGE

PREPARED FOR:

1093560 ONTARIO LTD. C/O
CORAL CREEK HOMES

May 2023
Y2318

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1.0 INTRODUCTION

PURPOSE

A residential development has been proposed by 1093560 Ontario Ltd. c/o Coral Creek Homes in the Township of Uxbridge. This report is an analysis of future sound levels within the development and describes the types and locations of noise mitigation measures which will be required based on the latest Site Plan.

SITE DESCRIPTION AND LOCATION

The proposed development will consist of 4 Parts (attached dwelling units) located south of Brock Street East (Highway No. 47), east of Nelkydd Lane at approximately 650m east of Main Street North in the Township of Uxbridge.

The surrounding land uses are existing and proposed residential development to the north, and west, with an existing hydro substation further northwest, schools to the southwest, a residential/ commercial property to the east and a pond to the south.

KEY PLAN

The location of the proposed development is further indicated by the Key Plan below.

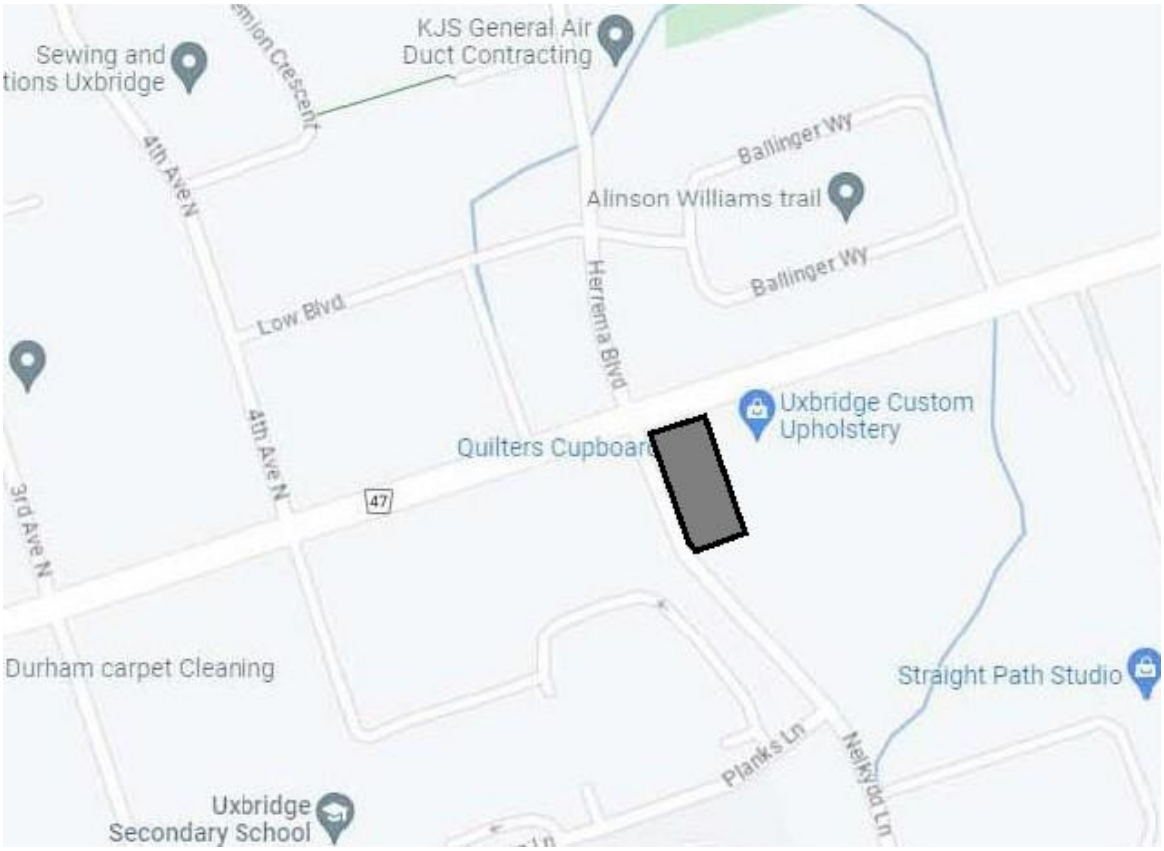

FIGURE 1

2.0 SOUND LEVEL CRITERIA

TRANSPORTATION:

The sound level descriptors (L_{eq} in dBA) are for 16 hours (daytime) and 8 hours (night-time) based on MECP Guideline NPC-300.

Outdoor Activity Areas (7 a.m. – 11 p.m.) – 16 Hr. Leq. = 55 dBA

If daytime outdoor sound levels at the backyards (outdoor activity areas) of residential areas exceed 60 dBA, physical noise attenuation measures such as acoustical fences, increased building setbacks or reorientation of dwellings and lots must be employed to reduce the sound levels. In some cases, outdoor sound levels may be allowed to exceed the above criteria by a maximum of 5 dBA. If such excesses occur, purchasers must be informed of the existence of potentially annoying sound levels by means of warning clauses registered on title.

