



# **APPENDIX B**

## **Acoustic Assessment Report**



December 2014

## APPENDIX B

# Acoustic Assessment Report Facility Design and Operations Volume IV Design and Operations Report Capital Region Resource Recovery Centre

REPORT

Report Number: 12-1125-0045/4500/vol IV





## **Executive Summary**

Golder Associates Ltd. (Golder) was retained by Taggart Miller Environmental Services (Taggart Miller) to prepare an Acoustic Assessment Report (AAR) for the Capital Region Resource Recovery Centre (CRRRC) facility (the Facility) located in Ottawa, Ontario. The purpose of this AAR is to evaluate the overall noise emissions of the Facility operations with respect to the Ontario Ministry of Environment and Climate Change (MOECC) noise guidelines.

The proposed CRRRC facility will provide Industrial, Commercial & Institutional (IC&I) and Construction & Demolition (C&D) waste processing and recovery in the Capital Region. The proposed operating hours for waste receiving and processing are from 6:00 am to 7:00 pm Monday to Saturday. Outdoor activities for the organic processing at the primary reactor cells are limited to 7:00 am to 7:00 pm. Indoor operations for the materials recovery facility (MRF) and C&D processing facility may operate until 11:00 pm (this excludes truck activities and outdoor operations). Equipment associated with bio-gas, leachate management and power generation is required to operate 24 hours per day 365 days of the year.

Noise generating equipment is summarised in Table 1.

Site specific noise measurements at a similar facility and Golder's database of similar sources were used as inputs to a predictive acoustical model to quantify outdoor noise emissions associated with the Facility. The criteria were established in accordance with MOECC publication NPC-300. Due to the nature of the sources, the Facility is not a significant source of vibration.

Ten (10) locations have been identified as being representative of the sensitive Points of Reception (PORs) in the vicinity of the Facility. In addition, three (3) vacant lots (VLs) zoned to allow possible future noise sensitive land uses have been identified in the vicinity of the Facility.

Golder predicted noise impacts from the Facility at these sensitive PORs below the applicable sound level limits during the predictable worst case hour of Facility operation. Therefore, based on the results presented in this AAR, the facility is expected to operate in compliance with MOECC noise guidelines as specified in NPC-300.



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### **ATTACHMENTS**

#### **ATTACHMENT A**

Zoning Designation Plan

#### **ATTACHMENT B**

Description of Technical Terms

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Noise Data

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Nomenclature

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Sample Calculations

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Noise Monitoring Data

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## ACOUSTIC ASSESSMENT REPORT CHECK-LIST

Company Name: Taggart Miller Environmental Services

Company Address: c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9

Location of Facility: Boundary Road and Devine Road  
Ottawa

The attached Acoustic Assessment Report was prepared in accordance with the guidance in the Ministry document "Information to be Submitted for Approval of Stationary Sources of Sound" (NPC 233) dated October 1995 and the minimum required information identified in the check-list on the reverse of this sheet has been submitted.

Company Contact:	
Name:	<u>Derek Cathcart</u>
Title:	<u>General Manager of Engineering</u>
Phone Number:	<u>905-415-7317</u>
Signature:	_____
Date:	_____

Technical Contact:	
Name:	<u>Tim Gully</u>
Representing:	<u>Golder Associates Ltd.</u>
Phone Number:	<u>416-3661730 x2210</u>
Signature:	_____
Date:	_____

*Recreated by Golder Associates Ltd. from Ontario Ministry of Environment Publication PIBS 5356e*



