

# **Environmental Noise Feasibility Study**

## **Hurontario Street & Highway 410**

**Proposed Mixed-use Development**  
Town of Caledon

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Project: 117-0183

Prepared for

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**VALCOUSTICS**

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# **Environmental Noise Feasibility Study**

## **Hurontario Street & Highway 410**

### **Proposed Mixed-use Development** Town of Caledon

#### **EXECUTIVE SUMMARY**

Valcoustics Canada Ltd. (VCL) has prepared this Environmental Noise Feasibility Study for the proposed mixed-use development located on the west side of the Hurontario Street and Highway 410 interchange in the Town of Caledon. The purpose of this report is to assess the environmental noise impact from the existing and future environmental noise sources in the vicinity onto the subject site, and where necessary, determine appropriate mitigation measures.

The development will consist of 198 two-storey detached dwellings (Lots 1 to 198), 312 three-storey townhouse dwellings (Blocks 199 to 251), a commercial block, transit hub, storm water management facilities and wood lots.

The significant transportation noise sources in the vicinity with the potential to impact the site are road traffic on the existing Hurontario Street and Highway 410, future internal roads Spine Road (Street A) and Streets B and C as well as rail traffic on the Orangeville Brampton Railway (OBRY) line that passes adjacent to the southern portion of the development.

There are no existing stationary sources in the vicinity expected to cause any significant noise impact at the site. There are stationary noise sources internal to the development that have the potential to impact the proposed residential components. These include the commercial block, transit hub and an institutional block. Detailed plans for these stationary sources are not available at this time. These facilities must be designed to meet the noise guideline requirements of the Ministry of the Environment and Climate Change (MOE). Detailed noise assessments should be completed for these blocks once specific site layouts, proposed tenant and operating procedures are known. This is typically done at the time of Site Plan approval for these lands.

To meet the applicable transportation noise source guideline limits:

- All townhouse units adjacent to Spine Road as well as one additional block beyond (Block 211) require mandatory air conditioning;

- The first row of dwellings in proximity to Streets B, C and Hurontario Street as well as a few lots beyond these and Spine Road require the provision for installing air conditioning;
- Lots adjacent to Spine Road require acoustical upgrades to the facade construction, such as a brick veneer. With this exterior wall construction, the windows require a minimum Sound Transmission Class (STC) rating of 29. At all other Lots and Blocks, construction complying with the minimum non-acoustical requirements of the OBC is expected to be sufficient. The final wall and window requirements should be reviewed when architectural plans are developed; and
- Acoustic barriers are required at the rear yards of the dwellings siding towards Streets B or C or with exposure to Spine Road or Hurontario Street/Highway 410.

## **1.0 THE PROJECT**

### **1.1 INTRODUCTION**

Valcoustics Canada Ltd. (VCL) has prepared this Environmental Noise Feasibility Study for the proposed mixed-use development located to the west of the Hurontario Street and Highway 410 interchange in the Town of Caledon. The purpose of this report is to assess the environmental noise impact from the existing and future environmental noise sources in the vicinity onto the subject site and, where necessary, determine appropriate mitigation measures.

### **1.2 AREA DESCRIPTION**

The proposed development is located to the west of the Hurontario Street and Highway 410 interchange in the Town of Caledon. The site is bounded by:

- future employment lands, with the Brampton Christian School beyond, to the north;
- Hurontario Street and future institutional lands (a portion of which is part of this site), with Highway 410 and existing single family residential dwellings beyond, to the east;
- existing single family residential dwellings to the south; and
- the existing OBRY line and a future proposed residential development to the west.

Figure 1 shows the Key Plan.

The assessment is based on the Draft Plan of Subdivision, prepared by Glen Schnarr & Associates Inc., dated September 12, 2017. Figure 2 shows the Draft Plan of Subdivision in reduced form.

### **1.3 PROPOSED DEVELOPMENT**

The proposed site will consist of:

- 198 two-storey detached dwellings (Lots 1 to 198);
- 39 three-storey townhouse units (Blocks 199 to 206);

- 255 three-storey rear lane townhouse units (Blocks 207 to 248); and
- 18 three-storey back to back townhouse units (Blocks 249 to 251).

All units within the development, except the back to back townhouses, will be provided with grade level outdoor amenity areas.

The site is bisected by the future major arterial roadway Spine Road (Street A) and there will be a commercial block, a transit hub and an institutional block at the east end of the site. In addition, there will be a storm water management pond towards the south of the site and existing Woodlots/Wetlands & Buffers along the west side of the site that are to remain. The OBRY passes directly west of the southern portion of the site.

## **2.0 NOISE SOURCES**

### **2.1 TRANSPORTATION NOISE SOURCES**

Road traffic data used in this assessment is summarized in Table 1A. Rail traffic data is summarized in Table 1B. Appendix A includes the associated correspondence.

#### **2.1.1 Road Traffic Sources**

The primary existing transportation noise sources in the vicinity with the potential to impact the site are road traffic on Hurontario Street and Highway 410 and rail traffic on the OBRY.

Future road traffic noise sources include Spine Road (Street A), Streets B and C. Traffic volumes on the other local streets within the area are insignificant relative to the primary traffic sources mentioned above and have not been considered further in the assessment.

Ultimate traffic volumes for Hurontario Street and Highway 410 were obtained from the Ministry of Transportation. A day/night split and medium/heavy truck split of approximately 85%/15% and 40%/60%, respectively, for Highway 410 was obtained from a 2010 traffic count completed by Ontario Traffic Inc. for a different project completed by VCL in the general vicinity. A day/night split and medium/heavy truck split for Hurontario Street was assumed to be 90%/10% and 60%/40% respectively.

Future (year 2031) traffic volumes for Spine Road and Streets B and C were obtained from the Mayfield West Phase 2 Secondary Plan Transportation Master Plan Final Report, prepared by Paradigm Transportation Solutions Limited, dated December 2015. Medium and heavy truck percentages were assumed to be 2%/3% respectively of the total volume. A day/night split of 90%/10% was assumed for all three roadways. The road traffic data for Spine Road and Streets B and C was projected to the future 20 year design condition (year 2037), as required by the Town of Caledon, using an assumed 2% growth rate compounded annually.

