YCA engineering Limited

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ENVIRONMENTAL NOISE ASSESSMENT
-REVISED-

226 BROCK STREET DEVELOPMENT
PROPOSED RESIDENTIAL TOWNS
SOUTH OF BROCK STREET AND
EAST OF HERREMA BOULEVARD

TOWNSHIP OF UXBRIDGE

PREPARED FOR:

WEST LANE DEVELOPMENTS GROUP LTD.

Revised September 2021
June 2018
Y1820A

EXECUTIVE SUMMARY

The proposed residential development is located south of Brock Street East (Highway No. 47) and approximately 800m east of Main Street North in the Township of Uxbridge.

The September 2021 Environmental Noise Assessment is issued to present the assessment of the proposed development and recommend any noise abatement features necessary to achieve sound levels acceptable to the Township of Uxbridge, the Region of Durham and the Ministry of Environment, Conservation and Parks.

The transportation noise sources having the potential to affect the living environment within the proposed development area include Brock Street East (Highway No. 47). The ultimate traffic volume on this noise source is used as input to the Stamson's 5.04 to generate the resultant sound levels. Copies of the correspondence regarding traffic data is included in Appendix 1 in this report.

Recommended noise abatement measures are described in Sections 5.1, 5.2, 5.3 and 5.4 and summarized in Table 3 of this report and on the attached Figure 2. These measures include:

1. Mandatory air conditioning is required for Building 1 (Units 1 to 4), Building 2 (Units 5 to 9) and Building 3 (Unit 10).

2. Provision for air conditioning is required for Building 3 (Units 11 to 14), Building 4 (Units 15,16), Building 5 (Units 25, 26) and Building 6 (Units 27, 28).

3. For Building 3 (Unit 10), a 2.5m high acoustic barrier is recommended along the side property line and returned to the house and rear property as shown on the attached Figure 2 to achieve a sound level of 57 dBA or less.

4. Standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all residential units within the proposed development.

5. 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.

TABLE OF CONTENTS

1.0 INTRODUCTION

PURPOSE

A residential development has been proposed by West Lane Developments Group Ltd. 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.

SITE DESCRIPTION AND LOCATION

The proposed development will consist of 2 storey Townhouse units located south of Brock Street East (Highway No. 47) at approximately 800m east of Main Street North in the Township of Uxbridge.

The surrounding land uses are existing residential development to the north, south and west, and vacant lands/open spaces to the east.