## APPENDIX B, VOL IV DESIGN AND OPERATIONS REPORT ACOUSTIC ASSESSMENT REPORT

### ACOUSTIC ASSESSMENT REPORT CHECKLIST

Required Information		Submitted	Explanation/Reference
<b>1.0</b>	<b>Introduction</b> (Project Background and Overview)	<input checked="" type="checkbox"/> Yes	Section 1.0
<b>2.0</b>	<b>Facility Description</b>		
	2.1 Operating hours of facility and significant Noise Sources	<input checked="" type="checkbox"/> Yes	Sections 2.0 and 3.0
	2.2 Site Plan identifying all significant Noise Sources	<input checked="" type="checkbox"/> Yes	Figure 1
<b>3.0</b>	<b>Noise Source Summary</b>		
	3.1 Noise Source Summary Table	<input checked="" type="checkbox"/> Yes	Table 1
	3.2 Source noise emissions specifications	<input checked="" type="checkbox"/> Yes	Table 1
	3.3 Source power/capacity ratings	<input checked="" type="checkbox"/> Yes	Table 1, Attachment G
	3.4 Noise control equipment description and acoustical specifications	<input checked="" type="checkbox"/> Yes	Table 1, Attachment D
<b>4.0</b>	<b>Point of Reception Noise Impact Calculations</b>		
	4.1 Point of Reception Noise Impact Table	<input checked="" type="checkbox"/> Yes	Section 6.2, Table 4
	4.2 Point(s) of Reception (POR) list and description	<input checked="" type="checkbox"/> Yes	Section 4.0
	4.3 Land-use Zoning Plan	<input checked="" type="checkbox"/> Yes	Attachment A
	4.4 Scaled Area Location Plan	<input checked="" type="checkbox"/> Yes	Figure 2
	4.5 Procedure used to assess noise impacts at each POR	<input checked="" type="checkbox"/> Yes	Sections 5.0 and 6.1
	4.6 List of parameters/assumptions used in calculations	<input checked="" type="checkbox"/> Yes	Section 6.0
<b>5.0</b>	<b>Acoustics Assessment Summary</b>		
	5.1 Acoustic Assessment Summary Table	<input checked="" type="checkbox"/> Yes	Section 6.2, Table 8
	5.2 Rationale for selecting applicable noise guideline limits	<input checked="" type="checkbox"/> Yes	Section 5.0
	5.3 Predictable Worst Case Impacts Operating Scenario	<input checked="" type="checkbox"/> Yes	Sections 2.0 and 3.0
<b>6.0</b>	<b>Conclusions</b>		
	Statement of compliance with the selected noise performance limits	<input checked="" type="checkbox"/> Yes	Section 7.0
<b>7.0</b>	<b>Appendices</b> (Provide details such as)		
	Listing of Insignificant Noise Sources	<input type="checkbox"/> Yes	N/A
	Manufacturer's Noise Specifications	<input checked="" type="checkbox"/> Yes	Attachment C
	Calculations	<input checked="" type="checkbox"/> Yes	Attachment G
	Instrumentation	<input checked="" type="checkbox"/> Yes	Attachment E
	Meteorology during Sound Level Measurements	<input checked="" type="checkbox"/> Yes	Attachment F
	Raw Data from Measurements	<input checked="" type="checkbox"/> Yes	Attachment C
	Drawings (Facility / Equipment)	<input checked="" type="checkbox"/> Yes	Figures

Recreated by Golder Associates Ltd., from Ontario Ministry of Environment Publication PIBS 5356e



## **1.0 INTRODUCTION**

Golder Associates Ltd. (Golder) was retained by Taggart Miller Environmental Services (Taggart Miller) to prepare an Acoustic Assessment Report (AAR) for the Capital Region Resource Recovery Centre (CRRRC) facility (the Facility) located in Ottawa, Ontario. The purpose of this AAR is to evaluate the overall noise emissions of the Facility operations with respect to the Ontario Ministry of Environment and Climate Change (MOECC) noise guidelines.