Living and Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads, 40 dBA Railways
Living and Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads, 40 dBA Railways
Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads, 35 dBA Railways

Appropriate building components such as walls, doors and windows are chosen with reference to the following. If daytime sound levels at the external dwelling walls are 65 dBA or less (roadways), and 60 dBA or less (railways), then the indoor sound level criteria described above will be achieved using standard (Ontario Building Code) construction methods and building components. If night-time sound levels are 60 dBA or less (roadways) and 55 dBA or less (railways), standard construction methods and building components can be utilized. If the external sound levels exceed the above criteria, then components having extra sound insulation properties may be required.

Ventilation requirements are determined with reference to the following. If night-time sound levels at the bedroom window of a dwelling unit are in the range of 50 to 60 dBA, the ventilation system must be designed to allow the optional installation of central air conditioning at the owner's discretion. If night-time sound levels are greater than 60 dBA, central air conditioning must be installed. If daytime sound levels at the living room/dining room windows are in the range of 55 to 65 dBA, the ventilation system must be designed to allow optional installation of central air conditioning. For daytime sound levels greater than 65 dBA, central air conditioning must be installed.

STATIONARY SOURCES

As per the M.E.C.P. guidelines (Publication NPC-300), this area is considered to be a Class 2 classification area. The noise produced by a stationary source at the plane of window for noise sensitive spaces is the energy equivalent sound level (L_{EQ}), 50 dBA during daytime and evening time (0700-2300) or 45 dBA during night-time (2300-0700). For outdoor receptors, the energy equivalent sound level (L_{EQ}) is 50 dBA during daytime (0700-2300) and 45 dBA during night-time (2300-0700).

3.0 NOISE SOURCES

ROAD TRAFFIC

As indicated on Figures 1 and 2, the proposed residential development will be located south of Brock Street (Highway No. 47), east of Nekydd Lane at approximately 650m east of Main Street in the Township of Uxbridge. Noise generated by Brock Street (Highway No. 47) has the potential to affect future development. All other roads within or near this site are considered acoustically insignificant due to low traffic volumes and distance separation.

Traffic volume information for Brock Street East (Highway No. 47) was obtained from the Regional Municipality of Durham dated May 2023. The traffic data obtained is summarized in Table 1 below:

TABLE 1: BROCK STREET EAST (HIGHWAY NO. 47) TRAFFIC DATA

Projected Annual Average Daily Traffic*	11,000
Percent Trucks	15%
Heavy to Medium trucks ratio	80/20
Speed (km/hr)	50
Number of Lanes	4
Day/Night Traffic split	90/10

* Projected traffic provided by the Region of Durham.

EXISTING STATIONARY NOISE SOURCES

An existing hydro substation is located to the northwest of the proposed development at approximately 100m from the nearest receptor. Based on a site visit conducted, the hydro substation resulted in a tonal sound level lower than the background traffic noise.

Existing Schools are located to the southeast approximately 140m from the proposed residential with mechanical roof top units.

The adjacent land to the east is a residential/ commercial property with an upholstery repair activities. Based on the Site visit, the repair activity is expected to occur at the workshop/garage building to the west of the property which is directly adjacent to the proposed residential development as shown on the attached Figure 3.

4.0 NOISE ASSESSMENT

4.1 ROAD TRAFFIC NOISE ASSESSMENT

Figure 2 is based on the latest Site Plan showing various noise analysis locations and noise mitigation measures within the proposed development. Sound levels were calculated using the Ministry of Environment's Stamson 5.04 computer-based noise prediction model. The noise criteria and warning clauses are listed in Appendix 4.

Table 2 lists the unattenuated sound levels at various locations.

TABLE 2: UNATTENUATED SOUND LEVELS

LOCATIONS	DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME 16 Hr. Leq dBA		NIGHT-TIME 8 Hr. Leq dBA
		REAR YARD	DWELLING WALL	SECOND STOREY
Part 1	22.0[1]	-	66.42	60.21
	24.0[1]	64.88	-	-
Part 2	28.0[1]	-	61.78	55.66
	30.0[1]	60.25		
Part 4	45.0[1]	-	58.57	52.63
	47.0[1]	55.89	-	-

[1] Brock Street East (Highway No. 47 Road)

4.2 STATIONARY NOISE SOURCES ASSESSMENT

The noise impact from the existing hydro substation to the northwest, schools to the southwest and the adjacent commercial with mechanical units and repair activities have the potential to exceed the sound level limits at the proposed residential development.

Based on a site visit conducted, the existing hydro substation resulted in a tonal sound level lower than the background traffic noise. However, a sound level of 81 dBA $_{(PWL)}$ or less was taken into account for noise analysis based on similar sound measurements.

The Sound Power Levels for the mechanical roof top units (HVAC) were taken to be 80 to 95dBA $_{(PWL)}$ for a similar type of mechanical equipment. All mechanical units are assumed to be operating 100% of the time during the daytime/evening and operating 50% of the time during the night-time. Analysis is included in Appendix 3.

The adjacent commercial/upholstery activities are repairs within the workshop building. There are no openings facing the proposed residential, Therefore, the activities such as sawing and hammering have been taken into consideration operating 8 to 10 hours per day and assuming the east doors facing away are left open. The Sound Power Levels for the repair activities are taken to be 96dBA and impulse sound levels are assumed to be 100dBAI.

The sound levels were calculated using the CadnaA Version 2022 computer program using the International Standard ISO 9613-2.

