

# **ENVIRONMENTAL NOISE ASSESSMENT**

## **PROPOSED RESIDENTIAL DEVELOPMENT VILLAGES OF CENTRAL PARK COBOURG TRAILS (PHASE 2)**

**PART OF LOT 13, CONCESSION A  
TOWN OF COBOURG  
(COUNTY OF NORTHUMBERLAND)**

**PREPARED FOR:  
TRIBUTE (COBOURG) LIMITED**

January 25, 2022

Town of Cobourg  
Planning Department  
55 King Street West  
Cobourg, ON  
K9A 2M2

**Re:            Environmental Noise Assessment  
                 Proposed Residential Development  
                 Villages of Central Park  
                 Cobourg Trails (Phase 2)  
                 Tribute (Cobourg) Limited  
                 Part of Lot 13, Concession A  
                 Town of Cobourg (County of Northumberland)  
                 Project No. Y1837A**

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We are pleased to submit this Environmental Noise Assessment for the above noted development based on the latest Phase 2 Draft Plan and Grading Plans dated January 2022 to achieve sound levels acceptable to the Ministry of Environment, Conservation and Parks and the Town of Cobourg.

The study addresses noise generated by transportation noise sources: Brook Road North to the east, the future realigned Nagle Road to the southeast, and the stationary noise sources to the south: existing Hydro Substation and existing industries.

Prior to construction of the dwelling units, it is recommended that the architectural plans and site plans to be reviewed to ensure all building components meet the acoustical requirements.

Prior to the issuance of occupancy permit, it is recommended that a qualified engineer should submit a letter to the Town indicating that the recommended noise control measures or acceptable alternatives have been incorporated in the building which satisfy the M.E.C.P. noise criteria.

Should you have any questions regarding this report, please contact the undersigned.

Respectfully Submitted,

**YCA ENGINEERING Limited**



Hava Jouharchi, P.Eng.  
Senior Project Engineer

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## 1.0 INTRODUCTION

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### PURPOSE

A residential development has been proposed by Tribute (Cobourg) Limited in the Town of Cobourg. This report is an analysis of future sound levels within the proposed development and describes the types and locations of noise mitigation measures which will be required.

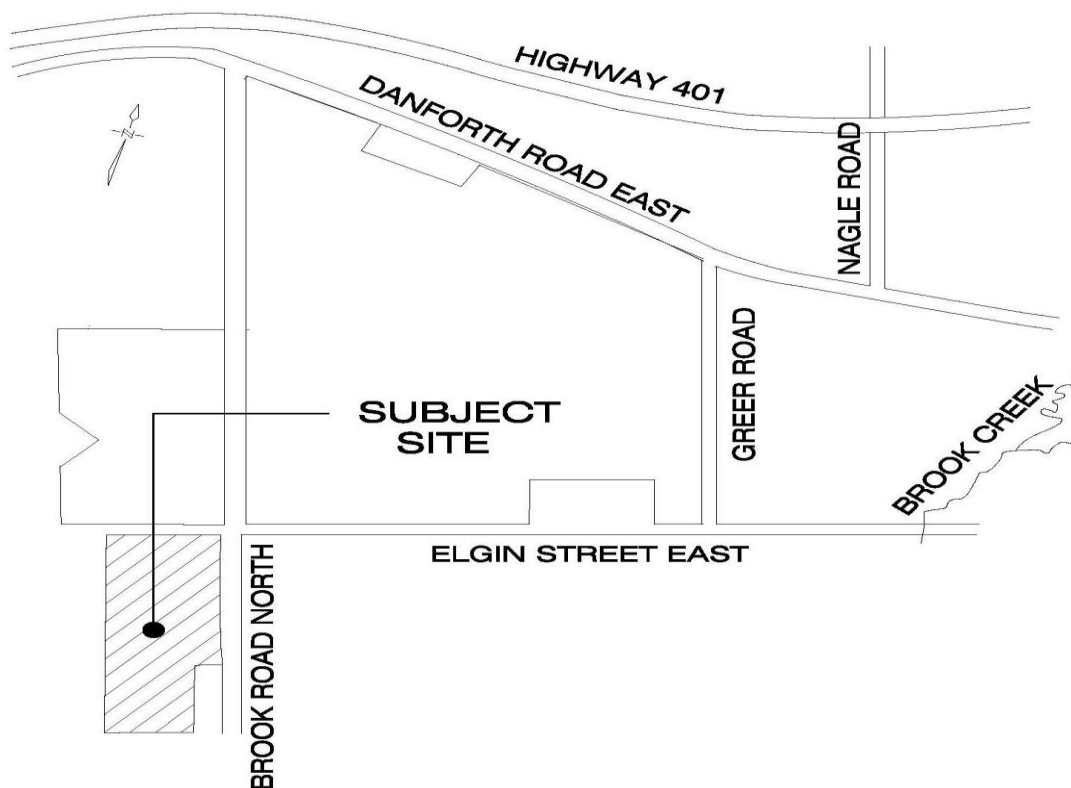
### SITE DESCRIPTION AND LOCATION

The proposed Phase 2 of the development consists of detached residential units, townhouse blocks, a stormwater management pond, parks/ open spaces, Environmental Protection Blocks and local internal roads. Brook Road North is located to the east and the future realigned Nagle Road is conceptually identified approximately 110m to the southeast in the Town of Cobourg.

The surrounding land uses are existing soccer fields, Brook creek and residential developments to the west, existing rural/agricultural uses and woodlots to the north and east, and existing industries and a Hydro Substation.

### KEY PLAN

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



**FIGURE 1**

## 2.0 SOUND LEVEL CRITERIA

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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 Roads

If daytime outdoor sound levels at the backyards (outdoor activity areas) exceed 60 dBA, physical noise attenuation measures such as acoustical fences, increased building setbacks or reorientation of the buildings 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 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/sleeping quarters window of a 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 area/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 due to higher traffic volume during the daytimes as per observation during the site visits.

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 (0700-1900) and 45dBA during evening-time (1900-0700).

## LAND USE COMPATIBILITY AND DISTANCE SEPARATION

Land use compatibility requirements are as per D-1 and D-6 Guidelines. The industries to the south of the proposed development are considered to be Class I industrial facilities.

The minimum recommended setback distance between the property lines of Class I industrial facilities and a noise sensitive land use is 20m. The proposed residential development meets the minimum distance setback requirement for the Class I industries.

The D-1 and D-6 Guidelines allow the minimum setback distances to be reduced if sufficient mitigation measures are implemented.

There are no Class II industries within 500m or Class III industries within 1000m of the proposed development.

### 3.0 NOISE SOURCES

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#### ROAD TRAFFIC

The proposed residential development is located west of Brook Road North, approximately 200m south of Elgin Street East and 110m northwest of the Future realigned Nagle Road as indicated on Figures 1 and 3. Highway 401 is located at 1.5km to the north. Noise generated by Brook Road North and the future Nagle Road have the potential to affect the future residential development.

Due to distance separation and low traffic volumes, all other roads within or near this site are acoustically insignificant.

Traffic volume information for Brook Road North was based on a Traffic Impact Study prepared by R.J. Burnside & Associates Limited dated October 2017 and updated January 2022. The truck percentages were assumed to be 30% medium and 70% heavy trucks for Brook Road North and 50% medium and 50% heavy trucks for the future realigned Nagle Road. The forecasted traffic information was projected to the year 2042 at a growth rate of 3% per year.

Therefore, for noise analysis purposes, the following traffic information for Brook Road North and the future realigned Nagle Road are summarized in the Tables 1 and 2 below:

<b>TABLE 1: BROOK ROAD TRAFFIC DATA</b>	
Projected Annual Average Daily Traffic*	8,000
Percent Trucks	10%
Heavy and Medium trucks ratio	70:30
Speed (km/hr)	60
Number of Lanes	2

<b>TABLE 2: FUTURE REALIGNED NAGLE ROAD TRAFFIC DATA</b>	
Projected Annual Average Daily Traffic*	10,000
Percent Trucks	10%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	60
Number of Lanes	2

\* Projected future traffic based on Traffic Impact Study prepared by R. J. Burnside & Associates Ltd.

#### RAIL TRAFFIC

The proposed development is located at more than 700m from the CP and CN railways to the south. Therefore, the railway noise is considered acoustically insignificant.



## STATIONARY NOISE SOURCES

**Hydro Substation (833 Brook Road North):** is located to the southeast corner of the proposed development along Brook Road North. The noise sources of concern are the transformers as shown on Figure 4.

**Markham Metals Ltd. (701 Brook Road North):** is located approximately 50m from the nearest residential receptor location within the proposed development as shown on Figure 2. The main operation of this industry is metal recycling services which occurs within the building and the operation hours are 7:00am to 7:00pm weekdays with possible operation hours up to 2:00am.

The noise sources of concern are the mechanical roof top units on the roof, a transformer north of the building, a blower located north of the building and loading activities at the north and east of the building. The frequency of truck deliveries is generally 5 to 6 trucks per day.

**Canadian Wear Technologies (675 Brook Road North):** is located approximately 200m from the proposed residential development with daytime operations. The main noise sources of concern from this industry are the truck movements on site. In addition, there may be some repair activities and mechanical equipment at the loading bays and rear of the building.

## 4.0 NOISE ASSESSMENT

Figures 2A and 2B are based on the latest Phase 2 Draft Plan and Grading Plan dated January 2022 showing various noise analysis locations and noise mitigation measures within the proposed development.

Sound levels were calculated using the Ministry of Environment's Stanson 5.04 computer-based noise prediction model. The noise criteria and warning clauses are listed in Appendix 3. Table 3 lists the unattenuated sound levels at various locations.