KEY PLAN

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

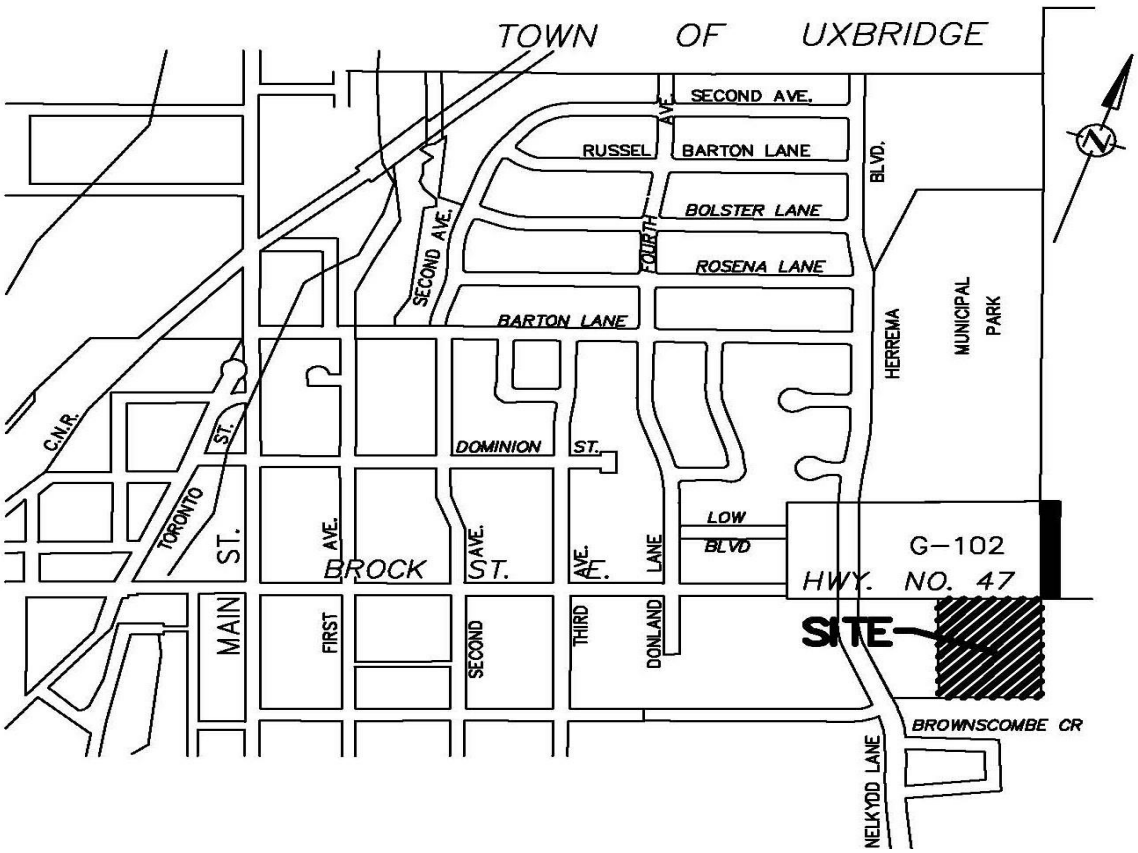


FIGURE 1

2.0 SOUND LEVEL CRITERIA

TRANSPORTATION:

The sound level descriptor (L_{eq} in dBA) is 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/Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads,
Living/Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads
Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads

Appropriate building components such as walls, doors and windows are chosen with reference to the following. Building facade requirements apply for both day and night at all facade heights. If daytime sound levels at the external dwelling walls are 65 dBA or less (roadways), and 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), 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. As per the Region of Peel's noise guidelines, if night-time sound levels are 60 dBA or greater, 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), the subject site is considered to be a Class 2 area. The sound level limits for a Class 2 area due to stationary sources for an Outdoor Point of Reception is sound level (L_{EQ}), 50 dBA during daytime (0700-1900) and 45 dBA during evenings (1900-2300). The sound level limits for a Class 2 area due to stationary sources for Plane of Window of Noise Sensitive Spaces is sound level (L_{EQ}), 50 dBA during daytime (0700-1900), 50 dBA during evenings (1900-2300) and 45 dBA during night-time (2300-0700). The Leq descriptor for stationary noise sources used are for a One Hour Time period.

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) and at approximately 800m 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 October 19, 2017. 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 at approximately 200m from the nearest receptor Block 1. Due to Distance separation, the noise impact from the existing hydro substation is considered acoustically insignificant.

4.0 NOISE ASSESSMENT

Figure 2 is based on the latest Site Plan dated September 2021 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 3.

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
Building 1 (Unit 1)	24.0[1] 36.0[1]	- <55	68.26 -	61.73 -
Building 3 (Unit 10)	25.0[1] 27.0[1]	- 64.11	68.08 -	61.55 -
Building 3 (Unit 14)	65.0[1] 67.0[1]	- 54.47	58.36	52.56
Building 6 (Unit 27)	68.0[1] 70.0[1]	- <55	58.04 -	52.25 -
Building 6 (Unit 29)	75.0[1] 77.0[1]	- 51.12	54.66 -	48.91 -

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

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

Table 2 indicates that daytime rear yard sound levels at the Outdoor Amenity Area (Rear Yard) of Building 3 (Unit 10) is expected to be above 60dBA in the absence of mitigative measures.

Therefore, outdoor noise mitigation measure is required for Building 3 (Unit 10).

NOISE BARRIERS

In accordance with M.E.C.P.'s policy, mitigative measure is required for the outdoor amenity areas to reduce the sound levels close to 55 dBA as technically, economically and administratively feasible.

For Building 3 (Unit 10), a 2.5m high acoustic barrier is recommended along the side property line and returned to the house and rear property as shown on the attached Figure 2 to achieve a sound level of 57 dBA or less.

The recommended barriers should be constructed of a material, which provides a minimum surface density of 20 kg per square metre.