TABLE 3 - STATIONARY SOURCES SOUND LEVELS (UMITIGATED)			
RECEPTOR	SOUND LEVEL RESULTS (dBA)		EXCEEDANCE (dBA)
	DAYTIME/ EVENING (0700 -2300)	NIGHTTIME (2300 -0700)	
R1 (Part1, Northwest Wall)	43.9	39.3	No
R2 (Part 4, West Wall)	44.7	41.7	No
R3 (Part 3, East Wall)	49.0	32.5	No
R4 (Part 1, Back Yard)	43.1	33.5	No
R5 (Part 4, Back Yard)	41.3	34.6	No

The total sound level results from the existing hydro substation, existing repair activities to the east and mechanical roof top units for the schools are expected to meet the sound level limit during the daytime and night-time at all receptor locations.

Therefore, noise mitigation measures are not required. However, a warning clause should advise the future residents of possible noise levels at times.

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

5.1.1 TRAFFIC NOISE OUTDOOR MEASURES

Table 2 indicates that daytime rear yard sound level at Parts 1 and 2 are expected to be above 60dBA in the absence of mitigative measures. Therefore, outdoor noise mitigation measure is required for Part 1.

The daytime rear yard sound level at Part 2 is expected to be reduced with the noise mitigation measure on Part 1.

Parts 3 and 4 are expected to be between 55dBA and 60dBA in the absence of mitigative measures.

NOISE BARRIERS

In accordance with M.E.C.P, mitigative measure is required for Part 1 to reduce the sound levels close to 55 dBA.

For Part 1, a 2.5m high acoustic fence is required along the side/rear properties as shown on the attached Figure 2 to achieve a sound level of 57 dBA.

With the 2.5m high acoustic fence along Part 1, the outdoor sound level at Part 2 rear yard is expected to be reduced to 55 dBA or less.

The recommended barriers should be constructed of a material, which provides a minimum surface density of 20 kg per square meter. In accordance with MECP. policy, minimized and localized gaps (25mm maximum) at fence bottoms may be used to accommodate surface drainage, if necessary.

Following installation of the recommended acoustic barrier, future outdoor sound levels may exceed the sound level limits at the following location due to road traffic noise:

- Part 1

A warning clause should therefore be incorporated into the Development Agreement, which will be registered on title and should be included in all offers of purchase and sale or lease of the dwelling units at the above location. The clause should state:

> Warning Clause No. B
>
> *“Purchasers/tenants are advised that despite the inclusion of noise control features, the sound levels due to increasing road traffic may continue to be of concern, occasionally interfering with the activities of the dwelling occupants as the noise levels may exceed the noise criteria of the Municipality and the Ministry of the Environment."*

5.1.2 STATIONARY NOISE OUTDOOR MEASURES

As per the sound level results in Table 3, the noise activities from the existing hydro substation, the existing school and the existing commercial development are expected to meet the sound level limits at all locations.

Therefore, outdoor noise mitigation measures are not required due to stationary noise sources.

5.2 VENTILATION REQUIREMENTS

5.2.1 VENTILATION REQUIREMENTS DUE TO ROAD TRAFFIC

Ventilation requirements were determined using the sound levels at the building facades listed in Table 2 due to road traffic noise sources.

MANDATORY CENTRAL AIR CONDITIONERS

The following locations are expected to be above 65dBA during the daytime and/or above 60dBA during the nighttime. Therefore, mandatory air conditioning is required for the following location:

- Part 1

The following warning clause Type D must be incorporated into the Development Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above location:

Warning Clause Type D:

"This unit was fitted with an air conditioner to allow the windows and exterior doors to remain closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."

PROVISION FOR AIR CONDITIONERS

Based on the information in Table 2, the following locations must be constructed with a forced air heating system with ducting sized to accommodate a central air conditioning unit, in order to allow the homeowner the option of installing central air conditioning should he or she wish to do so in the future due to road traffic:

- Parts 2 to 4

In addition, the following warning clause must be incorporated into the Development Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above suites:

Warning Clause Type C:

"This unit was fitted with ducting sized to accommodate a central ventilation system to allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of central air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."

5.2.2 VENTILATION REQUIREMENTS DUE TO STATIONARY NOISE SOURCE

Based on the MECP Noise Guideline, the use of air conditioning is not acceptable for noise mitigation in the context of controlling the noise from a stationary source. However, if a building is designed with air conditioning due to transportation noise sources, then air conditioning may provide further noise mitigation for stationary noise sources given that the windows are kept closed if the stationary noise sources are audible at times.

Due to high ambient noise as a result of road traffic, the noise impact from the stationary noise sources are not expected to be significant most of the time. However, possible noise activities may exceed the sound level limit at times.

5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.E.C.P. Detailed floor plans of the proposed dwelling units are required in order to best determine the required building components. Although this information is not yet available for the proposed development, the result is based on the assumption that a living, dining or recreation room is located at the side of the house closest to the roadway and contains three components (two exterior walls and a set of windows). The windows are assumed to be 30% of the floor area and the same side exterior walls are assumed to be 70% of the floor area.