<b>TABLE 3: UNATTENUATED SOUND LEVELS</b>					
<b>LOCATIONS</b>		<b>DISTANCE TO CENTRELINE OF ROAD (m)</b>	<b>DAYTIME (16 Hr. Leq (dBA))</b>		<b>NIGHT-TIME (8 Hr. Leq (dBA))</b>
			<b>OUTDOOR AMENITY</b>	<b>DWELLING WALL</b>	<b>DWELLING WALL</b>
<b>PHASE 2</b>					
Block 1 (East Unit)	Side Wall	26.0 <sup>1</sup>	-	63.29	57.14
	Rear Yard	28.0 <sup>1</sup>	62.24	-	-
Block 4 (South Unit)	Front Wall	40.0 <sup>1</sup>	-	61.83	55.30
	Rear Yard	58.0 <sup>1</sup>	<55	-	-
Block 10 (North Unit)	Rear Wall	81.0 <sup>1</sup>	-	54.83	49.09
	Rear Yard	78.0 <sup>1</sup>	54.71	-	-
<b>Future Development*</b>					
Future Block 11 (East Unit)	Side Wall	18.0 <sup>1</sup> 100.0 <sup>2</sup>	-	65.80 54.09 (66.08)	59.50 48.44 (59.83)
	Rear Yard	20.0 <sup>1</sup> 100.0 <sup>2</sup>	64.20 53.23 (64.53)	-	-
Future Block A (East Unit)	Side Wall	18.0 <sup>1</sup> 140.0 <sup>2</sup>	-	65.80 51.80 (65.97)	59.50 46.27 (59.70)
	Rear Yard	20.0 <sup>1</sup> 150.0 <sup>2</sup>	64.35 49.67 (64.50)	-	-

- 1 Brook Road North  
 2 Future Realigned Nagle Road  
 ( ) Combined sound level from multiple sources

\* See Figures 2B and 3B for the Future Development location and layout.

## 4.2 STATIONARY NOISE SOURCES ASSESSMENT

The sound levels were calculated using the CadnaA Version 2021 computer program using the International Standard ISO 9613-2.

### EXISTING STATIONARY NOISE SOURCES:

#### Mechanical Units:

The mechanical roof top units from all industrial buildings have the potential to generate sound levels exceeding the sound level limits at the proposed residential development. The air condensing units and exhaust fans are located at the roof tops of all industrial buildings as shown on the attached Figures 4 and 5.

The Sound Power Levels for all the mechanical roof top units were taken to be between a typical 82dBA and 92dBA and the at ground transformer was taken to be 76 dBA as it was inaudible during the site visit. All roof top units and mechanical equipment are assumed to be operating 100% of the time during the daytime/evening and operating 50% of the time during the night-time based on similar roof top units sound levels.

As discussed with Markham Metals Ltd., a blower is located north of the building that is audible at times during the night-time. The Sound Power Level for the blower was taken to be 90dBA.

Repair activities at the loading bays of the industrial building to the south and blowers were also taken into account for noise analysis purposes.

#### Loading Activities:

The loading area is located north of the building partially shield by the building itself. The delivery activities have been taken into account in the noise analysis with 8 trucks during the days/evenings and 1 truck during the evening for worst case scenario. An idling time of up to 10minutes per hour has been assumed. Based on the delivery truck sizes, truck movements are taken to be 110 dBA as line sources.

#### Garbage pickups and Infrequent deliveries:

The garbage pick-ups and infrequent deliveries are expected to occur during the daytime. The garbage pickups and infrequent/unscheduled deliveries are generally short in duration and are excluded from the stationary source noise sources. However, some activities may be audible at times.

#### Hydro Substation (Transformers):

A site visit and sound measurements were conducted in October 2021 for the Hydro Substation. As per discussion with a representative of the Hydro Substation, the transformer was operating at maximum capacity during the sound measurements. Therefore, the sound levels measured are considered to be the highest sound levels.

The Transformer Sound Power Level (PWL) was calculated to be 74dBA based on the sound measurement results. A 5dBA penalty has been added in the analysis.

The following Table 4 summarizes the sound levels from the surrounding stationary noise sources on the proposed receptor locations:

<b>RECEPTOR</b>	<b>DAYTIME/ EVENING (0700 - 2300)</b>	<b>NIGHTTIME (2300 - 0700)</b>	<b>Exceedance</b>
R1* (Future Block 11- Rear wall 3rd floor)	47.0	45.0	No
R1a** (Future Block 11 - Rear Yard)	48.7	47.5	Yes
R2* (Future Block 11- Rear wall, 3rd floor)	47.6	45.0	No
R2a** (Future Block 11 - Rear Yard)	47.7	45.6	Yes
R3* (Block 10- Side Wall, 3rd floor)	44.7	41.4	No
R4* (Block 9- Side Wall, 3 <sup>rd</sup> floor)	43.7	40.4	No
Ra** (Block 9- Rear Yard)	43.4	40.0	No

\* Receptors analysed at 3rd floor of buildings (7.5m above ground)

\*\* Receptors analysed at ground level (1.5m above ground)

The total sound level results from the proposed mechanical units, loading activities and Hydro Substation are expected to meet the sound level limits of 50dBA during the daytime/evenings.

However, the sound levels at the Future Block 11 are expected to exceed the sound level limits of 45 dBA during the night-time, mostly due to the Hydro Substation sound levels.

Therefore, noise mitigation measures are required for the Future Block 11 due to the existing stationary noise sources which are discussed in Section 5.1.2 and 5.3.2 of this noise report.

## 5.0 RECOMMENDED NOISE MITIGATION MEASURES

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### 5.1 OUTDOOR MEASURES

#### 5.1.1 TRAFFIC NOISE OUTDOOR MEASURES

Table 3 indicates that daytime rear yard sound level at the following location will be above 60dBA in the absence of mitigative measures. Therefore, outdoor noise mitigation measures are required for as shown on Figure 2A:

- Blocks 1, 2 (East Unit)

##### Future Development:

The following blocks are expected to be provided with outdoor noise mitigation measures once the Future development is constructed as shown on the attached Figure 2B and 3B (grading plan) attached.

- Future Blocks 11 and A (East Unit)

#### NOISE BARRIERS

In accordance with M.E.C.P, mitigative measure is required for Blocks 1, 2 (East Unit) and the Future Blocks 11 and A (East Unit) to reduce the sound levels close to 55 dBA as technically, economically and administratively feasible based on the latest grading information provided January 2022.

For Blocks 1, 2 (East Unit), flanking onto Brook Road North, a 2.1m high acoustic barrier is required along the side properties. The 2.1m high acoustic fence should return to the side wall of the houses as shown on the attached Figure 2A to achieve a sound level of 59 dBA or less.

##### Future Development:

For Future Blocks 11 and A (East Unit), flanking onto Brook Road North, a 2.1m high acoustic barrier is required along the side properties. The 2.1m high acoustic fence should return to the side wall of the houses and the rear property line of Future Block A (East Unit) as shown on the attached Figures 2B and 3B to achieve a sound level of 59 dBA or less.

#### 5.1.2 STATIONARY NOISE OUTDOOR MEASURES

As per the sound level results in Table 4, the stationary noise sources from the proposed industrial developments are not expected to exceed the sound level limits at the outdoor amenity areas of the proposed residential development due to stationary noise sources. However, an acoustic barrier is recommended along the rear property of the Future Block 11 to mitigate the sound levels at the building façade.

##### Future Development:

A 2.5m high acoustic barrier (fence) is required at the south property of the Future Block 11 (All Units) as shown on Figures 2B and 3B.

- Future Partial Block 11 (All Units)

A warning clause should therefore be incorporated into the Subdivision 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:

- Blocks 1, 2 (East Unit)

Future Development:

- Future Block 11 (All Units) and Future Block A (East Unit)

Warning Clause No. B

*“Occupants are advised that despite the inclusion of noise control features, the sound levels due to increasing road traffic and the existing Hydro Substation and industrial developments 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.”*

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.

The following Table 5 summarizes the sound levels from the surrounding stationary noise sources on the proposed receptor locations with the above recommended outdoor noise mitigation measures:

<b>RECEPTOR</b>	<b>DAYTIME/ EVENING (0700 - 2300)</b>	<b>NIGHTTIME (2300 - 0700)</b>	<b>Exceedance</b>
R1* (Future Block 11- Rear wall 3rd floor)	46.6	44.5	No
R1a** (Future Block 11 - Rear Yard)	42.8	40.5	No
R2* (Future Block 11- Rear wall, 3rd floor)	47.5	44.8	No
R2a** (Future Block 11 - Rear Yard)	46.6	43.7	No
R3* (Block 10- Side Wall, 3rd floor)	44.7	41.4	No
R4* (Block 9- Side Wall, 3 <sup>rd</sup> floor)	43.7	40.4	No
Ra** (Block 9- Rear Yard)	43.4	40.0	No

\* Receptors analysed at 3rd floor of buildings (7.5m above ground)

\*\* Receptors analysed at ground level (1.5m above ground)

The total sound level results from the surrounding mechanical units, loading activities and the Hydro Substation are expected to meet the outdoor sound level limits of 50dBA during the daytime/evenings and 45dBA during the night-times at all proposed receptor locations.

See Section 5.3.2. for building setback distance requirement due to stationary noise sources.

In addition , a warning clause Type E (included in Section 5.4) should be included in offers of purchase an agreement to inform the future residents of the potential noise activities.

## 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 3.

#### MANDATORY CENTRAL AIR CONDITIONERS

Based on the information in Table 3, 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:

#### Future Development:

- Future Blocks 11 and A (East Unit)

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

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 CENTRAL AIR CONDITIONERS

The following dwelling units 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.

- Blocks 1, 2 (All Units within 50m of Brook Road), Block 4 (All Units)

#### Future Development:

- Future Blocks 11, A (Units between 30m and 60m from Brook Road)

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

Warning Clause Type C:

*“This dwelling unit was fitted with ducting sized to accommodate a central air conditioning unit. The installation of central air conditioning by the homeowner will 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 SOURCES**

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.

## **5.3 BUILDING COMPONENTS**

### **5.3.1 BUILDING COMPONENTS DUE TO TRAFFIC NOISE**

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 buildings are not available at this time 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 25% of the floor area and the same side exterior walls are assumed to be 80% of the floor area.

#### **DAYTIME SOUND LEVELS**

In order to ensure acceptable daytime indoor sound levels at the most noise sensitive location (Future Block 11), the various building components must provide a STC rating of 29 for windows and a STC rating of 36 for exterior walls (using a daytime dwelling wall sound level of 66 dBA).

#### **NIGHT-TIME SOUND LEVELS**

In order to ensure acceptable night-time second storey sound levels at the most noise sensitive location (Future Block 11), the various building components must provide a STC rating of 26 for windows and a STC rating of 33 for exterior walls (using a night-time bedroom sound level of 60 dBA).

#### **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 window and exterior wall components are acceptable to meet the indoor sound levels.