#### **2.1.2 Rail Traffic Sources**

Existing (2017) rail data for the OBRY was provided by the Orangeville Railway Development Corp. The data indicates that current activity in the vicinity of the site consists of freight trains only. Currently, movements occur two days a week and only during daytime hours (0700 to 2300). However, OBRY indicates that there may be train movements at night, depending on demand.

Thus, for the assessment, it was assumed that two train movements also occur during the nighttime. Trains currently comprise of one locomotive, but could go to two in the future as demand necessitates.

The existing data (plus two additional movements at night) was projected to the 20 year design condition using a 2.5% growth rate compounded annually. Each train was assumed to be comprised of two locomotives, to be conservative.

### **2.1.3 Brampton Airport**

The Brampton Airport is located east of McLaughlin Road approximately 1.5 km north of Old School Road. NEF (Noise Exposure Forecast) contours for this airport were provided in Reference 7. As per the MOE noise guidelines, the site lies outside the NEF 25 contour, noise mitigation is not required. However, to be consistent with other sites in the general vicinity, a warning clause specific to the airport is recommended to ensure future occupants are aware of this potential noise source.

## **2.2 STATIONARY NOISE SOURCES**

### **2.2.1 Existing Facilities**

The existing Brampton Christian School is located approximately 270 m north of the proposed site. The only significant noise source at this facility would be the rooftop HVAC equipment. Due to the significant setback distance and the close proximity of the intervening roadways (Street B, Highway 410 and Hurontario Street), noise impact from this facility is not expected, thus, this facility has not been considered further.

### **2.2.2 Future Facilities**

The subject site contains lands which will be developed for future stationary sources; including a commercial block, transit hub and institutional block. To the north of the site there are also lands indicated as future employment.

Detailed plans for the facilities on these lands are not available at this time. However, these blocks must be designed to comply with the MOE stationary noise source guidelines within NPC-300, recognizing the surrounding residential development. This is typically addressed, in part, at the site plan approval stage for these non-residential developments, as well as in the detailed design stages. Any resulting noise mitigation required to meet the applicable MOE guidelines would be the responsibility of the developer/builder of the non-residential uses.

Potential noise sources could consist of rooftop or other mechanical equipment and larger commercial vehicle movements on the site. These issues are typically addressed by considering equipment selections, locations, orientation of loading docks, the use of silencing components and sound barriers.



## 3.0 TRANSPORTATION NOISE IMPACT ASSESSMENT

### 3.1 NOISE GUIDELINES

#### 3.1.1 MOE

The applicable noise guidelines for new residential development are those in MOE Publication NPC-300, “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning”.

The environmental noise guidelines of the MOE, as provided in Publication NPC-300, are discussed briefly below and summarized in Appendix B.

##### 3.1.1.1 Architectural Elements

In the daytime, the indoor criterion for road/rail noise is  $L_{eq\ Day}^{(1)}$  of 45/40 dBA for sensitive spaces such as living rooms, dining rooms, dens and bedrooms. At night, the indoor criterion for road/rail noise is  $L_{eq\ Night}^{(2)}$  of 45/40 dBA for sensitive spaces such as living/dining rooms and dens and 40/35 dBA for bedrooms.

The architectural design of the building envelope (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits.

Also, brick veneer exterior wall construction is required for the first row of dwellings within 100 m of the rail line, if the  $L_{eq\ 24\ hour}$  is greater than 60 dBA.

##### 3.1.1.2 Ventilation

In accordance with the MOE noise guideline for road and rail traffic sources, if the daytime sound levels,  $L_{eq\ Day}$ , at the exterior face of a noise sensitive window is greater than 65 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding air conditioning at a later date. A warning clause advising the occupant of the potential interference with some activities is also required. During the nighttime, air conditioning is required when the sound level exceeds 60 dBA ( $L_{eq\ Night}$ ) at a noise sensitive window (provision for adding air conditioning is required when greater than 50 dBA).

##### 3.1.1.3 Outdoors

For outdoor amenity areas (“Outdoor Living Areas” - OLA’s), the guideline is 55 dBA  $L_{eq\ Day}$ , with an excess not exceeding 5 dBA considered acceptable if it is not feasible to achieve the 55 dBA objective for technical, economic or administrative reasons, provided warning clauses are registered on title.

The point of assessment in an OLA at grade is 3 m from the building facade, 1.5 m above grade and aligned with the midpoint of the subject building facade.

(1)  $L_{eq\ Day}$  - 16 hour energy equivalent A-weighted continuous sound level (0700-2300 hours).

(2)  $L_{eq\ Night}$  - 8 hour energy equivalent A-weighted continuous sound level (2300-0700 hours).

### **3.1.2 Region of Peel**

The Region of Peel guidelines are essentially the same as the MOE guidelines except that the nighttime level for triggering the air conditioning requirement is 1 dBA more stringent (i.e., lower) than the levels specified by the MOE – i.e., mandatory air conditioning for nighttime sound levels of 60 dBA or greater, and the provision for adding air conditioning for levels between 51 to 59 dBA inclusive.

A maximum desirable sound barrier height of 4 m (relative to roadway centreline) is indicated with a maximum acoustic fence component height of 2.4 m, although a height of no more than 2.0 m is preferred.

### **3.1.3 Town of Caledon**

The Town of Caledon's general policy is not to accept the 5 dBA excess above the 55 dBA daytime sound level objective for OLA's. However, an excess may be acceptable if unreasonably high sound barriers are needed to meet the 55 dBA objective.

The Town policy is that acoustic walls should not exceed a height of 2.4 m. Greater overall sound barrier heights can be obtained by using a combination of berm and acoustic wall.

Also, traffic noise impact is to be assessed based on the 20-year traffic forecast for the adjacent roadways and using a traffic speed 10 kph over the posted speed limit.

### **3.1.4 Federation of Canadian Municipalities and Railway Association of Canada**

OBRY does not have a published noise guideline. However, for developments adjacent to rail lines, the typically applied guideline document is that from the Federation of Canadian Municipalities and the Railway Association of Canada (FCM/RAC). See Reference 6.