DAYTIME SOUND LEVELS

For the worst-case location during daytime, (Part 1) a daytime sound level of 66 dBA was calculated due to road traffic. To ensure acceptable daytime indoor sound levels of 45 dBA from road noise source, the building components must provide an STC rating of 29 for windows, STC 36 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst-case location during night-time, (Part 1) night-time sound level of 60 dBA was calculated. To ensure acceptable nighttime indoor sound levels of 40 dBA from road noise source, the building components must provide an STC rating of 27 for windows, STC 34 for exterior wall construction.

BUILDING COMPONENT REQUIREMENTS

The minimum standard window and exterior wall construction of the Ontario Building Code meets STC 30 and STC 38, respectively. Therefore, standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all residential units.

WINDOWS

The following are some window configurations meeting an STC rating of 30, assuming the ratio of window area to room floor area is 30%:

- double glazing 3mm x 3mm thickness with 13mm air space (Sliders) or
- double glazing 3mm x 3mm thickness with 6mm air space (Casement or fixed) or
- any other window type yielding a similar or greater STC rating

EXTERIOR WALLS

The following exterior wall construction EW1 meets the STC 38 rating, assuming a ratio of wall area to room floor area of 70%:

EW1 12.7mm gypsum board, vapour barrier and 38 x 89mm studs with 50mm (or thicker) mineral wool or fiberglass batts in interstud cavities, plus sheathing, 25mm air space and vinyl/stucco.

Sample window and exterior wall configurations are included in Appendix 5 for additional options.

5.4 WARNING CLAUSES

We recommend the following warning clauses to be incorporated into the Development Agreement, which will be registered on title and included in all offers of purchase and sale or lease of locations noted below.

- Parts 2 to 4

Warning Clause Type A:

"Purchasers/tenants are advised that sound levels due to increasing road traffic, may continue to be of concern, occasionally interfering with the activities of the occupants as the noise levels may exceed the noise criteria of the Ministry of the Environment."

- Parts 1 to 4

Warning Clause Type E

"Occupants are advised that due to the proximity of the hydro substation, school, existing commercial development, sound levels from these uses may be audible at times"

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of all noise abatement measures are listed in the following Table 4 identifying ventilation requirements, building components and warning clauses.

TABLE 4: SUMMARY OF NOISE MITIGATION MEASURES

LOCATIONS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	SOUND BARRIERS	WARNING CLAUSES
Part 1	Mandatory air conditioning	Windows: OBC* Walls: OBC	2.5m**	Type B, D, E
Parts 2 to 4	Provision for air conditioning	Windows: OBC Walls: OBC	-	Type A, C, E

* OBC: Ontario Building Code Standard.

** 2.5m high acoustic fence at the side property line, returned to the rear property line and the side wall of the house as shown on the attached Figure 2.

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Part 1.

2. Provision for air conditioning is required for Parts 2 to 4.

3. A 2.5m high acoustic fence is required at the side property line of Part 1 and returned to the rear property line and the side wall of the house as shown on the attached Figure 2.

4. Standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all other faces of the proposed building.

6. All applicable warning clauses shall be listed in the Township's Development Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.

7. Prior to the issuance of occupancy permits, the Town's building inspector or a Professional Engineer qualified to perform acoustical engineering services in Ontario shall certify that the noise control measures have been properly installed and constructed.

CONCLUSION

This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks, Township of Uxbridge and the Region of Durham are expected to be achieved using the abatement measures in this report and as shown on the attached Figure 2.