#### **EXTERIOR WALLS**

The following exterior wall construction EW1 meets the STC 36 rating, assuming a ratio of wall area to room floor area of 80%:



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 20mm siding or stucco

## WINDOWS

The following are some window configurations meeting an STC rating of 29, assuming the ratio of window area to room floor area is 25%:

- double glazing 3mm x 3mm thickness with 13mm air space (Sliders/Casement) or
- double glazing 4mm x 4mm thickness with 6mm air space (Sliders/Casement) or
- any other window type yielding a similar or greater STC rating

Sample window and exterior wall configurations are included in Appendix 4 for additional options.

Please note that the final building components should be determined once final building floor plans become available and once dwelling locations and orientations are finalized.

### **5.3.2 BUILDING COMPONENTS DUE TO STATIONARY NOISES**

For Future Block 11 (All Units), the building should setback a minimum of 9m from the rear property line in order for the sound level from the Hydro Substation to meet the daytime sound level of 50 dBA and the night-time sound level of 45 dBA.

There are no further building component requirements due to stationary noise sources.

## **5.4 WARNING CLAUSES**

Warning clause Type A must be incorporated into the Subdivision Agreement for the following units, which will be registered on title and included in all offers of purchase and sale or lease.

- Blocks 1, 2 (All Units within 50m of Brook Road), Block 4 (All Units)

### Future Development:

- Future Blocks 11, A (Units between 30m and 60m from Brook Road)

Warning Clause Type A

*"Occupants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants as the sound level will exceed the Ministry of Environment's noise criteria."*

In addition, a warning clause Type E (included in Section 5.4) should be included in offers of purchase an agreement to inform the future residents of the potential noise activities.

- Future Block 11 (All Units)

Warning Clause Type E

*"Occupants are advised that due to the proximity of the Hydro Substation and the existing industries, noise from the activities may at times be audible"*

## 6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in the following Table 6 identifying ventilation requirements, noise barrier requirements, building components and warning clauses.

<b>TABLE 6: SUMMARY OF NOISE MITIGATION MEASURES</b>				
<b>LOCATIONS</b>	<b>VENTILATION REQUIREMENTS</b>	<b>BUILDING COMPONENTS</b>	<b>NOISE BARRIERS</b>	<b>WARNING CLAUSES</b>
<b>PHASE 2</b>				
Blocks 1, 2 (East Unit)	Provision for air conditioning	Wall: OBC Window: OBC	2.1m <sup>2</sup>	Type A, B and C
Blocks 1, 2 (Units within 50m of Brook Road) Block 4 (All Units)	Provision for air conditioning	Wall: OBC Window: OBC	No	Type A, C
All Remaining Blocks/Lots	No Requirements			
<b>FUTURE DEVELOPMENT</b>				
Future Block 11 (East Unit)	Mandatory central air conditioning	Wall: OBC <sup>1</sup> Window: OBC  min. of 9m setback from south property	2.1m <sup>2</sup>	Type A, B D and E
Future Block A (East Unit)	Mandatory central air conditioning	Wall: OBC <sup>1</sup> Window: OBC	2.1m <sup>2</sup>	Type A, B and D
Future Block 11 (units between 30m and 60m of Brook Road)	Provision for air conditioning	Wall: OBC Window: OBC  min. of 9m setback from south property	2.5m <sup>3</sup>	Type A, B, C and E
Future Block A (Units between 30m and 60m of Brook Road)	Provision for air conditioning	Wall: OBC Window: OBC	No	Type A, C

<sup>1</sup> Ontario Building Code Standard requirement.

<sup>2</sup> 2.1m high acoustic fence to be located at the side of the property. See Grading plans for details and Figures 2A,2B, 3A and 3B.

<sup>3</sup> 2.5m high acoustic fence to be located at the rear of the property (on top of the slope. See Grading plans for details and Figures 2B and 3B.

## 7.0 RECOMMENDATIONS AND CONCLUSION

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### RECOMMENDATIONS

1. Mandatory air conditioning is required for the Future Development Blocks 11, A (East Unit).
2. Provision for air conditioning is required for Blocks 1, 2 (All Units within 50m of Brook Road), Block 4 (All Units) and the Future Development Blocks 11, A (Units between 30m and 60m of Brook Road).
3. For Blocks 1, 2 (East Unit), flanking onto Brook Road North, a 2.1m high acoustic barrier is required along the side properties. The 2.1m high acoustic fence should return to the side wall of the houses as shown on the attached Figures 2A and 3A to achieve a sound level of 59 dBA or less.

#### Future Development:

For Future Blocks 11 and A (East Unit), flanking onto Brook Road North, a 2.1m high acoustic barrier is required along the side properties. The 2.1m high acoustic fence should return to the side wall of the houses and the rear property line of Future Block A (East Unit) as shown on the attached Figures 2B and 3B to achieve a sound level of 59 dBA or less.

A 2.5m high acoustic barrier (fence) is required at the south property of the Future Block 11 (All Units) as shown on Figures 2B and 3B.

4. For the Future Development Block 11 (All Units), the building should setback a minimum of 9m from the rear property line in order for the sound level from the Hydro Substation to meet the daytime sound level of 50 dBA and the night-time sound level of 45 dBA.
5. Standard window and exterior wall components are acceptable to meet the indoor sound levels.
6. All applicable warning clauses shall be listed in the Town of Cobourg's Subdivision Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.
7. Prior to construction of the dwelling units, it is recommended that the architectural plans to be reviewed to ensure all building components meet the acoustical requirements.
8. Prior to the issuance of occupancy permit for any unit for which noise barriers, ventilation and building components has been specified in the Noise Study, it is recommended that a qualified engineer should submit a letter to the Town indicating that the recommended measures or acceptable alternatives have been incorporated in the building which satisfy the M..E.C.P. criteria.

CONCLUSION

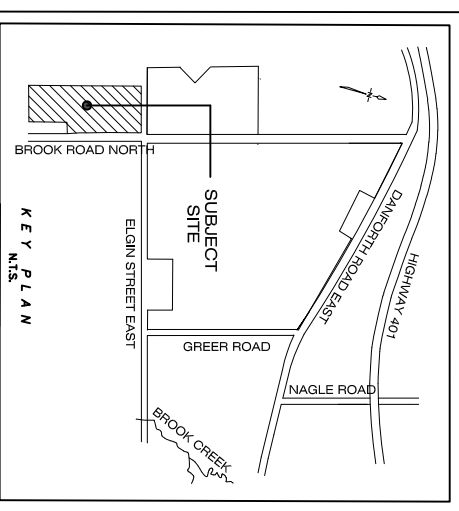
This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks and Town of Cobourg are expected to be achieved using the abatement measures in this report and as shown on the attached Figures 2A and 2B.

Respectfully submitted,

**YCA ENGINEERING Limited**



Hava Jouharchi, P.Eng.  
Senior Project Engineer



**LEGEND:**

- MANDATORY CENTRAL AIR CONDITIONING AND WARNING CLAUSE D
- OPTIONAL CENTRAL AIR CONDITIONING AND WARNING CLAUSE C
- \* WARNING CLAUSE A
- △ WARNING CLAUSE E
- ▬ PROPOSED ACOUSTIC BARRIER AND WARNING CLAUSE B
- [R] RECEPTOR LOCATIONS

**YCA ENGINEERING** Limited  
 9251 Yonge Street, Suite 8557  
 Richmond Hill, ON, L4C 9T3  
 Tel: 416-894-3213  
 Email: [hovd@ycacengineering.com](mailto:hovd@ycacengineering.com)

**PLAN OF SUBDIVISION  
 NOISE  
 MITIGATION MEASURES**

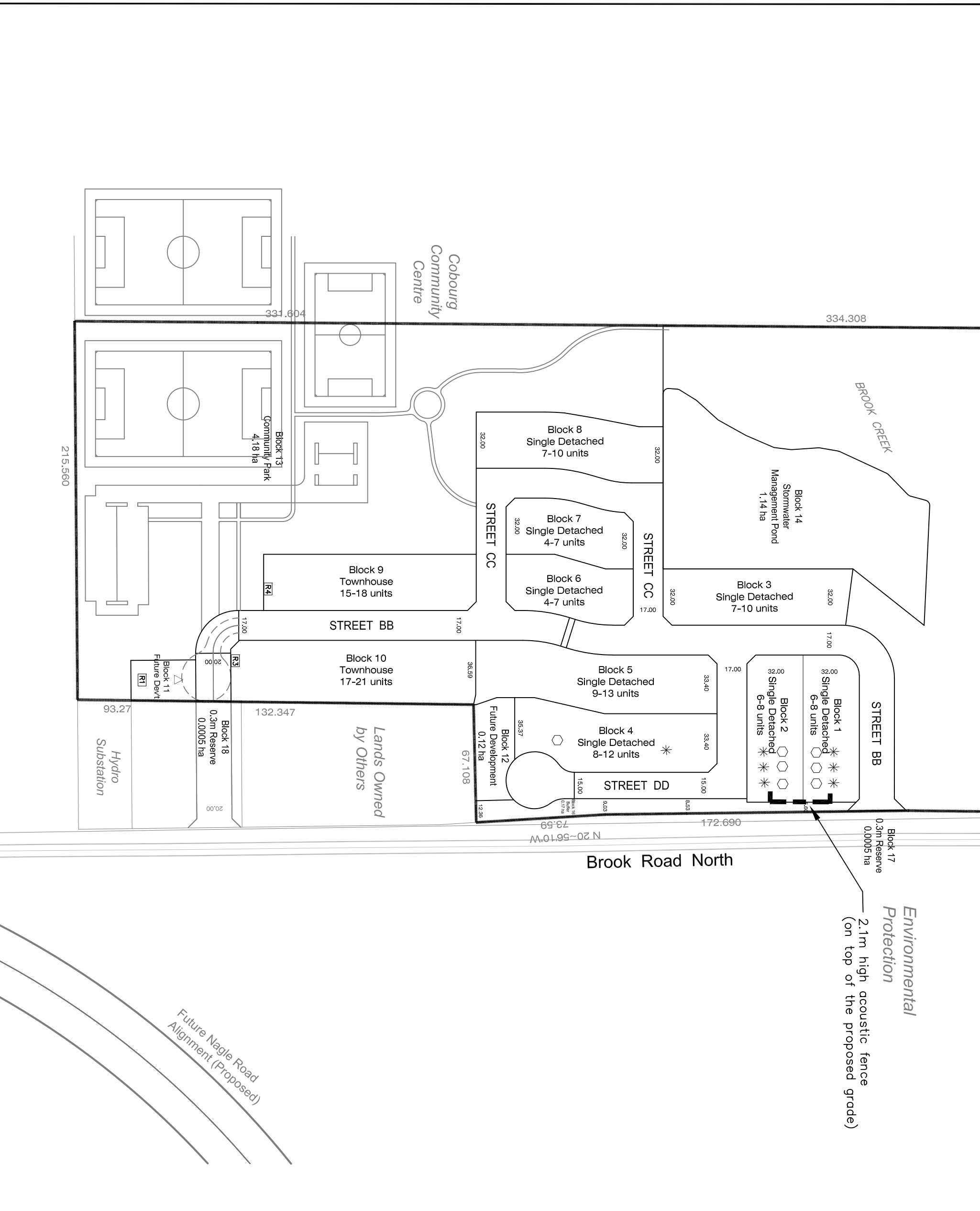
**COBOURG TRAILS  
 (PHASE 2)**  
 Part of Lots 11,12 and 13  
 Concessions A and 1, Block D  
 Registered Plan 277  
 File: 14T06001-R