A site layout plan showing the locations of noise sources is provided in Figure 1. A site location plan showing the location of the Facility and sensitive Points of Reception (PORs) is provided in Figure 2. Figure 3 shows the location of the vacant lots (VLs) zoned to allow possible future noise sensitive land use and the assumed location of such possible future developments. The land use and zoning to the west of the Site is Rural Heavy Industrial, as is a limited portion of the Site. The Site itself is otherwise zoned General Rural, as is the land to the south and west. A 400 series highway is located to the north of the Site. Lands to the east are mainly zoned Agricultural Resource and are used for this purpose. A zoning plan for the property and surrounding areas is provided in Attachment A.

Sound level limits for the Facility's operations were established in accordance with MOECC guidelines. Noise predictions were completed to determine the possible noise impact of the Facility operations at the neighbouring PORs. For a description of technical terminology used in this report, refer to Attachment B.

The Facility is not considered a significant source of vibration; therefore a vibration assessment was not considered warranted.

For the purpose of this assessment ten (10) locations have been selected representing the existing sensitive PORs, labelled POR01 to POR10, and three (3) vacant lots (VLs) zoned to allow possible future noise sensitive land use labelled VL01 to VL03. The closest existing POR is located approximately 70 metres from the property line south of the Facility entrance.





## **2.0 FACILITY DESCRIPTION**

The proposed CRRRC facility will provide Industrial, Commercial & Institutional (IC&I) and Construction & Demolition (C&D) waste processing and recovery in the Capital Region. The primary components will be a materials recovery facility (MRF) for commercial waste; C&D waste processing; hydrocarbon contaminated soil treatment; surplus soil management; anaerobic digestion of organic waste from commercial sources; a drop off for separated materials or separation of materials; and leaf and yard materials composting. The outputs from the organics processing will be bio-gas that will be sent to an on-Site flare and possibly an on-Site electrical generation plant, a high quality compost for use as a soil amendment and fertilizer, and a non-organic residue for disposal. The organics digestion process will be equipped with a bio-filter for odour control. The primary noise generating equipment is summarised in Table 1.

The proposed operating hours for outdoor waste receiving and processing are from 6:00 am to 7:00 pm Monday to Saturday. Outdoor activities for the organic processing at the primary reactor cells are limited to 7:00 am to 7:00 pm. The proposed operating hours for indoor operations for the MRF and C&D processing facility are from 6:00 am to 11:00 pm Monday to Saturday. Equipment associated with bio-gas, leachate management and power generation is required to operate 24 hours per day 365 days of the year.



### 3.0 NOISE SOURCE SUMMARY

The primary noise sources are summarized in Table 1. Noise data is attached in Attachment C. In preparing the assessment, efforts were taken to ensure the source ID numbering convention was consistent, where applicable, with the information submitted by Miller Taggart to the MOECC, as part of the documentation provided in the Emission Summary and Dispersion Modelling (ESDM) Report. Also attached in Attachment C is Table 1 from the ESDM Report that provides descriptions of the sources.

**Table 1: Noise Source Summary**

Source ID (ESDM ID)	Source Description	Overall Day (0700 to 1900) Sound Power Level (dBA)	Overall Night (0600 to 0700) Sound Power Level (dBA)	Source Location <sup>1</sup>	Sound Characteristics <sup>1</sup>	Noise Control Measures <sup>1</sup>
001 (FLARE)	Flare <sup>2,3</sup>	96	96	O	S	U
002	MRF Vent 1	83	83	O	S	U
003	MRF Vent 2	83	83	O	S	U
004	MRF Vent 3	83	83	O	S	U
005	MRF Vent 4	83	83	O	S	U
006	MRF Vent 5	83	83	O	S	U
007	MRF Vent 7	83	83	O	S	U
008	MRF Vent 6	83	83	O	S	U
009	MRF Vent 8	83	83	O	S	U
010	MRF Vent 9	83	83	O	S	U
011	MRF Vent 10	83	83	O	S	U
012	MRF Vent 11	83	83	O	S	U
013	MRF Vent 12	83	83	O	S	U
014	C&D Vent 1	83	83	O	S	U
015	C&D Vent 2	83	83	O	S	U
016	C&D Vent 3	83	83	O	S	U
017	C&D Vent 4	83	83	O	S	U
018	C&D Vent 5	83	83	O	S	U
019	C&D Vent 6	83	83	O	S	U
020	C&D Vent 7	83	83	O	S	U
021	C&D Vent 8	83	83	O	S	U
022	C&D Vent 9	83	83	O	S	U
023	C&D Vent 10	83	83	O	S	U
024	C&D Vent 11	83	83	O	S	U
025	C&D Vent 12	83	83	O	S	U
026 (MRFDC1)	MRF Dust Collector	102	102	O	S	U
027 (CDC1)	C&D Dust Collector	102	102	O	S	U
028	Welding Fume Hood	91	91	O	S	U