Respectfully submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Engineer

APPENDIX 1

FIGURES

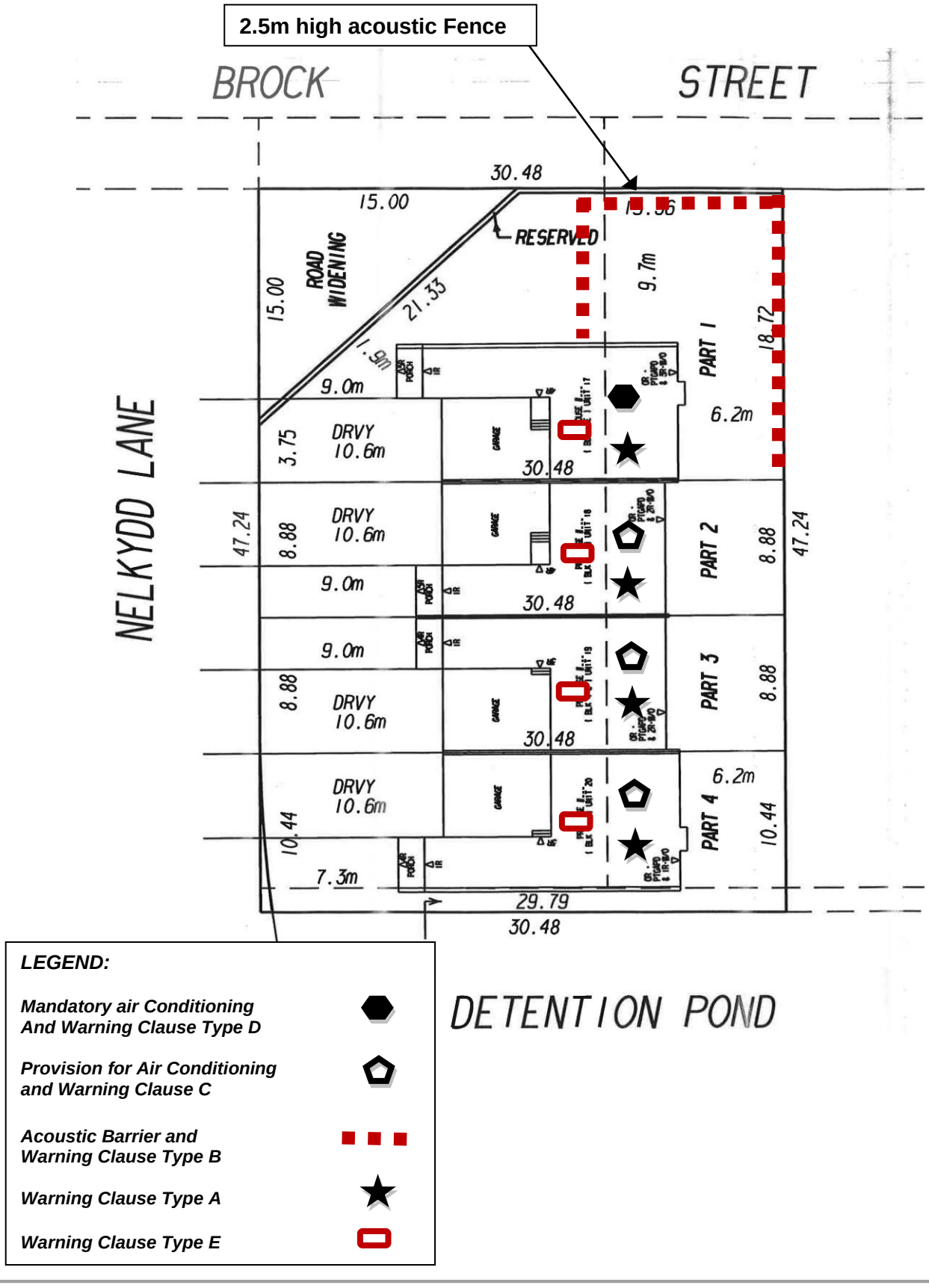

FIGURE 2 - 202 Brock Street East
Proposed Residential Development

FIGURE 3

DISTANCES FROM THE STATIONARY NOISE SOURCES

APPENDIX 2

TRAFFIC DATA

Planning and Economic Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
P.O. BOX 623
WHITBY, ON L1N 6A3
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www.durham.ca

Brian Bridgeman, MCIP, RPP
Commissioner of Planning and Economic Development

The Regional Municipality of Durham

ROAD SEGMENT TRAFFIC FORECASTS FOR NOISE ANALYSES

This information is to be used as the basis for assessing the potential impacts of noise, generated by traffic on Provincial Highways and arterial roads, on proposed land uses that are sensitive (e.g., residential subdivisions). Arterial roads include existing and future Type A, B and C, as designated in the Durham Regional Official Plan.

Noise assessment reports recommend specific measures to be integrated into the design of sensitive developments to reduce road noise impacts to acceptable levels.

Provided For:

Name / Name of Firm: Hava Jouharchi, YCA Engineering Limited

Address: 9580 Yonge Street, Suite 9557

Telephone: Fax:

Location of Proposal:

202 Brock Street East

Municipality: Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: April 27, 2023 Received By: Alia Tulloch

Date Forecast Sent: May 2, 2023

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
Brock Street (Main St. to 4th Ave.)	16,000	4	15	80	20	60
Brock Street (4th Ave. to RR23)	11,000	4	15	80	20	80
	0	0	0	0	0	0
	0	0	0	0	0	0

* Average Annual Daily Traffic. Forecast based on ultimate development according to the Durham Regional Official Plan.

APPENDIX 3

SOUND LEVEL CALCULATIONS

STAMSON 5.0 SUMMARY REPORT Date: 11-05-2023 08:43:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt1sw.te Time Period: Day/Night 16/8 hours
Description: Part 1, Side Wall

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

Car traffic volume : 8415/935 veh/TimePeriod *
Medium truck volume : 297/33 veh/TimePeriod *
Heavy truck volume : 1188/132 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): 11000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 12.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brock Street (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 : 22.00 / 22.00 m
Receiver height : 4.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	66.42	66.42
Total			66.42 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	60.21	60.21
Total			60.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.42
(NIGHT): 60.21

STAMSON 5.0 SUMMARY REPORT Date: 11-05-2023 08:54:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt1ry.te Time Period: Day/Night 16/8 hours
Description: Part 1, Rear Yard

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

Car traffic volume : 8415/935 veh/TimePeriod *
Medium truck volume : 297/33 veh/TimePeriod *
Heavy truck volume : 1188/132 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): 11000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 12.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brock Street (day/night)

Angle1 Angle2 : -55.00 deg 80.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 24.00 / 24.00 m
Receiver height : 1.50 / 7.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 80.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 9.00 / 9.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	64.88	64.88 *
Total			64.88 dBA

* Bright Zone !