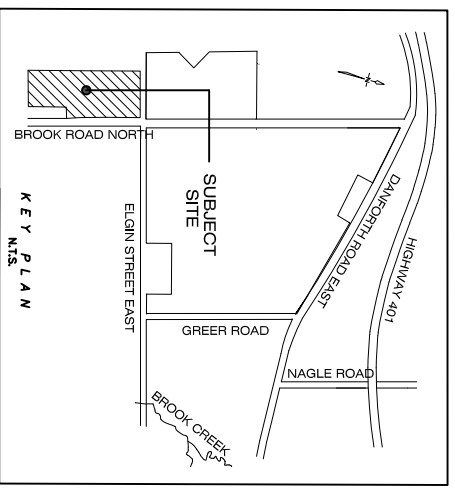
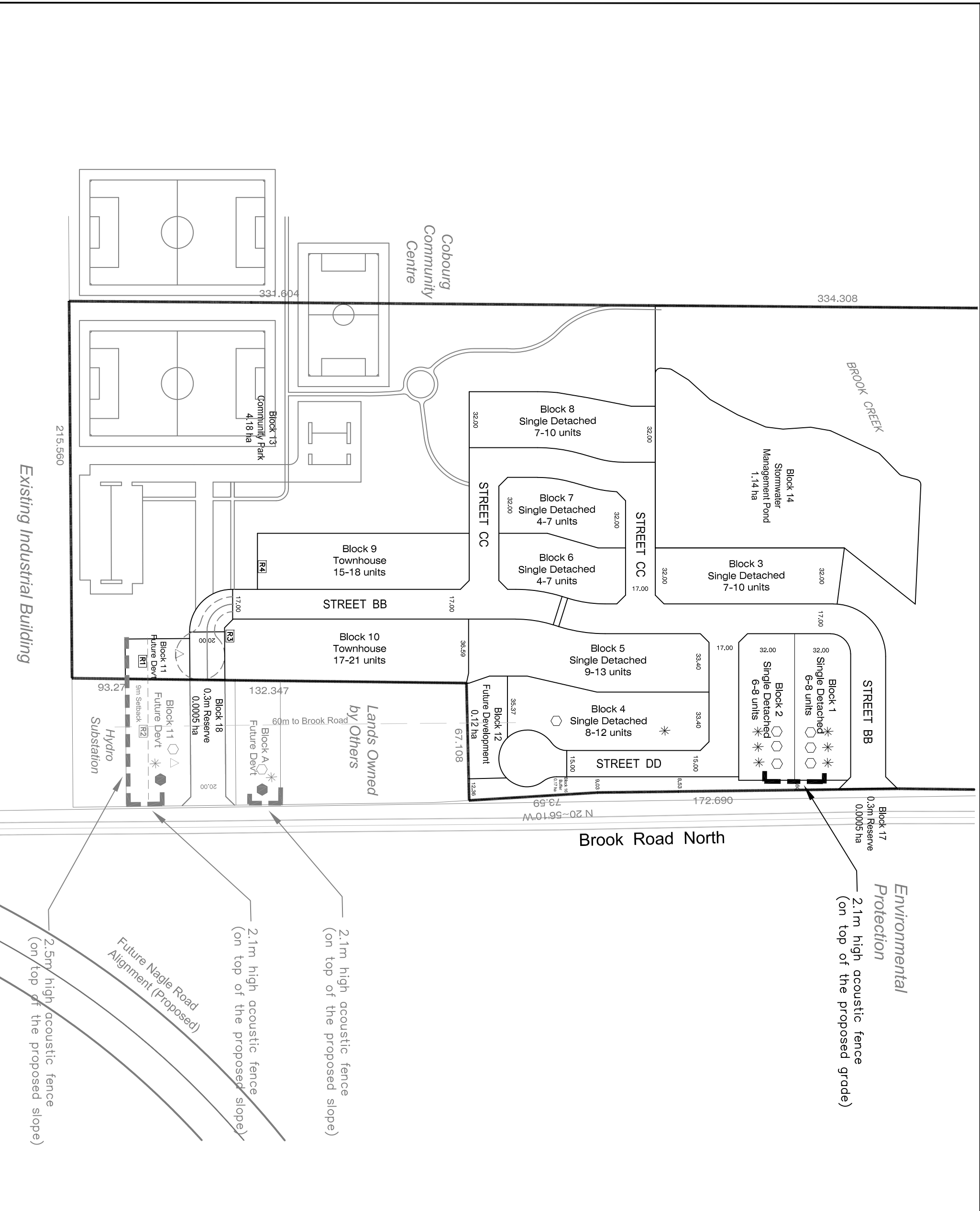
**TOWN OF COBOURG**

**FIGURE 2A**

Scale: NTS

DATE: JANUARY 2022





- LEGEND:**
- MANDATORY CENTRAL AIR CONDITIONING AND WARNING CLAUSE D
  - OPTIONAL CENTRAL AIR CONDITIONING AND WARNING CLAUSE C
  - \* WARNING CLAUSE A
  - △ WARNING CLAUSE E
  - ▬ PROPOSED ACOUSTIC BARRIER AND WARNING CLAUSE B
  - RECEPTOR LOCATIONS

**YCA ENGINEERING Limited**  
 9251 Yonge Street, Suite 8557  
 Richmond Hill, ON, L4C 9T3  
 Tel: 416-894-3213  
 Email: havo@ycaengineering.com