The FCM/FRA guideline outlines standard mitigation requirements based on the classification of the rail line. The data provided for the OBRY did not indicate the classification of the rail line. However, based on the criteria indicated by FCM/RAC the rail line would likely be a principal branch line.

The standard mitigation requirements of the FCM/RAC suggest a dwelling setback of 15 m for a residential development adjacent to a principal branch line. A 4.0 m high sound barrier is also suggested consisting of a 2.0 m high acoustic fence atop a 2.0 m high safety berm.

Note, due to the substantial setback distance of the site to the rail line, and the intervening wood lot, the safety berm is likely not required. However, this should be confirmed with the rail authority.

A warning clause specific to the railway for all dwellings within 300 m of the right-of-way is recommended.

Aside from "standard" requirements regarding the setback of dwellings and safety berm/sound barrier configuration, the sound level design objectives of the FCM/RAC are similar to those of the MOE.

### 3.2 ROAD AND RAIL NOISE IMPACT ASSESSMENT

Using the road and rail traffic data in Tables 1A and 1B, sound pressure levels, in terms of  $L_{eq Day}$  and  $L_{eq Night}$ , were determined using ORNAMENT and STEAM, the road and rail traffic noise prediction models of the MOE.

The daytime and nighttime calculations were made at top storey heights for each dwelling representing the top storey windows. For the 3-storey townhouse dwellings, receptors were taken at a height of 7.5 m above grade. For the 2-storey detached dwellings, receptor heights were taken at a height of 4.5 m above grade. At the OLA's, the receptor height used was 1.5 m above grade, representing standing height.

The grade of the site was assumed to be flat relative to the existing road and rail noise sources. Inherent screening effects due to dwelling orientation as well as the screening effects from the existing development to the south were included in the assessment. Screening effects from future developments adjacent to the site were not included.

The highest daytime and nighttime sound levels of 71 dBA and 64 dBA, respectively, are predicted at the south facade of Block 230, which is closest to Spine Road. The highest daytime sound level of 64 dBA at an OLA is predicted to occur at Block 211 adjacent to Street B and with exposure to Spine Road, Hurontario Street and Highway 410.

Table 2 summarizes the predicted sound level calculations due to the transportation noise sources. A sample calculation is included as Appendix C.

### 3.3 NOISE CONTROL MEASURES

The noise control measures for transportation noise sources can generally be classified into two categories which are interrelated, but which can be treated separately for the most part:

- (a) Architectural elements to achieve acceptable indoor noise guidelines;
- (b) Design features to protect the OLA's.

Figure 2, Table 3 and the notes to Table 3 summarize the transportation noise abatement requirements.

#### 3.3.1 Exterior Wall and Window Construction

The indoor noise guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. In determining the worst-case architectural requirements for the residential units, wall and window areas were *assumed* to be 80% and 30% of the associated floor area, respectively, on each facade of a corner room with the facades exposed directly or at an angle to the road or rail traffic noise sources, for both living/dining areas and sleeping quarters.

Blocks 211 and 221 to 239 require acoustical upgrades to the exterior facade construction such as a brick veneer (with an estimated rating of STC 54). With this exterior wall construction, the windows with exposure to the roadways require a minimum rating of STC 29.

Acoustical upgrades to the exterior facade construction or windows are not required for the remaining units in the development.

Note, the STC requirements for windows are applicable to the entire window assembly and not just the glass. The supplier/manufacturer should be made to submit acoustical laboratory test data for the intended windows indicating the entire assembly can meet the required STC rating.

The above STC requirements are based on assumption and should be reviewed once building floor plans and elevations are finalized.

### **3.3.2 Ventilation Requirements**

Blocks 211, 221 to 239 require central air conditioning to allow for windows to remain closed for noise control purposes.

Lots 15 to 21, 48 to 55, 82 to 85, 106 to 110, 136 to 151, 163 to 172, 197, 198 and Blocks 199, 207 to 210, 218 to 220, 240, 242, 243 and 248 require the provision to allow the future installation of air conditioning by the occupant at a later date. For low density developments, this normally takes the form of a ducted ventilation system suitably sized to accommodate the addition of central air conditioning.

Figure 2 and Table 3 show the ventilation requirements.

### **3.3.3 Outdoors**

To meet the 55 dBA design objective, sound barriers are required at:

- the most easterly units of Blocks 211 and 230 - 3.0 m high;
- Lots 17, 18, 51, 52 and 85 - 2.3 m high;
- the most easterly units of Blocks 231, 238, 242 and 248 and the most westerly units of Blocks 237 and 243 - 2.2 m high; and
- Lots 107, 151, 198, the most easterly units of Blocks 199, 219 and 222, the most westerly units of Blocks 218, 220, 221, 223, 239 and 240 - 1.8 m high.

The sound barrier locations and orientations are shown on Figure 2.

Note, at Blocks 211 and 230 the required sound barrier height exceeds the maximum acoustic wall height allowable by the City (2.4 m high). As such, a small berm (0.6 m high) or other grading features will be needed.

The assessment is based on assumed flat topography and should be updated once specific grading information, floor plans and building sitings are developed.

The sound barrier must be of solid construction with no gaps, cracks or holes and must have a minimum surface density of 20 kg/m<sup>2</sup>. A variety of materials are available, including wood, masonry, earth berms, or a combination of the above.

### **3.3.4 Warning Clauses**

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing/future noise sources. Where the sound level guidelines are exceeded, warning clauses should be registered on title or included in the development agreement that is registered on title. The warning clauses should also be included in agreements of Offers of Purchase and Sale and/or lease/rental agreements.

## **4.0 CONCLUSIONS**

With appropriate design of the residential development, a suitable acoustical environment can be provided for the occupants and the applicable MOE noise guideline requirements met.

## **5.0 REFERENCES**

1. PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.
2. Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J. D. Quirt, Division of Building Research, National Council of Canada, September 1985.
3. "Environmental Noise Assessment in Land-Use Planning 1987", Ontario Ministry of the Environment, February 1987, ISBN 0-7729-2804-5.
4. "Road and Rail Noise: Effects on Housing", Canada Mortgage and Housing Corporation, Publication NHA 5156, 81/10.
5. "Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning", MOE Publication NPC-300, October 2013.
6. "Guidelines for New Development in Proximity to Railway Operations", Prepared for The Federation of Canadian Municipalities and the Railway Association of Canada (FCM/RAC), May 2013.
7. "Environmental Noise and Vibration Impact Assessment, Mayfield West Phase Two Secondary Plan, Part A - Existing Conditions," Jade Acoustics, December 22, 2008.