Barrier table for segment # 1: Brock Street (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	1.80	59.28	59.28
1.90	1.90	59.15	59.15
2.00	2.00	58.96	58.96
2.10	2.10	58.71	58.71
2.20	2.20	58.42	58.42
2.30	2.30	58.09	58.09
2.40	2.40	57.73	57.73
2.50	**2.50**	**57.35**	**57.35**
2.60	2.60	56.96	56.96
2.70	2.70	56.56	56.56
2.80	2.80	56.16	56.16
2.90	2.90	55.76	55.76
3.00	3.00	55.36	55.36

STAMSON 5.0 SUMMARY REPORT Date: 11-05-2023 08:44:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt2fw.te Time Period: Day/Night 16/8 hours
Description: Part 2, Front Wall

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

Car traffic volume : 8415/935 veh/TimePeriod *
Medium truck volume : 297/33 veh/TimePeriod *
Heavy truck volume : 1188/132 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): 11000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 12.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brock Street (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 : 28.00 / 28.00 m
Receiver height : 4.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	61.78	61.78
Total			61.78 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	55.66	55.66
Total			55.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.78
(NIGHT): 55.66

```
STAMSON 5.0        SUMMARY REPORT        Date: 11-05-2023 08:45:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt2ry.te            Time Period: Day/Night 16/8 hours
Description: Part 2, Rear Yard

Road data, segment # 1: Brock Street (day/night)
----------------------------------------------
Car traffic volume  :  8415/935   veh/TimePeriod  *
Medium truck volume :   297/33    veh/TimePeriod  *
Heavy truck volume  :  1188/132   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):  11000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.00
    Heavy Truck  % of Total Volume     :  12.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Brock Street (day/night)
----------------------------------------------
Angle1   Angle2           : -10.00 deg   50.00 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           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -10.00 deg   Angle2 : 50.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street      !     1.86 !    60.25 !    60.25 *
--------------------+---------+---------+---------
                       Total                 60.25 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 53.96 dBA (with the 2.5m high noise fence along Part 1)
```

STAMSON 5.0 SUMMARY REPORT Date: 11-05-2023 08:44:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt4fw.te Time Period: Day/Night 16/8 hours
Description: Part 4, Front Wall

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

Car traffic volume : 8415/935 veh/TimePeriod *
Medium truck volume : 297/33 veh/TimePeriod *
Heavy truck volume : 1188/132 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): 11000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 12.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brock Street (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 : 45.00 / 45.00 m
Receiver height : 4.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	58.57	58.57
Total			58.57 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	52.63	52.63
Total			52.63 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.57
(NIGHT): 52.63

STAMSON 5.0 SUMMARY REPORT Date: 11-05-2023 08:45:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: prt4y.te Time Period: Day/Night 16/8 hours
Description: Part 4, Rear Yard

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

Car traffic volume : 8415/935 veh/TimePeriod *
Medium truck volume : 297/33 veh/TimePeriod *
Heavy truck volume : 1188/132 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): 11000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 12.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brock Street (day/night)

Angle1 Angle2 : -5.00 deg 40.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 1.50 / 7.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -5.00 deg Angle2 : 40.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	55.89	55.89 *
Total			55.89 dBA

Project No.: Y2318
Project Name: 202 Brock Street
Date: May 2023

Receiver Table

Name	M.	ID	Level Lr		Limit. Value		Height		Coordinates		
			Day	Night	Day	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(m)		(m)	(m)	(m)
R1		R1	43.9	39.3	50.0	45.0	8.50	r	387.95	851.24	8.50
R2		R2	44.7	41.7	50.0	45.0	8.50	r	386.83	813.41	8.50
R3		R3	49.0	32.5	50.0	45.0	8.50	r	406.20	828.47	8.50
R1ola		R1ola	43.1	33.5	50.0	45.0	1.50	r	409.04	849.05	1.50
R2ola		R2ola	41.3	34.6	50.0	45.0	1.50	r	409.64	816.43	1.50

Source Table

Name	Result. PWL			Lw / Li		Operating Time			Freq.	Height		Coordinates		
	Day	Evening	Night	Type	Value	Day	Special	Night				X	Y	Z
	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	(Hz)	(m)		(m)	(m)	(m)
S1	95.1	95.1	95.1	Lw	AC5	720.00	240.00	240.00		1.00	g	229.33	704.59	7.00
S5	86.1	86.1	86.1	Lw	AC3	720.00	240.00	240.00		1.00	g	184.49	696.79	7.00
S10	86.1	86.1	86.1	Lw	AC3	720.00	240.00	240.00		1.00	g	116.22	688.67	7.00
S7	86.1	86.1	86.1	Lw	AC3	720.00	240.00	240.00		1.00	g	174.14	722.18	7.00
S4	82.1	82.1	82.1	Lw	AC2	720.00	240.00	240.00		1.00	g	207.36	724.56	7.00
S11	82.1	82.1	82.1	Lw	AC2	720.00	240.00	240.00		1.00	g	59.10	695.76	7.00
S6	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	187.88	707.54	7.00
S12	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	52.73	696.24	7.00
S8	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	162.20	715.25	7.00
S9	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	160.76	727.13	7.00
S2	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	218.88	700.36	7.00
S3	95.1	95.1	95.1	Lw	Ac5	720.00	240.00	240.00		1.00	g	237.70	683.48	7.00
S13	86.1	86.1	86.1	Lw	AC3	720.00	240.00	240.00		1.20	g	41.80	728.25	7.20
S15	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	219.33	599.12	5.00
S16	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	210.61	598.12	5.00
S17	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.00	g	186.88	598.13	5.00
S14	95.1	95.1	95.1	Lw	Ac5	720.00	240.00	240.00		1.20	g	43.01	679.02	7.20
S18	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.20	g	175.53	598.19	5.20
S19	95.1	95.1	95.1	Lw	AC5	720.00	240.00	240.00		1.20	g	166.73	598.30	5.20
S20	92.1	92.1	92.1	Lw	AC4	720.00	240.00	240.00		1.20	g	186.96	582.99	5.20
S21	95.1	95.1	95.1	Lw	AC5	720.00	240.00	240.00		1.20	g	171.65	568.83	5.20
Trans1	80.9	80.9	80.9	Lw	Trans					2.50	r	258.00	899.22	2.50
Trans2	83.4	83.4	83.4	Lw	AC1	720.00	240.00	240.00		1.80	r	248.30	920.91	1.80
Rep1	96.1	96.1	96.1	Lw	Rep	480.00	120.00	0.00		1.50	r	429.58	836.95	1.50
Rep2	100.0	100.0	100.0	Lw	100	30.00	15.00	10.00	500	1.80	r	429.54	836.02	1.80