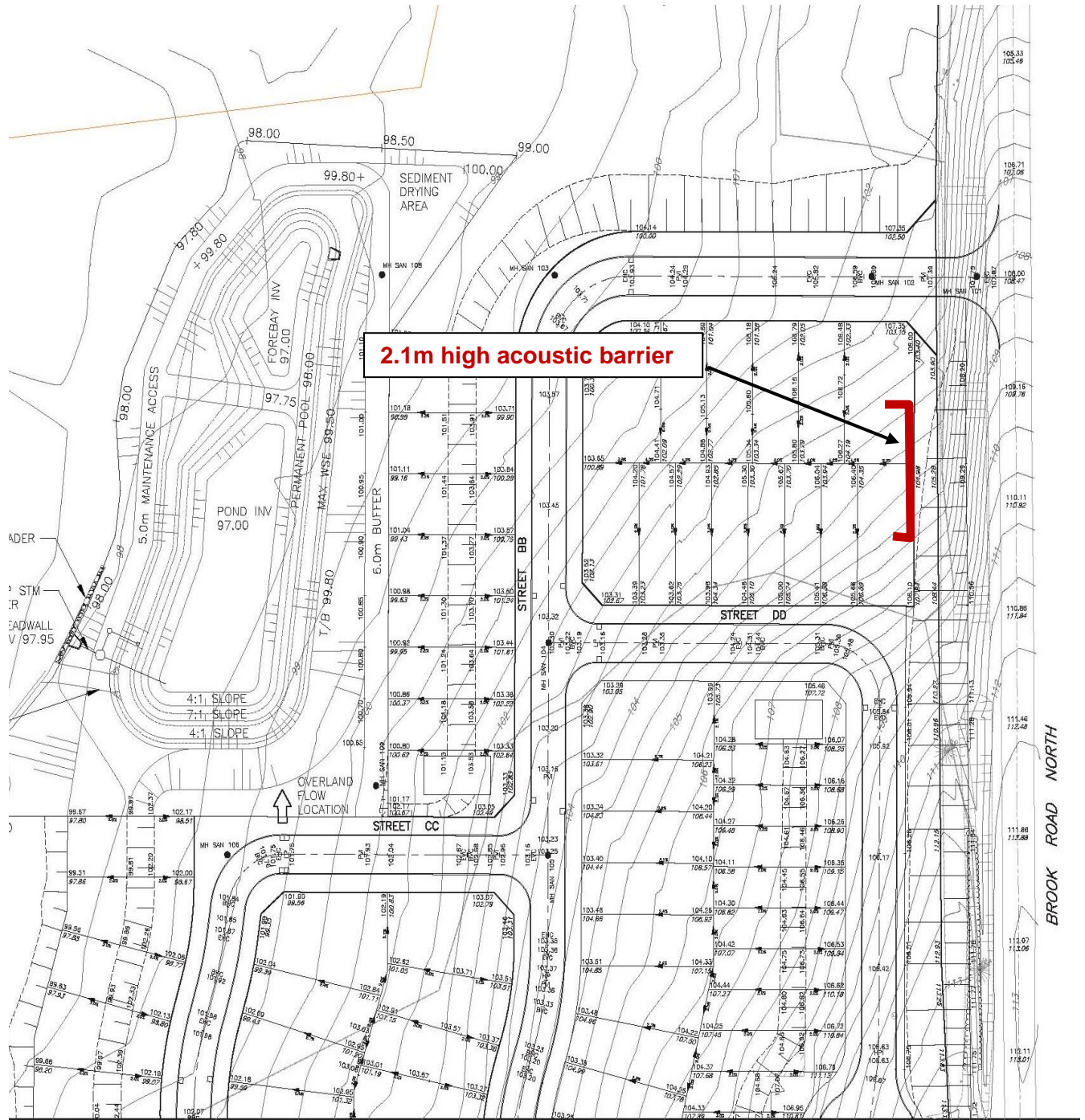
**PLAN OF SUBDIVISION  
 NOISE  
 MITIGATION MEASURES**

**COBOURG TRAILS  
 (PHASE 2)  
 FUTURE DEVELOPMENT INCLUDED**

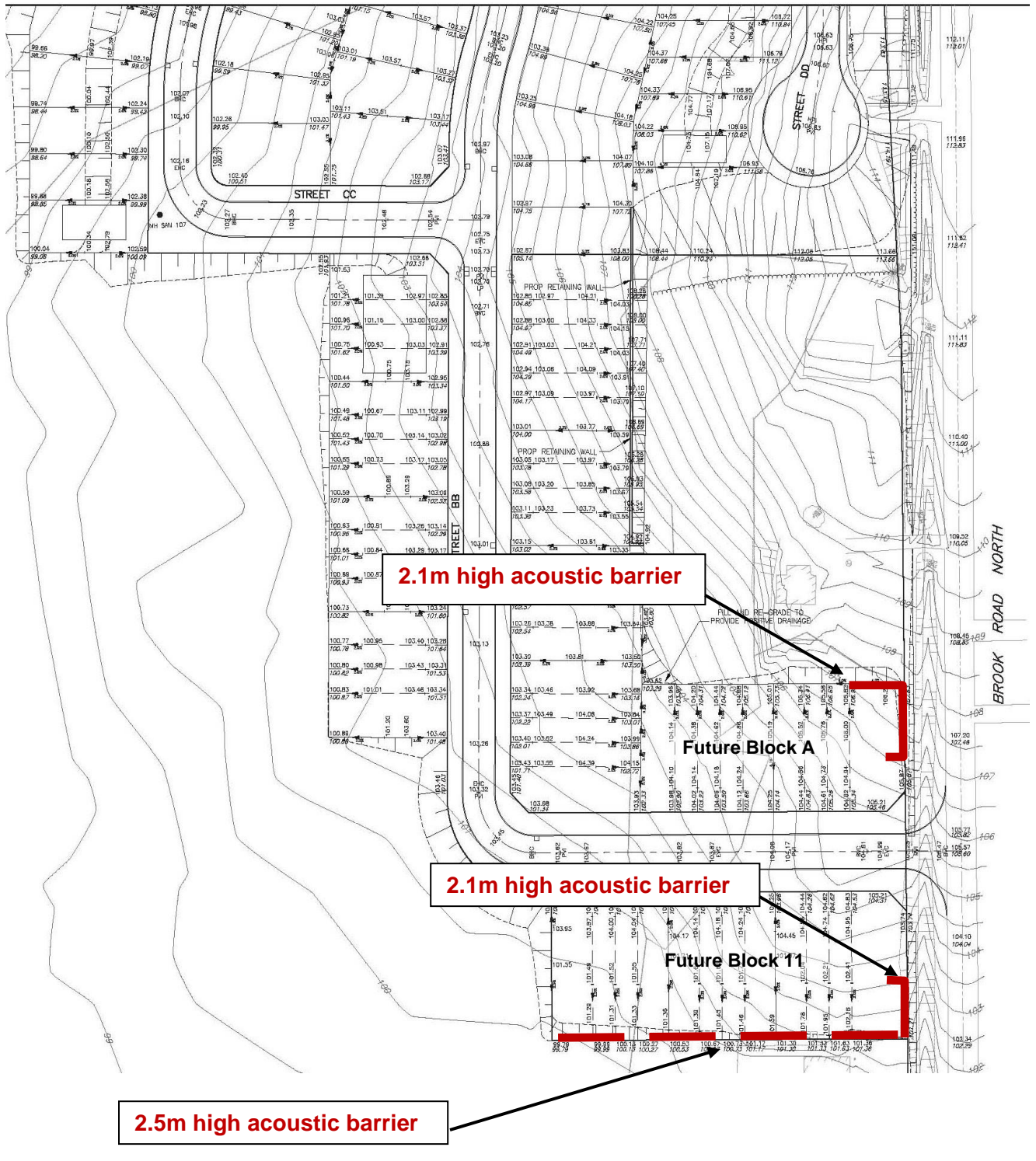
Part of Lots 11,12 and 13  
 Concessions A and 1, Block D  
 Registered Plan 277  
 File: 14T06001-R

**TOWN OF COBOURG**

**FIGURE 2B**



**FIGURE 3A**  
**GRADING PLAN (NORTH PORTION)**  
**SHOWING NOISE BARRIER LOCATIONS**



**FIGURE 3B**  
**GRADING PLAN (SOUTH PORTION)**  
**SHOWING NOISE BARRIER LOCATIONS (FUTURE DEVELOPMENT INCLUDED)**





**FIGURE 4**

**DISTANCES FROM THE STATIONARY NOISE SOURCES**



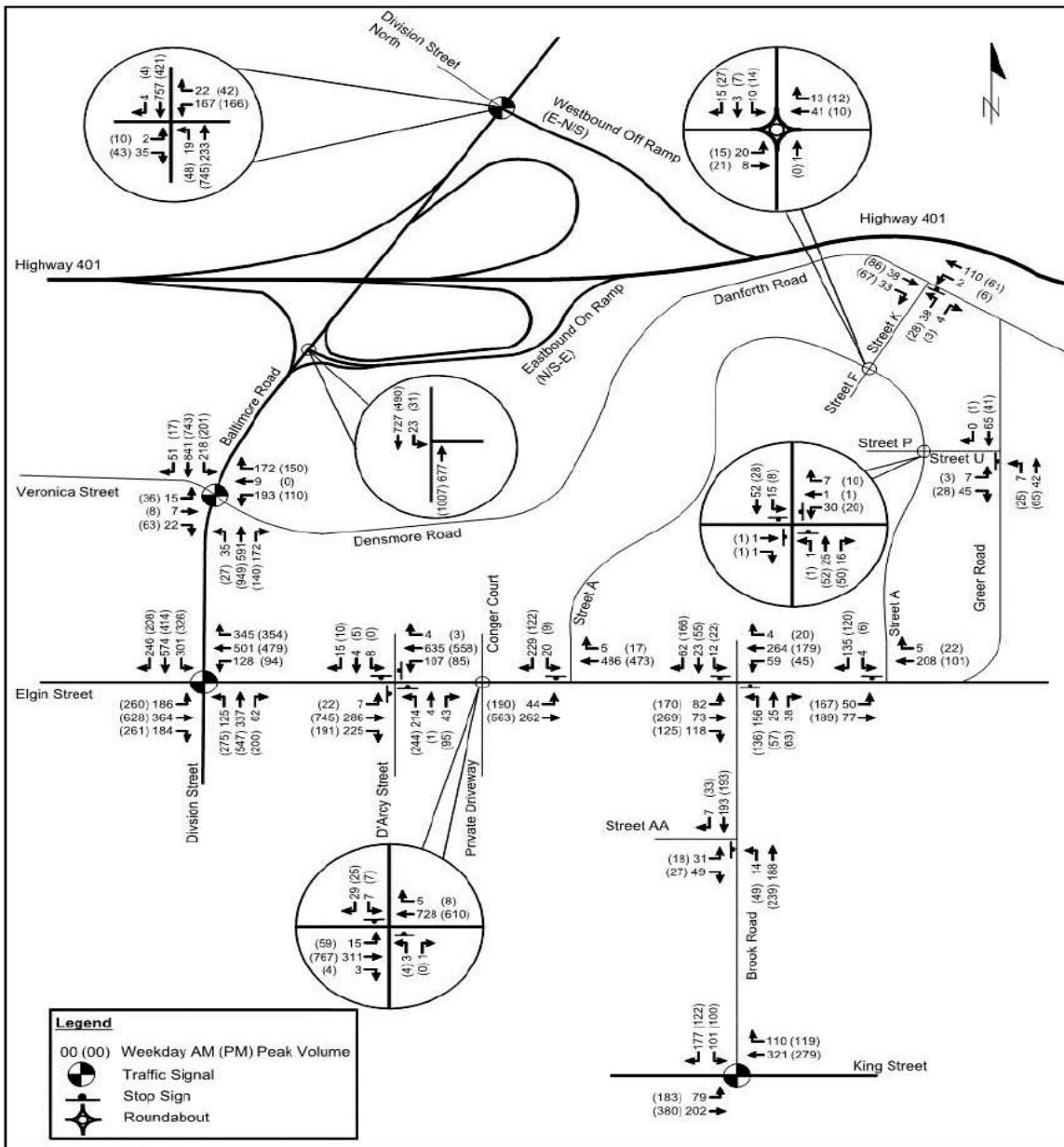
**FIGURE 5**  
**Cobourg Trails (Phase 2)**  
**LOCATION OF STATIONARY NOISE SOURCES (CadnaA)**

**APPENDIX 1**  
**TRAFFIC DATA**

### 5.5 2027 Total Traffic Operations

The 2027 total traffic volumes consists of 2027 background volumes shown in Figure 12 plus total subdivision trips shown in Figure 15. The resulting traffic volumes are shown in Figure 16.

Figure 16: 2027 Total Traffic Volumes



## **APPENDIX 2**

### **STAMSON 5.04**

## **SOUND LEVEL CALCULATIONS**

STAMSON 5.0                      SUMMARY REPORT                      Date: 19-01-2022 12:48:55  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk1sw.te                      Time Period: Day/Night 16/8 hours  
 Description: Block 1, Side Wall

Road data, segment # 1: Brook Rd N (day/night)

```
-----
Car traffic volume   : 6480/720   veh/TimePeriod  *
Medium truck volume : 216/24    veh/TimePeriod  *
Heavy truck volume  : 504/56    veh/TimePeriod  *
Posted speed limit  : 60 km/h
Road gradient       : 3 %
Road pavement      : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 8000
  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      : 7.00
  Day (16 hrs) % of Total Volume     : 90.00
-----
```

Data for Segment # 1: Brook Rd N (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 : 26.00 / 26.00 m
Receiver height  : 4.50 / 7.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
-----
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Brook Rd N ! 1.63 ! 63.29 ! 63.29
-----+-----+-----+-----
Total 63.29 dBA
-----
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Brook Rd N ! 1.63 ! 57.14 ! 57.14
-----+-----+-----+-----
Total 57.14 dBA
-----
```

TOTAL Leq FROM ALL SOURCES (DAY): 63.29  
 (NIGHT): 57.14

STAMSON 5.0 SUMMARY REPORT Date: 19-01-2022 12:49:16  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bklry.te Time Period: Day/Night 16/8 hours  
 Description: Block 1, Rear Yard

Road data, segment # 1: Brook Rd N (day/night)

```
-----
Car traffic volume : 6480/720 veh/TimePeriod *
Medium truck volume : 216/24 veh/TimePeriod *
Heavy truck volume : 504/56 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 3 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 8000
  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 : 7.00
  Day (16 hrs) % of Total Volume : 90.00
-----
```

Data for Segment # 1: Brook Rd N (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 : 28.00 / 28.00 m
Receiver height : 1.50 / 7.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 80.00 deg
Barrier height : 0.00 m
Elevation : 3.50 m
Barrier receiver distance : 6.00 / 6.00 m
Source elevation : 110.00 m
Receiver elevation : 106.50 m
Barrier elevation : 106.70 m
-----
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Brook Rd N ! 1.63 ! 62.18 ! 62.18 *
-----+-----+-----+-----
Total 62.18 dBA
-----
```

\* Bright Zone !