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**TABLE 1A**  
**FUTURE ROAD TRAFFIC DATA<sup>(1)</sup>**

Roadway	AADT <sup>(3)</sup>	% Trucks		Speed Limit (kph) <sup>(4)</sup>
		Medium	Heavy	
Hurontario Street <sup>(1)</sup>	76,000	6	4	80
Highway 410 <sup>(1)</sup>	109,000	2.5	3.5	100
Spine Road (future) <sup>(2)</sup>	39,000	2	3	60
Streets B and C (future) <sup>(2)</sup>	5,000	2	3	50

**Notes:**

- (1) MTO ultimate data. See Appendix A.
- (2) Future (Year 2031) traffic counts obtained from the Mayfield West Phase 2 Secondary Plan Transportation Master Plan, prepared by Paradigm Transportation Solutions Limited, dated December 2015. The year 2031 data shown was extrapolated to the 20 year design condition (year 2037) using a 2% growth rate compounded annually for use in the assessment.
- (3) AADT – Annual Average Daily Traffic.
- (4) The speed limit shown is the posted speed limit. In accordance with Town of Caledon requirements, the assessment was completed using a traffic speed 10 kph over the posted speed limit.

**TABLE 1B**  
**RAIL TRAFFIC DATA<sup>(1)</sup>**

Railway	Train Type	Maximum # of Trains (Day/Night)	Average # of Cars/Train	Average # of Locomotives/Train	Maximum Speed (kph)
OBRY	Freight	8/3	12	2	40

**Note:**

- (1) Existing volumes for the railway were provided by the Orangeville Railway Development Corp. To be conservative, two trains (existing conditions) were included at night. The data shown has been extrapolated to the 20 year design condition (year 2037) using a 2.5% growth rate compounded annually.

**TABLE 2**  
**PREDICTED SOUND LEVEL OUTDOORS<sup>(1)</sup>**  
**ROAD AND RAIL TRAFFIC NOISE – NO MITIGATION**

Location <sup>(2)</sup>	Source	Distance (m) <sup>(3)</sup>	L <sub>eq</sub> Day (dBA)	L <sub>eq</sub> Night (dBA)
Lot 14 North Façade	Hurontario Street	313	53	46
	Highway 410	342	45	41
	Street B	52	51	44
	<b>TOTAL</b>	-	<b>55</b>	<b>49</b>
Lot 16 OLA	Hurontario Street	293	53	-
	Street B	33	54	-
	<b>TOTAL</b>	-	<b>57</b>	-
Lot 17 OLA	Hurontario Street	279	56	-
	Highway 410	312	54	-
	Street B	20	59	-
	<b>TOTAL</b>	-	<b>61</b>	-
Lot 21 North Façade	Hurontario Street	307	53	47
	Highway 410	363	48	43
	Street B	52	49	43
	<b>TOTAL</b>	-	<b>56</b>	<b>50</b>
Lot 85 OLA	Hurontario Street	277	56	-
	Highway 410	373	53	-
	Street B	21	58	-
	<b>TOTAL</b>	-	<b>61</b>	-
Lot 108 OLA	Spine Road	108	55	-
	OBRY	129	44	-
	<b>TOTAL</b>	-	<b>55</b>	-
Lot 111 West Facade	Spine Road	138	54	48
	OBRY	120	44	45
	<b>TOTAL</b>	-	<b>55</b>	<b>50</b>
Lot 120 West Façade	Spine Road	264	50	43
	OBRY	66	50	49
	<b>TOTAL</b>	-	<b>53</b>	<b>50</b>

.../cont'd

**TABLE 2 (continued)**

**PREDICTED SOUND LEVEL OUTDOORS<sup>(1)</sup>**

**ROAD AND RAIL TRAFFIC NOISE – NO MITIGATION**

<b>Location<sup>(2)</sup></b>	<b>Source</b>	<b>Distance (m)<sup>(3)</sup></b>	<b>L<sub>eq</sub> Day (dBA)</b>	<b>L<sub>eq</sub> Night (dBA)</b>
Block 208 OLA	Hurontario Street	288	51	-
	Spine Road	94	49	-
	Street B	45	48	-
	<b>TOTAL</b>	-	<b>54</b>	-
Block 211 East Façade	Hurontario Street	255	61	54
	Highway 410	419	56	51
	Spine Road	55	61	55
	Street B	14	63	56
	<b>TOTAL</b>	-	<b>67</b>	<b>60</b>
Block 211 OLA	Hurontario Street	258	57	-
	Highway 410	423	53	-
	Spine Road	52	60	-
	Street B	17	60	-
	<b>TOTAL</b>	-	<b>64</b>	-
Block 230 South Façade	Hurontario Street	253	58	51
	Spine Road	22	70	64
	Street B	15	58	52
	<b>TOTAL</b>	-	<b>71</b>	<b>64</b>
Block 240 OLA	Spine Road	51	57	-
	OBYR	166	41	-
	<b>TOTAL</b>	-	<b>58</b>	-
Lot 242 East Facade	Spine Road	54	59	52
	Street C	13	63	57
	<b>TOTAL</b>	-	<b>65</b>	<b>58</b>
Lot 242 OLA	Spine Road	51	58	-
	Street C	17	60	-
	<b>TOTAL</b>	-	<b>62</b>	-

**Notes:**

- (1) Daytime and nighttime facade sound levels apply to a 7.5 m high bedroom window at all townhouse blocks and a 4.5 m high bedroom windows at all detached dwellings. Daytime OLA sound levels apply at a receptor height of 1.5 m above grade.
- (2) See Figure 2.
- (3) Distance indicated is from the centreline of the noise source to facade.