Result Table

Receiver		Limiting Value		Lr w/o Noise Control		Exceeding		passive NC
Name	ID	Day	Night	Day	Night	Day	Night	
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R1	R1	50	45	43.9	39.3	-	-	-
R2	R2	50	45	44.7	41.7	-	-	-
R3	R3	50	45	49.0	32.5	-	-	-
R1ola	R1ola	50	45	43.1	33.5	-	-	-
R2ola	R2ola	50	45	41.3	34.6	-	-	-

APPENDIX 4

SOUND LEVEL CRITERIA

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

ENVIRONMENTAL NOISE GUIDELINE
Stationary and Transportation Sources - Approval and Planning
Publication NPC-300

August 2013

Day-time Outdoor Sound Level Limit

Table C-1 gives the equivalent sound level (L_{eq}) limit for designated Outdoor Living Areas. The limit applies to the entire day-time period from 07:00 to 23:00.

TABLE C-1
Sound Level Limit for Outdoor Living Areas
Road and Rail

Time Period	*L_{eq}(16) (dBA)*
16 hr, 07:00 - 23:00	*55*

Indoor Sound Level Limit

Table C-2 gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor space. The specified sound level criteria are minimum requirements and apply to the indicated indoor spaces with the windows and doors closed.

TABLE C- 2
Indoor Sound Level Limits (Road and Rail)

Type of Space	*Time Period*	*L_{eq} (Time Period) (dBA)*	
		Road	*Rail*
Living/dining, den areas of residences, nursing/retirement homes, hospitals, schools, day-care centers, etc.	*07:00-23:00*	*45*	*40*
Living/dining areas of residences, nursing/retirement homes, hospitals, etc. (except schools or daycare centres)	*23:00 - 07:00*	*45*	*40*
Sleeping quarters	*07:00-23:00*	*45*	*40*
Sleeping quarters	*23:00 - 07:00*	*40*	*35*

SUPPLEMENTARY NOISE LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-9.

TABLE C-9
Indoor Sound Level Limits (Road and Rail)

Type of Space	*Time Period*	*L_{eq} (Time Period) (dBA)*	
		Road	*Rail*
General offices, reception areas, retail stores, etc.	*16 hours between 07:00-23:00*	*50*	*45*
Living/dining areas of residences, hospitals, schools, nursing/retirement, homes day-care centers, theatres, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms etc.	*16 hours between 07:00-23:00*	*45*	*40*
Sleeping quarters of hotels/motels	*8 hours between 23:00 - 07:00*	*45*	*40*
Sleeping quarters of residences, hospitals, nursing/retirement homes etc	*8 hours between 23:00 - 07:00*	*40*	*35*

SUMMARY OF MINIMUM NOISE CONTROL AND VENTILATION REQUIREMENTS FOR ROAD AND RAIL NOISE

TABLE 1
COMBINATION OF ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
OUTDOOR, VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	*L_{eq} (16 hr) (dBA)*	*VENTILATION REQUIREMENTS*	*OUTDOOR CONTROL MEASURES*	*WARNING CLAUSE*
OUTDOOR LIVING AREA (OLA)	*Less than or equal to 55 dBA*	*N/A*	*None required*	*Not required*
	Greater than 55 dBA to less than or equal to 60 dBA	*N/A*	*Control measures (barriers) not required but should be considered*	*Required if resultant L_{eq} exceeds 55 dBA Type A*
	Greater than 60 dBA	*N/A*	*Control measures (barriers) required to reduce the L_{eq} below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible*	*Required if resultant L_{eq} exceeds 55 dBA Type B*
PLANE OF LIVING ROOM WINDOW	*Greater than 50 dBA to less than or equal to 55 dBA*	*None required*	*N/A*	*Not required*
	Greater than 55 dBA to less than or equal to 65 dBA	*Forced air heating with provision for central air conditioning*	*N/A*	*Required Type C*
	Greater than 65 dBA	*Central air conditioning*	*N/A*	*Required Type D*