Following installation of the recommended acoustic barrier, future outdoor sound levels may exceed 55 dBA at the following locations due to road traffic.

Therefore, 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 following locations. The clause should state:

- Building 3 (Unit 10)

  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."

5.2 VENTILATION REQUIREMENTS

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 locations:

- Building 1 (Units 1 to 4), Building 2 (Units 5 to 9), and Building 3 (Unit 10)

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:

- Building 3 (Units 11 to 14), Building 4 (Units 15, 16)
- Building 5 (Units 25, 26), Building 6 (Units 27, 28)

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"

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.

DAYTIME SOUND LEVELS

For the worst-case location during daytime, (Building 1, Unit 1) a daytime sound level of 68 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 30 for windows, STC 38 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst-case location during night-time, (Building 1, Unit 1) night-time sound level of 62 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 35 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 25%:

- double glazing 3mm x 3mm thickness with 13mm air space (Sliders) or
- double glazing 4mm x 4mm thickness with 6mm 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 80%:

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 4 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 suites noted below.

- Building 1 (Units 1 to 4), Building 2 (Units 5 to 9), Building 3 (Units 11 to 14), Building 4 (Units 15, 16), Building 5 (Units 25, 26), Building 6 (Units 27, 28)

Warning Clause Type A:

"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 occupants as the noise levels may exceed the noise criteria of the Ministry of the Environment."

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of all noise abatement measures are listed in the following Table 3 identifying ventilation requirements, building components and warning clauses.

TABLE 3: SUMMARY OF NOISE MITIGATION MEASURES

LOCATIONS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	SOUND BARRIERS	WARNING CLAUSES
Building 1 (Units 1 to 4), Building 2 (Units 5 to 9)	Mandatory air conditioning	Windows: OBC* Walls: OBC	-	Type A and D
Building 3 (Unit 10)	Mandatory air conditioning	Windows: OBC* Walls: OBC	2.5m**	Type B and D
Building 3 (Units 11 to 14), Building 4 (Units 15,16), Building 5 (Units 25, 26), Building 6 (Units 27, 28)	Provision for air conditioning	Windows: OBC Walls: OBC	-	Type A and C

* OBC: Ontario Building Code Standard.

** 2.5m high acoustic barrier along the side property line and returned to the side of the house and the rear property as shown on the attached Figure 2

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Building 1 (Units 1 to 4), Building 2 (Units 5 to 9) and Building 3 (Unit 10).

2. Provision for air conditioning is required for Building 3 (Units 11 to 14) Building 4 (Units 15, 16) Building 5 (Units 25, 26) and Building 6 (Units 27, 28).

3. For Building 3 (Unit 10), a 2.5m high acoustic is recommended along the side property line and returned to the house and rear property as shown on the attached Figure 2 to achieve a sound level of 57 dBA or less.

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

5. 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.