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Source ID (ESDM ID)	Source Description	Overall Day (0700 to 1900) Sound Power Level (dBA)	Overall Night (0600 to 0700) Sound Power Level (dBA)	Source Location <sup>1</sup>	Sound Characteristics <sup>1</sup>	Noise Control Measures <sup>1</sup>
029	SS Loader CAT966 <sup>4</sup>	109	109	O	S	U
030	HC Loader CAT966 <sup>4</sup>	109	109	O	S	U
031	SS Grader CAT12	116	116	O	S	U
032	SS Dozer CATD6	110	110	O	S	U
033	Compost Loader 1	109	109	O	S	U
034	Compost Loader 2	109	109	O	S	U
035	Compost Chipper	118	118	O	S	U
036	Compost Conveyor	94	94	O	S	U
037	Compost Turner	111	111	O	S	U
038	Compost Screen	104	104	O	S	U
039	Comp Air Classifier	111	111	O	S	U
040	C&D Truck Idle	98	98	O	S	U
041	MRF Truck Idle	98	98	O	S	U
042	MRF Exhaust 1	87	87	O	S	U
043	MRF Exhaust 2	87	87	O	S	U
044	MRF Exhaust 3	87	87	O	S	U
045	MRF Exhaust 4	87	87	O	S	U
046	MRF Exhaust 5	87	87	O	S	U
047	C&D Exhaust 1	87	87	O	S	U
048	C&D Exhaust 2	87	87	O	S	U
049	C&D Exhaust 3	87	87	O	S	U
050	C&D Exhaust 4	87	87	O	S	U
051	C&D Exhaust 5	87	87	O	S	U
052	Mech Exhaust	87	87	O	S	U
053	HC Soil Exhaust 1 <sup>2</sup>	87	87	O	S	U
054	HC Soil Exhaust 2 <sup>2</sup>	87	87	O	S	U
055	Org Pre Processing Exhaust 1 <sup>2</sup>	87	87	O	S	U
056	Org Pre Processing Exhaust 2 <sup>2</sup>	87	87	O	S	U
057	Leachate Exhaust 1 <sup>2</sup>	87	87	O	S	U
058	Leachate Exhaust 2 <sup>2</sup>	87	87	O	S	U
059 (EPG)	Diesel Generator	117	117	O	S	U
060	Compost Aerator Fans <sup>2</sup>	95	95	O	S	U
062 (ORG_FILT)	Pre Processing Biofilter <sup>2</sup>	90	90	O	S	U
063 (HC_FILT)	HC Soil Biofilter <sup>2</sup>	90	90	O	S	U