Barrier table for segment # 1: Brook Rd N (day)

```
-----
Barrier ! Elev of ! Road ! Tot Leq !
Height ! Barr Top! dBA ! dBA !
-----+-----+-----+-----+
1.80 ! 108.50 ! 62.24 ! 62.18 !
1.90 ! 108.60 ! 62.24 ! 62.18 !
2.00 ! 108.70 ! 62.24 ! 62.18 !
2.10 ! 108.80 ! 57.66 ! 57.66 !
2.20 ! 108.90 ! 57.60 ! 57.63 !
2.30 ! 109.00 ! 57.44 ! 57.51 !
2.40 ! 109.10 ! 57.20 ! 57.32 !
2.50 ! 109.20 ! 56.91 ! 57.06 !
2.60 ! 109.30 ! 56.57 ! 56.76 !
-----
```

STAMSON 5.0                    SUMMARY REPORT                    Date: 20-12-2021 13:22:20  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk4fw.te                    Time Period: Day/Night 16/8 hours  
 Description: Block 4, Front Wall

Road data, segment # 1: Brook Rd N (day/night)

-----  
 Car traffic volume : 6480/720    veh/TimePeriod \*  
 Medium truck volume : 216/24    veh/TimePeriod \*  
 Heavy truck volume : 504/56    veh/TimePeriod \*  
 Posted speed limit : 60 km/h  
 Road gradient : 3 %  
 Road pavement : 1 (Typical asphalt or concrete)  
 \* Refers to calculated road volumes based on the following input:  
   24 hr Traffic Volume (AADT or SADT): 8000  
   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 : 7.00  
   Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Brook Rd N (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 : 40.00 / 40.00 m  
 Receiver height : 4.50 / 7.50 m  
 Topography : 0                    (Define your own alpha.)  
 Barrier angle1 : -90.00 deg    Angle2 : 90.00 deg  
 Barrier height : 0.00 m  
 Barrier receiver distance : 4.50 / 4.50 m  
 Source elevation : 112.11 m  
 Receiver elevation : 106.80 m  
 Barrier elevation : 106.80 m  
 Alpha : 0.33

Result summary (day)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Brook Rd N	! 1.63 !	61.83	! 61.83
Total			61.83 dBA

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Brook Rd N	! 1.63 !	55.30	! 55.30
Total			55.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.83  
 (NIGHT): 55.30



STAMSON 5.0                      SUMMARY REPORT                      Date: 02-12-2021 13:22:55  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk11rw.te                      Time Period: Day/Night 16/8 hours  
 Description: Block 10, Rear Wall

Road data, segment # 1: Brook Rd N (day/night)

```
-----
Car traffic volume   : 5670/630   veh/TimePeriod *
Medium truck volume : 189/21    veh/TimePeriod *
Heavy truck volume  : 441/49    veh/TimePeriod *
Posted speed limit  : 60 km/h
Road gradient       : 3 %
Road pavement      : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 7000
  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     : 7.00
  Day (16 hrs) % of Total Volume    : 90.00
-----
```

Data for Segment # 1: Brook Rd N (day/night)

```
-----
Angle1  Angle2      : -80.00 deg  80.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 81.00 / 81.00 m
Receiver height  : 4.50 / 7.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Result summary (day)
-----
```

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Brook Rd N	! 1.63 !	54.83 !	54.83
	Total		54.83 dBA

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Brook Rd N	! 1.63 !	49.09 !	49.09
	Total		49.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.83  
 (NIGHT): 49.09

STAMSON 5.0                    SUMMARY REPORT                    Date: 20-12-2021 13:23:19  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk11ry.te                    Time Period: Day/Night 16/8 hours  
 Description: Block 10, Rear Yard

Road data, segment # 1: Brook Rd N (day/night)

```
-----
Car traffic volume   : 6480/720   veh/TimePeriod  *
Medium truck volume : 216/24    veh/TimePeriod  *
Heavy truck volume  : 504/56    veh/TimePeriod  *
Posted speed limit  : 60 km/h
Road gradient       : 3 %
Road pavement       : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 8000
  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       : 7.00
  Day (16 hrs) % of Total Volume      : 90.00
```

Data for Segment # 1: Brook Rd N (day/night)

```
-----
Angle1  Angle2      : -80.00 deg  80.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 80.00 / 80.00 m
Receiver height  : 1.50 / 7.50 m
Topography      : 2 (Flat/gentle slope; with barrier)
Barrier angle1   : -80.00 deg  Angle2 : 78.00 deg
Barrier height   : 0.00 m
Barrier receiver distance : 4.50 / 4.50 m
Source elevation : 110.40 m
Receiver elevation : 103.97 m
Barrier elevation : 105.00 m
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Brook Rd N ! 1.63 ! 54.71 ! 54.71 *
-----+-----+-----+-----
Total 54.71 dBA
```

STAMSON 5.0 SUMMARY REPORT Date: 02-12-2021 13:21:47  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk16sw.te Time Period: Day/Night 16/8 hours  
 Description: Block 11, Side Wall

Road data, segment # 1: Brook Rd N (day/night)

-----  
 Car traffic volume : 6480/720 veh/TimePeriod \*  
 Medium truck volume : 216/24 veh/TimePeriod \*  
 Heavy truck volume : 504/56 veh/TimePeriod \*  
 Posted speed limit : 60 km/h  
 Road gradient : 3 %  
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
 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 : 7.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Brook Rd N (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 : 18.00 / 18.00 m  
 Receiver height : 4.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)

Road data, segment # 2: Nagle Rd (day/night)

-----  
 Car traffic volume : 8100/900 veh/TimePeriod \*  
 Medium truck volume : 450/50 veh/TimePeriod \*  
 Heavy truck volume : 450/50 veh/TimePeriod \*  
 Posted speed limit : 60 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): 10000  
 Percentage of Annual Growth : 0.00  
 Number of Years of Growth : 0.00  
 Medium Truck % of Total Volume : 5.00  
 Heavy Truck % of Total Volume : 5.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Nagle Rd (day/night)

-----  
 Angle1 Angle2 : -80.00 deg 80.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 100.00 / 100.00 m  
 Receiver height : 4.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Brook Rd N	! 1.63 !	65.80 !	65.80
2.Nagle Rd	! 1.50 !	54.09 !	54.09
Total			66.08 dBA

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Brook Rd N	! 1.63 !	59.50 !	59.50
2.Nagle Rd	! 1.50 !	48.44 !	48.44
Total			59.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.08  
 (NIGHT): 59.83

STAMSON 5.0 SUMMARY REPORT Date: 20-12-2021 13:25:40  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
Filename: bk16ry.te Time Period: Day/Night 16/8 hours  
Description: Block 11, Rear Yard

Road data, segment # 1: Brook Rd N (day/night)

-----  
Car traffic volume : 6480/720 veh/TimePeriod \*  
Medium truck volume : 216/24 veh/TimePeriod \*  
Heavy truck volume : 504/56 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 3 %  
Road pavement : 1 (Typical asphalt or concrete)  
\* Refers to calculated road volumes based on the following input:  
24 hr Traffic Volume (AADT or SADT): 8000  
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 : 7.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Brook Rd N (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 : 20.00 / 20.00 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 : 5.00 / 5.00 m  
Source elevation : 103.00 m  
Receiver elevation : 102.00 m  
Barrier elevation : 102.00 m

Road data, segment # 2: Nagle Rd (day/night)

-----  
Car traffic volume : 8100/900 veh/TimePeriod \*  
Medium truck volume : 450/50 veh/TimePeriod \*  
Heavy truck volume : 450/50 veh/TimePeriod \*  
Posted speed limit : 60 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): 10000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 5.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Nagle Rd (day/night)

-----  
Angle1 Angle2 : -80.00 deg 80.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 100.00 / 100.00 m  
Receiver height : 1.50 / 4.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -80.00 deg Angle2 : 80.00 deg  
Barrier height : 0.00 m  
Barrier receiver distance : 5.00 / 5.00 m  
Source elevation : 103.00 m  
Receiver elevation : 102.00 m

Barrier elevation : 102.00 m

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Brook Rd N	! 1.63 !	! 64.20 !	! 64.20 *
2.Nagle Rd	! 1.50 !	! 53.23 !	! 53.23 *
	Total		64.53 dBA

\* Bright Zone !

Barrier table for segment # 1: Brook Rd N (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	! 103.80 !	! 59.45 !	! 59.45 !
1.90	! 103.90 !	! 59.39 !	! 59.39 !
2.00	! 104.00 !	! 59.23 !	! 59.23 !
<b>2.10</b>	<b>! 104.10 !</b>	<b>! 58.98 !</b>	<b>! 58.98 !</b>
2.20	! 104.20 !	! 58.65 !	! 58.65 !
2.30	! 104.30 !	! 58.26 !	! 58.26 !
2.40	! 104.40 !	! 57.82 !	! 57.82 !
2.50	! 104.50 !	! 57.35 !	! 57.35 !
2.60	! 104.60 !	! 56.87 !	! 56.87 !
2.70	! 104.70 !	! 56.37 !	! 56.37 !
2.80	! 104.80 !	! 55.88 !	! 55.88 !
2.90	! 104.90 !	! 55.38 !	! 55.38 !
3.00	! 105.00 !	! 54.90 !	! 54.90 !
3.10	! 105.10 !	! 54.43 !	! 54.43 !
3.20	! 105.20 !	! 53.98 !	! 53.98 !