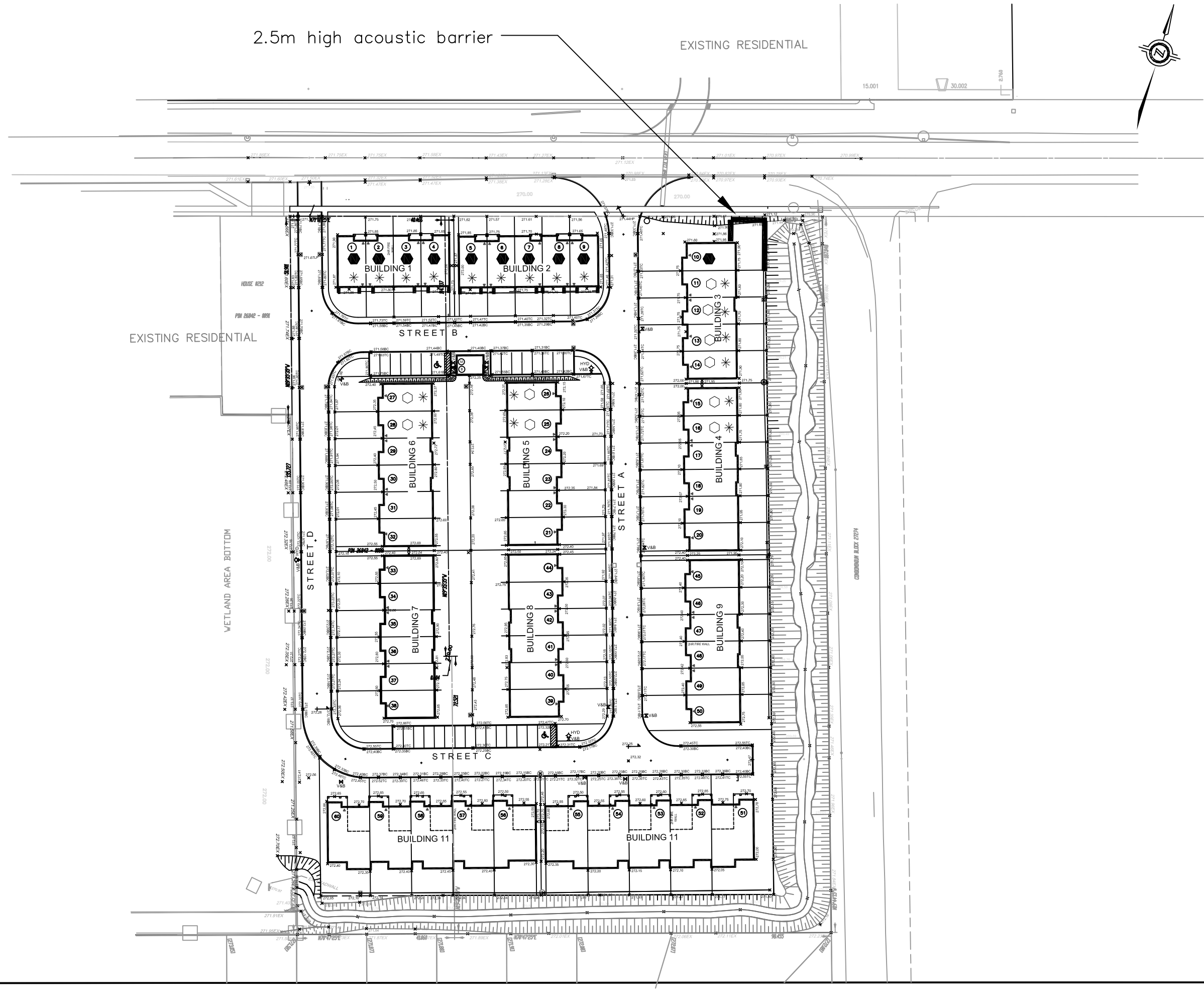
CONCLUSION

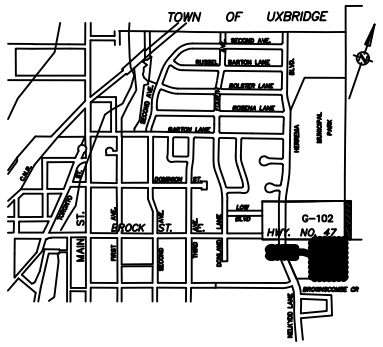
This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks, Township of Uxbridge and the Region of Durham are expected to be achieved using the abatement measures in this report and as shown on the attached Figure 2.

Respectfully submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Engineer





LEGEND:

- MANDATORY AIR CONDITIONING. AND WARNING CLAUSE D
- OPTIONAL AIR CONDITIONING. AND WARNING CLAUSE C
- WARNING CLAUSE A
- PROPOSED ACOUSTIC BARRIER AND WARNING CLAUSE B

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PLAN – NOISE MITIGATION MEASURES

226 BROCK STREET
PROPOSED RESIDENTIAL

TOWNSHIP OF UXBRIDGE

WEST LANE DEVELOPMENTS GROUP LTD.