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Source ID (ESDM ID)	Source Description	Overall Day (0700 to 1900) Sound Power Level (dBA)	Overall Night (0600 to 0700) Sound Power Level (dBA)	Source Location <sup>1</sup>	Sound Characteristics <sup>1</sup>	Noise Control Measures <sup>1</sup>
064 (LFG_ENG)	Generator 1 <sup>2,5</sup>	88	88	O	S	S / E
065 (LFG_ENG)	Generator 2 <sup>2,5</sup>	88	88	O	S	S / E
066 (LFG_ENG)	Generator 3 <sup>2,5</sup>	88	88	O	S	S / E
067 (LFG_ENG)	Generator 4 <sup>2,5</sup>	88	88	O	S	S / E
068 (LFG_ENG)	Generator 5 <sup>2,5</sup>	88	88	O	S	S / E
069 (LFG_ENG)	Generator 6 <sup>2,5</sup>	88	88	O	S	S / E
070 (LFG_ENG)	Generator 7 <sup>2,5</sup>	88	88	O	S	S / E
071	EGP Exhaust <sup>2</sup>	87	87	O	S	U
072	MRF HVAC 1	83	83	O	S	U
073	MRF HVAC 2	83	83	O	S	U
074	MRF HVAC 3	83	83	O	S	U
075	MRF HVAC 4	83	83	O	S	U
076	C&D HVAC 1	83	83	O	S	U
077	C&D HVAC 2	83	83	O	S	U
078	C&D HVAC 3	83	83	O	S	U
079	C&D HVAC 4	83	83	O	S	U
080	Mech HVAC	83	83	O	S	U
081	HC Soil HVAC 1 <sup>2</sup>	83	83	O	S	U
082	HC Soil HVAC 2 <sup>2</sup>	83	83	O	S	U
083	Leachate HVAC 1 <sup>2</sup>	83	83	O	S	U
084	Org Pre Processing HVAC 2 <sup>2</sup>	83	83	O	S	U
085	Fire Pump	106	106	O	S	U
086	Org Pre Processing HVAC 1 <sup>2</sup>	83	83	O	S	U
087	EGP HVAC <sup>2</sup>	83	83	O	S	U
088	Soil Truck Idle	98	98	O	S	U
089	Organics Truck Idle	98	98	O	S	U
090	Secondary Reactor Exhaust <sup>2</sup>	87	87	O	S	U
091	Secondary Reactor HVAC <sup>2</sup>	83	83	O	S	U
092	Truck Pump <sup>2</sup>	111	111	O	S	U
093	Admin HVAC	83	83	O	S	U
094	Leachate Truck Idle <sup>2</sup>	98	98	O	S	U
095	Generator Exhaust 1 <sup>2,5</sup>	86	86	O	S	S
096	Generator Exhaust 2 <sup>2,5</sup>	86	86	O	S	S



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Source ID (ESDM ID)	Source Description	Overall Day (0700 to 1900) Sound Power Level (dBA)	Overall Night (0600 to 0700) Sound Power Level (dBA)	Source Location <sup>1</sup>	Sound Characteristics <sup>1</sup>	Noise Control Measures <sup>1</sup>
097	Generator Exhaust 3 <sup>2,5</sup>	86	86	O	S	S
098	Generator Exhaust 4 <sup>2,5</sup>	86	86	O	S	S
099	Generator Exhaust 5 <sup>2,5</sup>	86	86	O	S	S
100	Generator Exhaust 6 <sup>2,5</sup>	86	86	O	S	S
101	Generator Exhaust 7 <sup>2,5</sup>	86	86	O	S	S
102	Compost Excavator <sup>6</sup>	103	103	O	S	S
103	Organics Loader	109	-	O	S	S
104	Organics Excavator <sup>6</sup>	103	-	O	S	S
105	Organics Skidsteer	92	-	O	S	S
106	Organics Dump Truck	108	-	O	S	S
107	Organics Conveyor	94	-	O	S	S
108	Truck Movements Road Segment 1	105	103	O	S	U
109	Truck Movements Road Segment 2	92	91	O	S	U
110	Truck Movements Road Segment 3	97	95	O	S	U
111	Truck Movements Road Segment 4	86	85	O	S	U
112	Truck Movements Road Segment 5	96	95	O	S	U
113	Truck Movements Road Segment 6	80	79	O	S	U
114	Truck Movements Road Segment 7	100	98	O	S	U
115	Truck Movements Road Segment 8	84	82	O	S	U
116	Truck Movements Road Segment 9	96	95	O	S	U
117	Truck Movements Road Segment 10	84	83	O	S	U
118	Truck Movements Road Segment 11	97	96	O	S	U
119	Truck Movements Road Segment 13	88	88	O	S	U
120	Leachate Truck Movements <sup>2</sup>	98	98	O	S	U