**TABLE 3**  
**NOISE ABATEMENT MEASURES**

<b>Building</b>	<b>Air Conditioning<sup>(1)</sup></b>	<b>Exterior Wall<sup>(2)</sup></b>	<b>Exterior Window<sup>(3)</sup></b>	<b>Sound Barrier<sup>(4)</sup></b>	<b>Warning Clauses<sup>(5)</sup></b>
Lot 17	Provision for Adding	OBC	OBC	2.3 m	A + C + D + E + F + J
Lots 15 and 16	Provision for Adding	OBC	OBC	–	A + C + F + J
Lots 1 to 14	None	OBC	OBC	–	F + J
Lot 18, 51, 52, 85	Provision for Adding	OBC	OBC	2.3 m	A + C + D + E + J
Lots 19 to 21, 48 to 50, 53 to 55 and 82 to 84	Provision for Adding	OBC	OBC	–	A + C + E + J
Lots 102, 105, 111 to 135, 152 to 162 and 173 to 183	None	OBC	OBC	–	I + J
Lots 107 and 151	Provision for Adding	OBC	OBC	1.8 m	A + C + D + I + J
Lots 106, 108 to 110, 136 to 150 and 163 to 172	Provision for Adding	OBC	OBC	–	A + C + I + J
Lot 197	Provision for Adding	OBC	OBC	-	A + C + H + J
Lot 198	Provision for Adding	OBC	OBC	1.8 m	A + C + D + H + J
Block 199	Provision for Adding	OBC	OBC	1.8 m sound barrier on end units with exposure to Spine Road	A + C + D + H + J
Blocks 218 to 220 and 240	Provision for Adding	OBC	OBC	1.8 m sound barrier on end units with exposure to Spine Road	A + C + D + I + J
Blocks 242 and 243	Provision for Adding	OBC	OBC	2.2 m sound barrier on end units with exposure to Spine Road	A + C + D + I + J
Block 248	Provision for Adding	OBC	OBC	2.2 m sound barrier on end units with exposure to Spine Road	A + C + D + H + J
Blocks 221 to 223 and 239	Mandatory	Brick veneer (or STC 54 equivalent)	STC 29	1.8 m sound barrier on end units with exposure to Spine Road	A + B + D + I + J
Blocks 211 and 230	Mandatory	Brick veneer (or STC 54 equivalent)	STC 29	3.0 m sound barrier on end units with exposure to Spine Road	A + B + D + G + J
Blocks 207 to 210	Provision for Adding	OBC	OBC	-	A + C + E + G + J
Blocks 237 and 238	Mandatory	Brick veneer (or STC 54 equivalent)	STC 29	2.2 m sound barrier on end units with exposure to Spine Road	A + B + D + I + J
Blocks 231	Mandatory	Brick veneer (or STC 54 equivalent)	STC 29	2.2 m sound barrier on most easterly unit	A + B + D + H + J
Blocks 224 to 229 and 232 to 236	Mandatory	Brick veneer (or STC 54 equivalent)	STC 29	-	A + B + J
All other units	No special noise control requirements				J

For notes to this table, see following page.