Barrier table for segment # 2: Nagle Rd (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	! 103.80 !	! 49.03 !	! 49.03 !
1.90	! 103.90 !	! 48.87 !	! 48.87 !
2.00	! 104.00 !	! 48.65 !	! 48.65 !
<b>2.10</b>	<b>! 104.10 !</b>	<b>! 48.38 !</b>	<b>! 48.38 !</b>
2.20	! 104.20 !	! 48.08 !	! 48.08 !
2.30	! 104.30 !	! 47.75 !	! 47.75 !
2.40	! 104.40 !	! 47.41 !	! 47.41 !
2.50	! 104.50 !	! 47.05 !	! 47.05 !
2.60	! 104.60 !	! 46.68 !	! 46.68 !
2.70	! 104.70 !	! 46.32 !	! 46.32 !
2.80	! 104.80 !	! 45.96 !	! 45.96 !
2.90	! 104.90 !	! 45.60 !	! 45.60 !
3.00	! 105.00 !	! 45.25 !	! 45.25 !
3.10	! 105.10 !	! 44.92 !	! 44.92 !
3.20	! 105.20 !	! 44.59 !	! 44.59 !

TOTAL Leq FROM ALL SOURCES (DAY): **59.34 dBA** (with a 2.1m high noise barrier)

57.74 dBA (with a 2.5m high noise barrier)

55.35 dBA (with a 3.0m high noise barrier)

STAMSON 5.0 SUMMARY REPORT Date: 02-12-2021 13:21:31  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: bk15sw.te Time Period: Day/Night 16/8 hours  
 Description: Block 12, Side Wall

Road data, segment # 1: Brook Rd N (day/night)

-----  
 Car traffic volume : 6480/720 veh/TimePeriod \*  
 Medium truck volume : 216/24 veh/TimePeriod \*  
 Heavy truck volume : 504/56 veh/TimePeriod \*  
 Posted speed limit : 60 km/h  
 Road gradient : 3 %  
 Road pavement : 1 (Typical asphalt or concrete)  
 \* Refers to calculated road volumes based on the following input:  
 24 hr Traffic Volume (AADT or SADT): 8000  
 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 : 7.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Brook Rd N (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 : 18.00 / 18.00 m  
 Receiver height : 4.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)

Road data, segment # 2: Nagle Rd (day/night)

-----  
 Car traffic volume : 8100/900 veh/TimePeriod \*  
 Medium truck volume : 450/50 veh/TimePeriod \*  
 Heavy truck volume : 450/50 veh/TimePeriod \*  
 Posted speed limit : 60 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): 10000  
 Percentage of Annual Growth : 0.00  
 Number of Years of Growth : 0.00  
 Medium Truck % of Total Volume : 5.00  
 Heavy Truck % of Total Volume : 5.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Nagle Rd (day/night)

-----  
 Angle1 Angle2 : -80.00 deg 80.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 140.00 / 140.00 m  
 Receiver height : 4.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Brook Rd N	! 1.63 !	65.80 !	65.80
2.Nagle Rd	! 1.50 !	51.80 !	51.80
Total			65.97 dBA

Result summary (night)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Brook Rd N	! 1.63 !	59.50 !	59.50
2.Nagle Rd	! 1.50 !	46.27 !	46.27
Total			59.70 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.97  
 (NIGHT): 59.70

STAMSON 5.0            SUMMARY REPORT            Date: 19-01-2022 12:54:29  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT  
 Filename: abkl2ry.te            Time Period: Day/Night 16/8 hours  
 Description: Block 12, Rear Yard

Road data, segment # 1: Brook Rd N (day/night)

```
-----
Car traffic volume : 6480/720   veh/TimePeriod *
Medium truck volume : 216/24    veh/TimePeriod *
Heavy truck volume  : 504/56    veh/TimePeriod *
Posted speed limit  : 60 km/h
Road gradient       : 3 %
Road pavement       : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 8000
  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 : 7.00
  Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 1: Brook Rd N (day/night)
-----
```

```
-----
Angle1  Angle2      : -80.00 deg  55.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.00 / 20.00 m
Receiver height : 1.50 / 7.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -80.00 deg  Angle2 : 55.00 deg
Barrier height : 0.00 m
Elevation : 1.70 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 108.00 m
Receiver elevation : 106.30 m
Barrier elevation : 107.00 m
Road data, segment # 2: Nagle Rd (day/night)
-----
```

```
-----
Car traffic volume : 8100/900   veh/TimePeriod *
Medium truck volume : 450/50    veh/TimePeriod *
Heavy truck volume  : 450/50    veh/TimePeriod *
Posted speed limit  : 60 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): 10000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 5.00
  Heavy Truck % of Total Volume : 5.00
  Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 2: Nagle Rd (day/night)
-----
```

```
-----
Angle1  Angle2      : -80.00 deg  30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 150.00 / 150.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -80.00 deg  Angle2 : 30.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 107.50 m
Receiver elevation : 106.30 m
Barrier elevation : 107.00 m
-----
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
```

1.Brook Rd N	!	1.63 !	64.32 !	64.32 *
2.Nagle Rd	!	1.50 !	48.95 !	48.95 *
Total				64.44 dBA

\* Bright Zone !

Barrier table for segment # 1: Brook Rd N (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	108.80	58.21	58.21
1.90	108.90	57.77	57.77
2.00	109.00	57.30	57.30
<b>2.10</b>	<b>109.10</b>	<b>56.81</b>	<b>56.81</b>
2.20	109.20	56.32	56.32
2.30	109.30	55.83	55.83
2.40	109.40	55.35	55.35
2.50	109.50	54.87	54.87

Barrier table for segment # 2: Nagle Rd (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	108.80	42.29	42.29
1.90	108.90	41.91	41.91
2.00	109.00	41.53	41.53
<b>2.10</b>	<b>109.10</b>	<b>41.16</b>	<b>41.16</b>
2.20	109.20	40.79	40.79
2.30	109.30	40.43	40.43
2.40	109.40	40.09	40.09
2.50	109.50	39.75	39.75

TOTAL Leq FROM ALL SOURCES (DAY): **56.93 dBA (with a 2.1m high noise barrier)**

55.00 dBA (with a 2.5m high noise barrier)



**Project No:** Y183A  
**Project Name:** Cobourg Trails Phase 2  
**Date:** January 2022

**CADNAA PROTOCOL**

CadnaA

Version 2021

General

Max Error (dB) 0

Max Search Radius (m) 2000

Min. Dist Src to Rcvr 0

Partition

Raster Factor 0.5

Max. Length of Section (m) 1000

Min. Length of Section (m) 1

Min. Length of Section (%) 0

Proj. Line Sources On

Proj. Area Sources On

Ref.Time

Reference Time Day (min) 60

Reference Time Night (min) 60

Daytime Penalty (db) 0

Recr. Time Penalty (dB) 0

Night-time Penalty (dB) 0

DTM

Standard Height (m) Triangulation

Model of Terrain

Reflection 1

max. Order of Reflection 100

Search Radius Src 100

Search Radius Rcvr 1000.00 1000.00

Max. Distance Sources-Rcvr 1.00 1.00

Min. Distance Rcvr-Reflector 0.1

Industrial (ISO 9613)

Lateral Diffraction some Obj

Obst. Within Area Src do not shield On

Screening Excl. Ground Att. Over Barrier

Dz with limit (20/25)

Barrier Coefficients C1,2,3 3.0 20.0 0.0

Temperature (°C) 10

rel. Humidity (%) 70

Ground Absorption G 0.6

Wind Speed for Dir. (m/s) 3

## Receiver Table

Name	Level Lr		Limit. Value		Height (m)		Coordinates		
	Day	Night	Day	Night			X (m)	Y (m)	Z (m)
	(dBA)	(dBA)	(dBA)	(dBA)					
R1	46.6	44.5	50.0	45.0	7.50	r	517.70	725.68	109.25
R1a	42.8	40.5	50.0	45.0	1.50	r	517.56	719.26	103.20
R2	47.5	44.8	50.0	45.0	7.50	r	483.74	725.15	109.15
R2a	46.6	43.7	50.0	45.0	1.50	r	484.06	720.59	103.00
R3	44.7	41.4	50.0	45.0	7.50	r	477.34	762.00	112.00
R4	43.7	40.4	50.0	45.0	7.50	r	457.11	786.23	111.50
R4a	43.4	40.0	50.0	45.0	1.50	r	444.56	788.01	105.50

## Point Source Table

Name	Result. PWL			Lw / Li		Correction			Operating Time			Freq. (Hz)	Height		Coordinates		
	Day	Evening	Night	Type	Value	Day	Evening	Night	Day	Special	Night		(m)		X	Y	Z
	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	(min)	(min)	(min)				(m)	(m)	(m)
Transformer	79.0	79.0	79.0	Lw	T	5.0	5.0	5.0					2.00	r	508.48	706.80	103.00
Tr1	99.4	99.4	99.4	Lw	Tridl	0.0	0.0	0.0	10.00	5.00	0.00		2.00	r	366.70	647.27	100.00
S1	82.2	82.2	82.2	Lw	RTU1	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	480.33	657.78	103.70
S2	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	459.86	648.12	103.70
S3	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	446.00	647.70	103.70
S4	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	432.02	647.12	103.70
S5	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	415.35	647.13	103.70
S6	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	399.82	647.55	103.70
S7	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	382.60	659.46	103.70
S8	82.2	82.2	82.2	Lw	RTU1	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	380.50	634.27	103.70
S9	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	385.96	616.63	103.70
S10	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	400.66	616.63	103.70
S11	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	417.87	616.63	103.70
S12	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	432.57	617.05	103.70
S13	87.8	87.8	87.8	Lw	RTU2	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	480.43	615.79	103.70
S14	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	495.55	475.97	102.40
S15	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	720.00	240.00	240.00		1.20	g	495.97	464.21	102.40
Tr2	99.4	99.4	99.4	Lw	Tridl	0.0	0.0	0.0	10.00	5.00	0.00		2.00	r	323.29	591.41	100.50
Tr3	99.4	99.4	99.4	Lw	Tridl	0.0	0.0	0.0	10.00	5.00	0.00		2.00	r	431.21	590.57	100.50
S16	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	60.00	20.00	0.00		2.00	r	477.62	473.00	103.20
S17	91.5	91.5	91.5	Lw	RTU3	0.0	0.0	0.0	30.00	10.00	0.00		2.00	r	480.53	459.24	103.20
Impulse 1	100.0	100.0	100.0	Lw	100	0.0	0.0	0.0	30.00	10.00	0.00	500	2.00	r	363.48	646.44	100.00
Impulse 2	100.0	100.0	100.0	Lw	100	0.0	0.0	0.0	30.00	10.00	0.00	500	2.00	r	430.72	595.22	101.00
Blower	90.0	90.0	90.0	Lw	Blower	0.0	0.0	0.0	720.00	240.00	240.00		1.50	r	372.67	663.79	99.50
Transformer	75.9	75.9	75.9	Lw	T2	0.0	0.0	0.0	720.00	240.00	240.00		1.50	r	425.65	678.76	100.50
Tr4	99.4	99.4	99.4	Lw	Tridl	0.0	0.0	0.0	10.00	5.00	0.00		2.00	r	511.66	447.14	100.00
Blower2	90.0	90.0	90.0	Lw	Blower	0.0	0.0	0.0	720.00	240.00	240.00		2.00	r	485.45	472.35	100.00
Rep1	88.1	88.1	88.1	Lw	Repair	0.0	0.0	0.0	360.00	60.00	0.00		1.50	r	485.45	465.60	99.50
Rep2	88.1	88.1	88.1	Lw	Repair	0.0	0.0	0.0	360.00	60.00	0.00		1.50	r	492.18	486.64	99.50