TABLE 2
COMBINATION OF ROAD AND RAIL NOISE, NIGHT-TIME (2300 - 0700)
VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	*L_{eq}(8hr) (dBA)*	*VENTILATION REQUIREMENTS*	*WARNING CLAUSE*
PLANE OF BEDROOM WINDOW	*Greater than 50 dBA to less or equal to 60 dBA*	*Forced air heating with provision for central air conditioning*	*Required Type C*
	Greater than 60 dBA	*Central air conditioning*	*Required Type D*

TABLE 3
ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		*L_{eq} (16 hr)*	*BUILDING COMPONENT REQUIREMENTS*
PLANE OF LIVING ROOM WINDOW	*ROAD*	*Less than or equal to 65 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

TABLE 4
ROAD AND RAIL NOISE, NIGHT-TIME (2300-0700)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		*L_{eq} (8 hr)*	*BUILDING COMPONENT REQUIREMENTS*
PLANE OF BEDROOM WINDOW	*ROAD*	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must bed designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

TABLE 5
FACADE REQUIREMENT FOR RAIL NOISE ONLY - 24 HOURS

ASSESSMENT LOCATION	*DISTANCE TO RAILWAY (m)*	*L_{eq} (24 hr) (dBA)*	*NOISE CONTROL REQUIREMENT*
PLANE OF BEDROOM WINDOW	*Less than 100 m*	*Less than or equal to 60 dBA*	*No additional requirement*
		Greater than 60 dBA	*Brick veneer or acoustically equivalent*
	Greater than 100 m	*Less than or equal to 60 dBA*	*No additional requirement*
		Greater than 60 dBA	*No additional requirement*

TABLE B- 1
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Outdoor Points of Reception

Time of Day	*Class 1 Area*	*Class 2 Area*	*Class 3 Area*	*Class 4 Area*
07:00-19:00	*50*	*50*	*45*	*55*
19:00 -23:00	*50*	*45*	*40*	*55*

TABLE B- 2
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Plane of Window of Noise Sensitive Spaces

Time of Day	*Class 1 Area*	*Class 2 Area*	*Class 3 Area*	*Class 4 Area*
07:00-19:00	*50*	*50*	*45*	*60*
19:00 -23:00	*50*	*50*	*40*	*60*
23:00-07:00	*45*	*45*	*40*	*55*

WARNING CLAUSES

The following warning clauses may be used individually or in combination:

TYPE A:

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of Environment."

TYPE B:

"Purchasers/tenants are advised that despite the inclusion of noise control features, the sound levels due to increasing road traffic may continue to be of concern, occasionally interfering with the activities of the dwelling occupants as the noise levels may exceed the noise criteria of the Municipality and the Ministry of the Environment."

TYPE C:

"This unit was fitted with ducting sized to accommodate a central ventilation system to allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."

TYPE D:

"This unit was fitted with an air conditioner to allow the windows and exterior doors to remain closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."

TYPE E:

"Occupants are advised that due to the proximity of the hydro substation, school, existing commercial development, sound levels from these uses may be audible at times"

APPENDIX 5

SAMPLE WINDOW AND EXTERIOR WALL CONFIGURATIONS

WINDOW STC RATINGS

STC	Double Glazing of indicated glass thickness					Triple Glazing	
	2mm and 2mm glass	**3mm and 3mm glass**	**4mm and 4mm glass**	**3mm and 6mm glass**	**6mm and 6mm glass**	**3mm 3mm and 3mm glass**	**3mm 3mm and 6mm glass**
	Interpane Spacing (mm)					Interpane Spacing (mm)	
27	6						
28	13						
29	15	6					
30	18	13	6				
31	22	16	13	6	6	6,6	
32	28	20	16	13	13	6,10	6,6
33	35	25	20	16	16	6,15	6,10
34	42	32	25	20	20	6,20	6,15
35	50	40	32	25	24	6,30	6,20
36	63	50	40	32	30	6,40	6,30
37	80	63	50	40	37	6,50	6,40
38	100	80	63	55	50	6,65	6,50
39	125	100	80	75	70	6,80	6,65
40	150	125	100	95	90	6,100	6,80
41		150	125	110	100		6,100
42			150	135	125		

Source: National Research Council, Division of Building Research

EXPLANATORY NOTES:

1. STC data listed in the table are for the well-fitted weather-stripped units that can be opened. The STC values apply only when the windows are closed. For windows fixed and sealed to the frame, add three to the STC given in the table.

2. If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.

3. If the interpane spacing for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacing are nearest the actual combined spacing.

4. The STC data listed in the table are for typical windows, but details of glass mounting, window seals, etc., may result in slightly different performance for some manufacturer's products. If the laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used.

EXTERIOR WALL STC RATINGS

Wall Configuration	EW1	EW2	EW3	EW4	EW1R	EW2R	EW3R	EW5	EW4R	EW6	EW7 EW5R	EW8
STC Rating	**38**	**40**	**43**	**46**	**47**	**48**	**49**	**54**	**55**	**57**	**58**	**62**

Source: National Research Council, Division of Building Research

NOTES:

1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.

- EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
- EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
- EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
- EW4 denotes the common structure, plus sheathing and 20 mm stucco.
- EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
- EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
- EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
- EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.

2 R signifies the mounting of the interior gypsum board on resilient clips.

3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.

4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.