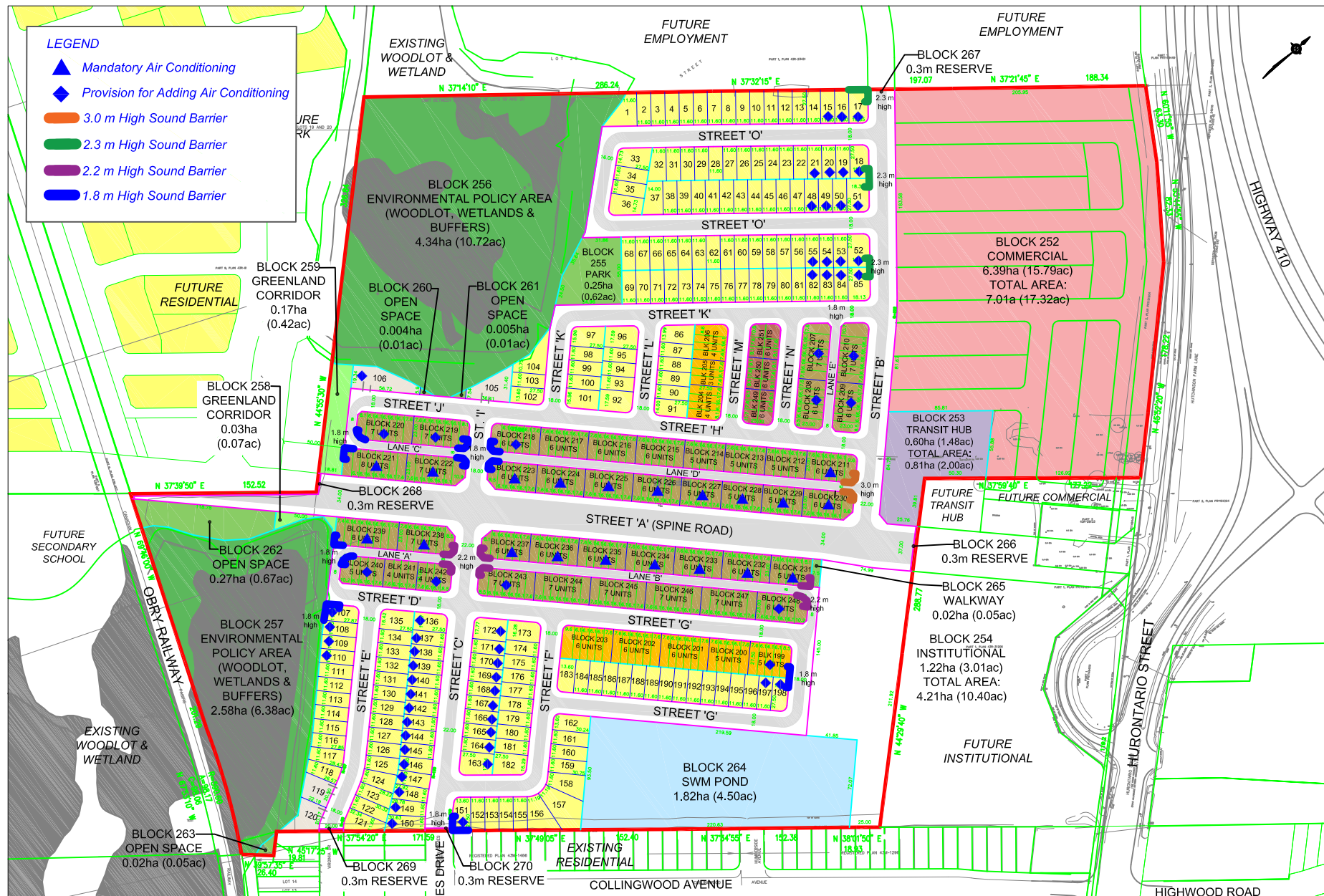
### Notes to Table 3

- (1) Where means must be provided to allow windows to remain closed for road noise control purposes, a commonly used technique is that of central air conditioning.
- (2) STC - Sound Transmission Class Rating (Reference ASTM-E413).
- The requirements are based on assumed percentages of wall and window area to associated floor area and should be checked once building plans are finalized.
- Upgraded wall construction means construction beyond that governed by the minimum non-acoustical requirements governed by the OBC (typically about STC 37).
- (3) STC - Sound Transmission Class Rating (Reference ASTM-E413). A sliding glass walkout door should be considered as a window and be included in the percentage of glazing.
- The requirements are based on assumed percentages of wall and window area to associated floor area and should be checked once building plans are finalized.
- Upgraded window construction means construction beyond that governed by the minimum non-acoustical requirements governed by the OBC (typically about STC 25).
- (4) Earthen berms, solid fences or combinations of berms/fences are acceptable
- Sound barriers must be of solid construction having a minimum face density of 20 kg/m<sup>2</sup> with no gaps, cracks or holes.
- (5) Warning clauses to be included in Occupancy Agreements:
- A. "Purchasers are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound level may exceed the noise guidelines of the Municipality and the Ministry of the Environment."
- B. "This dwelling has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the noise criteria of the municipality and the Ministry of the Environment."
- C. "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of Environment."
- D. "Purchasers/occupants are advised that the acoustical berm and/or barrier as installed shall be maintained, repaired or replaced by the owner. Any maintenance, repair or replacement shall be with the same material, to the same standards, and having the same colour and appearance of the original."
- E. "Purchases/tenants are advised that due to the proximity of the adjacent commercial block, noise from these facilities may at times be audible."
- F. "Purchases/tenants are advised that due to the proximity of the adjacent employment lands, noise from these facilities may at times be audible."
- G. "Purchases/tenants are advised that due to the proximity of the adjacent transit hub, noise from this facility may at times be audible."
- H. "Purchases/tenants are advised that due to the proximity of the adjacent Institutional facilities, noise from these facilities may at times be audible."
- I "Orangeville Brampton Railway or its affiliated railway companies has or have a railway right-of-way within 300 m from this dwelling unit. There may be alterations to or expansions of the railway facilities of such right-of-way in the future, including the possibility that Orangeville Brampton Railway or its affiliated railway companies as aforesaid, or their assigns or successors may expand their business operations. Such expansion may affect the living and business environment of the residents, tenants and their visitors, employees, customers and patients in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating features in the design of the development. Orangeville Brampton Railway or its affiliated railway companies and their successors and assigns will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."
- J "Purchases/tenants are advised that due to the proximity of the Brampton Airport, noise from aircraft from using this facility may at times be audible."
- (6) Conventional ventilated attic roof construction meeting OBC requirements is satisfactory in all cases.
- (7) All exterior doors shall be fully weatherstripped.



			<div><p>30 Wertheim Court, Unit 25 Richmond Hill, Ontario Canada L4B 1B9 Tel: 905-764-5223 Fax: 905-764-6813 solutions@valcoustics.com</p></div>	<b>Title</b>	<b>Project No.</b>	<b>Date</b>
				Key Plan	117-0183	Nov 20, 2017
				<b>Project Name</b>	<b>Scale</b>	<b>Figure</b>
				Hurontario Street and Highway 410, Caledon	N.T.S.	1
<b>No.</b>	<b>Revision/Issue</b>	<b>Date</b>				





# **APPENDIX A**

## **ROAD TRAFFIC CORRESPONDENCE**

## Greg Dennis

---

**From:** Semple, Paul (MTO) <Paul.Semple@ontario.ca>  
**Sent:** May-25-17 13:52  
**To:** Greg Dennis  
**Subject:** RE: Traffic Data Request (VCL file: 117-0183)

Sorry Greg, Highway 10 we definitely have! I should have taken a closer look at the map before looking through the database. Here you go:

### Hwy 10/Hurontario @ Brampton/Caledon Boundary

Current AADT = 22,900  
Ultimate AADT (Estimated) = 76,000  
Current Number of Through Lanes = 4  
Ultimate Number of Through Lanes = 4  
Posted Speed = 80 km/hr  
% Trucks (Estimated) = 10%

### Hwy 10 at Hwy 410 / Valleywood Blvd. IC

Current AADT = 28,100  
Ultimate AADT (Estimated) = 76,000  
Current Number of Through Lanes = 4  
Ultimate Number of Through Lanes = 4  
Posted Speed = 80 km/hr  
% Trucks (Estimated) = N/A

### Hwy 10, at Peel Rd 9

Current AADT = 25,600  
Ultimate AADT (Estimated) = 76,000  
Current Number of Through Lanes = 4  
Ultimate Number of Through Lanes = 4  
Posted Speed = 80 km/hr  
% Trucks (Estimated) = 13%

Apologies for the delayed response.

Regards,

### **Paul Semple**

Planner, Systems Analysis & Forecasting Office  
Ministry of Transportation  
Policy & Planning Division  
416-585-6308

---

**From:** Greg Dennis [<mailto:greg@valcoustics.com>]  
**Sent:** May-11-17 4:28 PM

## Greg Dennis

---

**From:** Semple, Paul (MTO) <Paul.Semple@ontario.ca>  
**Sent:** May-11-17 16:08  
**To:** Greg Dennis  
**Cc:** Tai, Arthur (MTO)  
**Subject:** RE: Traffic Data Request (VCL file: 117-0183)

Good afternoon Greg,

In response to your request please find below the information available from this office:

Current AADT = 35,700  
Ultimate AADT (Estimated) = 109,000  
Current Number of Through Lanes = 4  
Ultimate Number of Through Lanes = 4  
Posted Speed = 100 km/hr  
% Trucks (Estimated) = 6%

Please note that the above information is estimated based upon our current knowledge of the area, which may be subject to change in the future. Other information related to ROW, gradient, day/night split and heavy/medium truck split will be available from Central Region Traffic Office.