### Line Source Table

Name	Result. PWL			Result. PWL'			Lw / Li		Operating Time			Freq.	Moving Pt. Src			
	Day	Eve	Night	Day	Eve	Night	Type	Value	Day	Eve	Night		Number		Speed	
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)		(Hz)	Day	Eve	Night
T1	101.6	96.8	93.8	74.9	70.1	67.1	PWL-Pt	TrMov	10.00	5.00	2.00		6.0	2.0	1.0	20.0
T2	97.0	92.2	89.2	74.9	70.1	67.1	PWL-Pt	TrMov	10.00	5.00	2.00		6.0	2.0	1.0	20.0
T3	100.9	96.2	-10.8	78.9	74.1	-32.9	PWL-Pt	TrMov	20.00	0.00	0.00		15.0	5.0	0.0	20.0
T4	96.3	91.5	-15.4	78.9	74.1	-32.9	PWL-Pt	TrMov	20.00	0.00	0.00		15.0	5.0	0.0	20.0

### Partial Level Table (Day)

Source			Partial Level Day						
Name	M.	ID	R1	R1a	R2	R2a	R3	R4	R4a
Transformer		Transformer	40.8	36.3	37.8	33.3	15.1	11.2	5.7
Tr1		Tr1	17.7	12.3	19.7	18.1	19.6	24.2	24.0
S1		S1	32.3	28.6	33.6	35.5	29.4	27.2	26.5
S2		S2	35.8	32.2	37.5	39.0	34.1	32.3	31.8
S3		S3	34.9	31.4	36.9	36.4	33.8	33.2	31.9
S4		S4	34.0	30.7	36.1	35.4	33.4	32.0	33.2
S5		S5	33.0	29.8	35.1	34.3	32.8	31.8	32.9
S6		S6	35.5	32.5	37.6	36.6	35.7	34.9	34.7
S7		S7	31.4	28.6	33.6	32.9	32.2	33.3	31.7
S8		S8	25.0	22.0	26.7	24.3	25.2	24.6	24.4
S9		S9	33.6	30.5	35.2	32.6	33.6	32.9	32.5
S10		S10	30.8	27.6	32.4	29.9	30.5	29.7	30.8
S11		S11	35.1	31.8	36.6	34.3	34.5	33.4	33.0
S12		S12	32.3	28.9	33.7	31.6	31.3	31.1	29.8
S13		S13	34.0	29.0	34.6	34.6	31.7	30.1	29.5
S14		S14	29.1	24.8	29.2	27.0	27.7	26.7	23.6
S15		S15	28.6	24.4	28.7	26.5	27.2	26.4	23.3
Tr2		Tr2	15.6	11.9	16.4	15.3	15.3	16.4	13.7
Tr3		Tr3	18.0	13.9	18.6	19.1	16.9	15.6	14.5
S16		S16	18.6	14.2	18.8	16.6	17.4	16.5	14.6
S17		S17	15.1	10.6	15.2	13.0	13.9	13.0	11.1
Impulse1		Impulse1	25.3	20.6	27.2	25.9	28.3	29.3	29.3
Impulse2		Impulse2	24.3	21.1	25.0	26.1	23.3	22.1	21.3
Blower		Blower	29.6	18.6	32.3	32.4	30.9	19.3	19.3
Transformer		Transformer	25.0	20.2	29.0	29.1	26.3	25.1	25.1
Tr4		Tr4	19.4	14.9	19.3	14.8	18.0	16.2	12.6
Blower2		Blower2	21.5	17.4	21.6	19.8	20.5	19.7	19.1
Rep1		Rep1	18.0	13.4	18.1	16.4	17.0	16.2	15.5
Rep2		Rep2	26.3	20.3	25.1	23.1	24.7	22.4	19.5
T1		T1	20.9	17.4	22.4	21.2	22.0	22.0	22.0
T2		T2	16.9	10.1	16.5	14.5	12.5	12.9	11.2
T3		T3	23.7	17.2	23.3	21.4	20.1	18.9	17.7
T4		T4	16.0	10.4	15.8	12.9	9.9	13.7	8.6

### Partial Level Table (Night)

Source			Partial Level Night						
Name	M.	ID	R1	R1a	R2	R2a	R3	R4	R4a
Transformer		Transformer	40.8	36.3	37.8	33.3	15.1	11.2	5.7
Tr1		Tr1							
S1		S1	29.2	25.6	30.6	32.5	26.4	24.2	23.5
S2		S2	32.8	29.2	34.5	36.0	31.1	29.3	28.8
S3		S3	31.9	28.4	33.9	33.4	30.8	30.2	28.8
S4		S4	31.0	27.6	33.1	32.4	30.4	29.0	30.2

S5	S5	29.9	26.8	32.1	31.3	29.8	28.8	29.9
S6	S6	32.5	29.5	34.6	33.6	32.7	31.9	31.7
S7	S7	28.4	25.6	30.6	29.9	29.2	30.2	28.7
S8	S8	21.9	19.0	23.7	21.2	22.2	21.6	21.4
S9	S9	30.6	27.5	32.2	29.5	30.6	29.9	29.5
S10	S10	27.8	24.6	29.4	26.9	27.5	26.7	27.8
S11	S11	32.1	28.8	33.6	31.3	31.5	30.4	30.0
S12	S12	29.3	25.8	30.7	28.6	28.3	28.1	26.8
S13	S13	31.0	26.0	31.6	31.5	28.7	27.1	26.5
S14	S14	26.1	21.8	26.1	24.0	24.7	23.7	20.6
S15	S15	25.6	21.4	25.7	23.5	24.2	23.3	20.2
Tr2	Tr2							
Tr3	Tr3							
S16	S16							
S17	S17							
Impulse1	Impulse1							
Impulse2	Impulse2							
Blower	Blower	26.6	15.6	29.3	29.4	27.9	16.3	16.3
Transformer	Transformer	22.0	17.2	26.0	26.1	23.3	22.0	22.1
Tr4	Tr4							
Blower2	Blower2	18.5	14.4	18.6	16.8	17.5	16.7	16.1
Rep1	Rep1							
Rep2	Rep2							
T1	T1	7.9	4.4	9.4	8.2	9.0	9.0	8.9
T2	T2	3.9	-2.9	3.5	1.5	-0.5	-0.1	-1.8
T3	T3							
T4	T4							

### Result Table (Unmitigated)

Receiver Name	Limiting Value		rel. Axis			Lr w/o Noise Control		dL req.		Lr w/ Noise Control		Exceeding	
	Day	Night	Station	Distance	Height	Day	Night	Day	Night	Day	Night	Day	Night
	dB(A)	dB(A)	m	m	m	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R1	50	45	161	157.45	9.25	47.0	45.0	-	-	0.0	0.0	-	-
R1a	50	45	161	151.98	3.20	48.7	47.5	-	2.5	0.0	0.0	-	-
R2	50	45	435	126.68	8.15	47.6	45.0	-	-	0.0	0.0	-	-
R2a	50	45	435	125.40	2.00	47.7	45.6	-	0.6	0.0	0.0	-	-
R3	50	45	435	139.01	11.00	44.7	41.4	-	-	0.0	0.0	-	-
R4	50	45	435	140.77	10.50	43.7	40.4	-	-	0.0	0.0	-	-
R4a	50	45	435	134.41	4.50	43.4	40.0	-	-	0.0	0.0	-	-

### Result Table (Mitigated)

Receiver Name	Limiting Value		rel. Axis			Lr w/o Noise Control		dL req.		Lr w/ Noise Control		Exceeding	
	Day	Night	Station	Distance	Height	Day	Night	Day	Night	Day	Night	Day	Night
	dB(A)	dB(A)	m	m	m	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R1	50	45	161	157.45	9.25	46.6	44.5	-	-	0.0	0.0	-	-
R1a	50	45	161	151.98	3.20	42.8	40.5	-	-	0.0	0.0	-	-
R2	50	45	435	126.68	8.15	47.5	44.8	-	-	0.0	0.0	-	-
R2a	50	45	435	125.40	2.00	46.6	43.7	-	-	0.0	0.0	-	-
R3	50	45	435	139.01	11.00	44.7	41.4	-	-	0.0	0.0	-	-
R4	50	45	435	140.77	10.50	43.7	40.4	-	-	0.0	0.0	-	-
R4a	50	45	435	134.41	4.50	43.4	40.0	-	-	0.0	0.0	-	-

**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 <sub>eq</sub> (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 <sub>eq</sub> (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 <sub>eq</sub> exceeds 55 dBA Type A
	Greater than 60 dBA	N/A	Control measures (barriers) required to reduce the L <sub>eq</sub> below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant L <sub>eq</sub> 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 <sub>eq</sub> (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 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 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:*

*“Occupants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants and the outdoor sound level may exceed the Municipality and the Ministry of Environment’s noise criteria.”*

### *TYPE B:*

*“Occupants are advised that despite the inclusion of noise abatement features within the development area, sound levels from road traffic may be of concern, occasionally interfering with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria.”*

### *TYPE C:*

*"This unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate air conditioning. Installation of air conditioning by the occupant 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's noise criteria. (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 has been supplied with an air conditioning system which 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's noise criteria. (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 and the existing industries, noise from the activities may at times be audible"*

## **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
<b>STC Rating</b>	<b>38</b>	<b>40</b>	<b>43</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>54</b>	<b>55</b>	<b>57</b>	<b>58</b>	<b>62</b>

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.