FIGURE 2

Scale: NTS

DATE: SEPTEMBER 2021

APPENDIX 1

TRAFFIC DATA

Planning and Economic Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
P.O. BOX 623
WHITBY, ON L1N 6A3
CANADA
905-668-7711
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E-Mail: planning@durham.ca

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

Address: YCA

Telephone: (416) 894-4213 Fax:

Location of Proposal:

Brock Street East (Reg. Hwy 47), east of Main Street, Uxbridge

Municipality: Uxbridge Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: October-18-17 Received By: Sandra McEleney

Date Forecast Sent: October-19-17

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
Brock Street E. (Reg. Hwy 47)	11,000	4	15	80	20	50
	0	0	0	0	0	0
	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 2

SOUND LEVEL CALCULATIONS

```
STAMSON 5.04        SUMMARY REPORT        Date: 14-06-2018 14:39:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: blk1fw.te            Time Period: Day/Night 16/8 hours
Description: Unit 1, 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   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  24.00 / 24.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    68.26 !    68.26
--------------------+---------+---------+---------
                      Total                  68.26 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    61.73 !    61.73
--------------------+---------+---------+---------
                      Total                  61.73 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 68.26
                           (NIGHT): 61.73
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 14-06-2018 14:39:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: blk1ola.te           Time Period: Day/Night 16/8 hours
Description: Unit 1, OLA

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  :  36.00 / 24.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   2.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   2.80 m
Barrier elevation         :   2.80 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    51.43 !    51.43
--------------------+---------+---------+---------
                      Total                  51.43 dBA
```

STAMSON 5.0 SUMMARY REPORT Date: 21-09-2021 08:59:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: blg3sw.te Time Period: Day/Night 16/8 hours
Description: Unit 10, 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 : 2 (Reflective ground surface)
Receiver source distance : 25.00 / 25.00 m
Receiver height : 1.50 / 4.50 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	68.08	68.08
Total			68.08 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	61.55	61.55
Total			61.55 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.08
(NIGHT): 61.55

STAMSON 5.0 SUMMARY REPORT Date: 21-09-2021 08:59:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: blg3ry.te Time Period: Day/Night 16/8 hours
Description: Unit 10, 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 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.00 / 27.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 6.00 / 6.00 m
Source elevation : 270.80 m
Receiver elevation : 271.85 m
Barrier elevation : 271.65 m

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Brock Street	1.86	64.11	64.11 *
Total			64.11 dBA

* Bright Zone !

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

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	273.45	59.27	59.27
1.90	273.55	59.07	59.07
2.00	273.65	58.80	58.80
2.10	273.75	58.49	58.49
2.20	273.85	58.15	58.15
2.30	273.95	57.78	57.78
2.40	274.05	57.39	57.39
2.50	**274.15**	**57.00**	**57.00**
2.60	274.25	56.61	56.61
2.70	274.35	56.22	56.22
2.80	274.45	55.83	55.83
2.90	274.55	55.46	55.46
3.00	274.65	55.09	55.09

```
STAMSON 5.04        SUMMARY REPORT        Date: 14-06-2018 14:40:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: blk6fw.te            Time Period: Day/Night 16/8 hours
Description: Unit 27, 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  :  65.00 / 65.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    58.36 !    58.36
--------------------+---------+---------+---------
                      Total                  58.36 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    52.56 !    52.56
--------------------+---------+---------+---------
                      Total                  52.56 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 58.36
                           (NIGHT): 52.56
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 18-06-2018 12:43:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: blk4ry.te            Time Period: Day/Night 16/8 hours
Description: Unit 27, 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   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  67.00 / 67.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Brock Street     !     1.86 !    54.41 !    54.41
--------------------+---------+---------+---------
                      Total                  54.41 dBA
```

APPENDIX 3

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 6
AIRCRAFT NOISE ONLY - 24 HOURS

ASSESSMENT LOCATION	*NEF/NEP*	*VENTILATION REQUIREMENTS*	*NOISE CONTROL REQUIREMENT*	*WARNING CLAUSE*
ANY LOCATION ON PROPERTY OR LOT	*Less than NEF 25*	*None Required*	*Building Compliant with the OBC*	*Not required*
	Greater or equal to NEF 25 to less than NEF 30	*Provision for central air conditioning*	*Building components must be designed to achieve indoor sound level criteria*	*Required Type C*
	Greater than NEF 30	*Central air Conditioning*	*Building components must be designed to achieve indoor sound level criteria*	*Required Type B and D*

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 despite the inclusion of noise control features, 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"

TYPE D:

"This unit has been supplied with a central air conditioning system which will allow the 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 Environment."

APPENDIX 4

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.