Unfortunately we do not have any traffic data available for Hurontario Street in this location.

If you require further information, please don't hesitate to contact me.

Thanks,

**Paul Semple**  
Planner, Systems Analysis & Forecasting Office  
Ministry of Transportation  
Policy & Planning Division  
416-585-6308

---

**From:** Greg Dennis [<mailto:greg@valcoustics.com>]  
**Sent:** May-09-17 1:21 PM  
**To:** Semple, Paul (MTO)  
**Subject:** RE: Traffic Data Request (VCL file: 117-0183)

Hi Paul,

I am following up with an email from Syed:

My company is preparing a noise feasibility study for a proposed development to the west of Highway 410 and Hurontario Street in Caledon. (see attached Google Earth as reference).

Are you able to provide traffic data for Highway 410, between Hurontario Street and Mayfield Road?

# Orangeville Railway Development Corp.

87 Broadway  
Orangeville, Ontario L9W 1K1



Telephone: (519) 941-0440  
Toll-Free: 1-866-941-0440

May 3, 2017

Valcoustics Canada Limited, 30 Wertheim Court, Unit 25  
Richmond Hill, Ontario Canada L4B 1B9

Attention: **Greg Dennis**  
Re: **Rail Traffic Data in the area of Highway 410 and Hurontario**

The Orangeville Railway Development Corporation is in receipt of your e-mail request for rail traffic information on the Orangeville-Brampton Railway (OBRY). An invoice in the amount of \$350.00 (plus HST) will be forwarded to you under separate cover for the administration fee for the information provided.

In response to your request, the following rail traffic data for movements along the OBRY at the above location is being provided to you:

1. The train movements in the vicinity of the location requested comprise entirely of freight movements with an average between 4 and 5 one-way trips per day, to the industries being serviced, during the hours of 07:00 – 23:00; no traffic is scheduled between 23:00 – 07:00 at this time and movements are usually scheduled on Tuesdays and Fridays. However, due to scheduling and testing, night trips and trips on other weekdays have and will occasionally occur. Service could increase to 5 or 6 days per week as efforts are being made to expand OBRY traffic. The average number of locomotives per trip is one although ORDC may use two on occasion as growth and volumes demand.
2. The average number of cars per train is approximately 8 to 12 per trip. It must be noted that special shunts might be requested by the industries being serviced on days other than those noted above.
3. The maximum speed of each train is 25 mph. There are no welded rails along this stretch of line (jointed track only).
4. For study purposes, assume that the crossings are whistle stop and the right-of-way is 30 metres.

Should you have any further questions, please call Tony Dulisse toll free at 1-866-941-0440, extension 2248 or by e-mail at [tdulisse@orangeville.ca](mailto:tdulisse@orangeville.ca).

Nancy Tuckett, MSc., Pl., BEd., MCIP, RPP  
General Manager

/td

---

**O. R. D. C.**



**TABLE 9.4: PEDESTRIAN AND CYCLING INFRASTRUCTURE REQUIREMENTS**

Roadway	Section	Forecasted 2031 AADT	Sidewalk	Bike Lanes
<b>Spine Road</b>	Hurontario Street to a point 200 metres west of McLaughlin Road	24,000 – 39,000	1.5 metre north side, 2.0 metre south side	2.0 metre west of Collector Road F
	200 metres west of McLaughlin Road to Chinguacousy Road	5,000 – 16,000	1.5 metre	1.8 metre
<b>McLaughlin Road</b>	Mayfield Road to a point 200 metres south of the Spine Road	19,000	1.5 metre	1.8 metre
	200 metres south of the Spine Road to a point 200 metres north of the Spine Road (Village Centre)	22,000	1.5 metres with additional surface to building face	1.8 metre
	200 metres north of the Spine Road to MW2 study limits	10,000	1.5 metre	1.8 metre
<b>Chinguacousy Road</b>	Mayfield Road to MW2 study limits	6,000	1.5 metre	1.8 metre paved shoulders
<b>Collectors</b>	As shown in <b>Figure 9.1</b>	3,000 – 5,000	1.5 metre	1.5 metre shared lanes or bike lanes



# **APPENDIX B**

## **ENVIRONMENTAL NOISE GUIDELINES**

## APPENDIX B

### ENVIRONMENTAL NOISE GUIDELINES

#### MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE (MOE)

Reference: MOE Publication NPC-300, October 2013: “Environmental Noise Guideline, Stationary and Transportation Source – Approval and Planning”.

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road	23:00 to 07:00	45 dBA
	Rail	23:00 to 07:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Sleeping quarters	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 0
Sleeping quarters	Road	23:00 to 07:00	40 dBA
	Rail	23:00 to 07:00	35 dBA
	Aircraft	24-hour period	NEF/NEP 0
Outdoor Living Areas	Road and Rail	07:00 to 23:00	55 dBA
Outdoor Point of Reception	Aircraft	24-hour period	NEF/NEP 30 <sup>#</sup>
	Stationary Source		
	Class 1 Area	07:00 to 19:00 <sup>(1)</sup>	50 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(1)</sup>	50 <sup>+</sup> dBA
	Class 2 Area	07:00 to 19:00 <sup>(2)</sup>	50 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(2)</sup>	45 <sup>+</sup> dBA
	Class 3 Area	07:00 to 19:00 <sup>(3)</sup>	45 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(3)</sup>	40 <sup>+</sup> dBA
	Class 4 Area	07:00 to 19:00 <sup>(4)</sup>	55 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(4)</sup>	55 <sup>+</sup> dBA

..../cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of a Window of Noise Sensitive Spaces	Stationary Source Class 1 Area	07:00 to 19:00 <sup>(1)</sup>	50 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(1)</sup>	50 <sup>+</sup> dBA
		23:00 to 07:00 <sup>(1)</sup>	45 <sup>+</sup> dBA
	Class 2 Area	07:00 to 19:00 <sup>(2)</sup>	50 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(2)</sup>	50 <sup>+</sup> dBA
		23:00 to 07:00 <sup>(2)</sup>	45 <sup>+</sup> dBA
	Class 3 Area	07:00 to 19:00 <sup>(3)</sup>	45 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(3)</sup>	45 <sup>+</sup> dBA
		23:00 to 07:00 <sup>(3)</sup>	40 <sup>+</sup> dBA
	Class 4 Area	07:00 to 19:00 <sup>(4)</sup>	60 <sup>+</sup> dBA
		19:00 to 23:00 <sup>(4)</sup>	60 <sup>+</sup> dBA
		23:00 to 07:00 <sup>(4)</sup>	55 <sup>+</sup> dBA

- # may not apply to in-fill or re-development.  
 \* or the minimum hourly background sound exposure  $L_{eq}(1)$ , due to road traffic, if higher.  
 (1) Class 1 Area : Urban  
 (2) Class 2 Area : Urban during day; rural-like evening and night  
 (3) Class 3 Area : Rural  
 (4) Class 4 Area: Subject to land use planning authority's approval

Reference: MOE Publication ISBN 0-7729-2804-5, 1987: "Environmental Noise Assessment in Land-Use Planning".

EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA)	CHANGE IN SUBJECTIVE LOUDNESS ABOVE	MAGNITUDE OF THE NOISE PROBLEM	NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN)
No excess (<55 dBA)	—	No expected noise problem	None
1 to 5 inclusive (56 to 60 dBA)	Noticeably louder	Slight noise impact	If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses.
6 to 10 inclusive (61 - 65 dBA)	Almost twice as loud	Definite noise impact	Recommended.
11 to 15 inclusive (66 - 70 dBA)	Almost three times as loud	Serious noise impact	Strongly Recommended.
16 and over (>70 dBA)	Almost four times as loud	Very serious noise impact	Strongly Recommended (may be mandatory).

# **APPENDIX C**

## **TRANSPORTATION SOURCE SAMPLE SOUND LEVEL CALCULATION**

STAMSON 5.04                      NORMAL REPORT                      Date: 23-11-2017 14:40:00  
 MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE / NOISE ASSESSMENT

Filename: b230\_s.te                      Time Period: Day/Night 16/8 hours

**Description: Block 230 South Facade**

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

```
-----
Car traffic volume   : 61560/6840   veh/TimePeriod  *
Medium truck volume : 4104/456     veh/TimePeriod  *
Heavy truck volume  : 2736/304     veh/TimePeriod  *
Posted speed limit  : 90 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 76000
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 6.00
Heavy Truck % of Total Volume       : 4.00
Day (16 hrs) % of Total Volume      : 90.00
```

Data for Segment # 1: HURONTARIO (day/night)

```
-----
Angle1  Angle2      : 0.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 1          (Absorptive ground surface)
Receiver source distance : 253.00 / 253.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Road data, segment # 2: Street B (day/night)

```
-----
Car traffic volume   : 4815/535   veh/TimePeriod  *
Medium truck volume : 101/11     veh/TimePeriod  *
Heavy truck volume  : 152/17     veh/TimePeriod  *
Posted speed limit  : 60 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 5631
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 2.00
Heavy Truck % of Total Volume       : 3.00
Day (16 hrs) % of Total Volume      : 90.00
```

Data for Segment # 2: Street B (day/night)

```
-----
Angle1  Angle2      : 0.00 deg  55.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 1          (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

## Road data, segment # 3: Spine (day/night)

```

-----
Car traffic volume   : 37552/4172   veh/TimePeriod  *
Medium truck volume  : 791/88      veh/TimePeriod  *
Heavy truck volume   : 1186/132    veh/TimePeriod  *
Posted speed limit   : 70 km/h
Road gradient        : 0 %
Road pavement        : 1 (Typical asphalt or concrete)

```

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

```

24 hr Traffic Volume (AADT or SADT) : 43920
Percentage of Annual Growth          : 0.00
Number of Years of Growth            : 0.00
Medium Truck % of Total Volume       : 2.00
Heavy Truck % of Total Volume        : 3.00
Day (16 hrs) % of Total Volume       : 90.00

```

## Data for Segment # 3: Spine (day/night)

```

-----
Angle1 Angle2      : -90.00 deg   90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface            : 1          (Absorptive ground surface)
Receiver source distance : 22.00 / 22.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00

```

## Results segment # 1: HURONTARIO (day)

Source height = 1.41 m

ROAD (0.00 + 57.58 + 0.00) = 57.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.48	79.93	0.00	-18.19	-4.15	0.00	0.00	0.00	57.58

Segment Leq : 57.58 dBA

## Results segment # 2: Street B (day)

Source height = 1.32 m

ROAD (0.00 + 58.13 + 0.00) = 58.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	55	0.49	63.63	0.00	0.00	-5.50	0.00	0.00	0.00	58.13

Segment Leq : 58.13 dBA

## Results segment # 3: Spine (day)

Source height = 1.32 m

ROAD (0.00 + 70.31 + 0.00) = 70.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.49	73.93	0.00	-2.47	-1.15	0.00	0.00	0.00	70.31

Segment Leq : 70.31 dBA

Total Leq All Segments: 70.78 dBA

## Results segment # 1: HURONTARIO (night)

-----

Source height = 1.41 m

ROAD (0.00 + 51.05 + 0.00) = 51.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.48	73.40	0.00	-18.19	-4.15	0.00	0.00	0.00	51.05

Segment Leq : 51.05 dBA

## Results segment # 2: Street B (night)

-----

Source height = 1.32 m

ROAD (0.00 + 51.61 + 0.00) = 51.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	55	0.49	57.10	0.00	0.00	-5.50	0.00	0.00	0.00	51.61

Segment Leq : 51.61 dBA

## Results segment # 3: Spine (night)

-----

Source height = 1.32 m

ROAD (0.00 + 63.79 + 0.00) = 63.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.49	67.40	0.00	-2.47	-1.15	0.00	0.00	0.00	63.79

Segment Leq : 63.79 dBA

Total Leq All Segments: 64.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.78  
 (NIGHT): 64.26