**Notes:**

<sup>1</sup> See Attachment D for noise source summary table nomenclature

<sup>2</sup> Equipment operates 24 hours per day, 365 days per year<sup>3</sup> Enclosed flare designed not to exceed 85 dBA at 1 m

<sup>4</sup> One loader is modelled at the PHC soil treatment facility, and one loader is modelled at the surplus soil facility, though one loader will be shared between these facilities and the landfill and may operate at one time.

<sup>5</sup> Electrical Generators will be equipped with silencers and they will be housed in containers. Generator containers designed not to exceed 55 dBA at 10 m

<sup>6</sup> The number of excavators modelled is 2, though 1 excavator is shared by ancillary facilities and may operate at one time.



## 4.0 POINT(S) OF RECEPTION

A total of ten (10) existing PORs were identified in the AAR as the most sensitive PORs in the vicinity of the Facility. Three (3) vacant lots (VLs) zoned to allow possible future noise sensitive land use have also been identified. Table 2 provides a summary of the PORs and VLs used in the assessment. The table also includes the UTM coordinates and indicates which baseline noise monitoring location was used to establish the existing noise level at each POR. The existing PORs are shown on Figure 2, and the VLs are shown on Figure 3.

**Table 2: Summary of Sensitive Points of Reception (PORs)**

Receptor	UTM Coordinates	Representative Noise Monitoring Location
POR01	465558, 5020774	Meas Loc #2
POR02	465319, 5020015	Meas Loc #3
POR03	465888, 5019611	Meas Loc #3
POR04	465421, 5020818	Meas Loc #2
POR05	465428, 5021084	Meas Loc #2
POR06	465323, 5021149	Meas Loc #2
POR07	465319, 5021197	Meas Loc #2
POR08	465306, 5021229	Meas Loc #2
POR09	465318, 5021389	Meas Loc #2
POR10	464934, 5021613	Meas Loc #1
VL01	465916, 5020949 <sup>1</sup>	Meas Loc #2
VL02	466206, 5020603 <sup>1</sup>	Meas Loc #3
VL03	466808, 5021378 <sup>1</sup>	N/A <sup>2</sup>

**Notes:**

<sup>1</sup> UTM coordinates are for the assumed location of the future developments

<sup>2</sup> Noise monitoring was not carried out at this location. The minimum background sound level due to road traffic was calculated using STAMSON v5.04 (see Table 6)



## 5.0 ASSESSMENT CRITERIA

The PORs located in the vicinity of the Facility are in an area defined as Class 1 as per MOECC publication NPC-300. A Class 1 area means an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as “urban hum”. In this case Highway 417 and Boundary Road are primarily responsible for background noise.

In assessing stationary noise sources, the MOECC has established exclusionary sound level limits for Class 1 areas for both Plane of Window (POW) and Outdoor areas. The POW sound level limit for the noise sensitive receptors in a Class 1 area is described as follows:

*The sound level limit at a POW POR is set as the higher of either the applicable exclusionary limit of 50 dBA in the daytime period of 07:00-19:00, 50 dBA in the evening period of 19:00-23:00 and 45 dBA in the night-time period of 23:00-07:00, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment.*

The outdoor sound level limit for the noise sensitive receptors in a Class 1 area is described as follows:

*The sound level limit at an outdoor POR is set as the higher of either the applicable exclusionary limit of 50 dBA in the daytime period of 07:00-19:00 and 50 dBA in the evening period of 19:00-23:00, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment. In general, the outdoor POR will be protected during the night-time as a consequence of meeting the sound level limit at the adjacent POW.*

The One Hour Equivalent Sound Level ( $L_{eq}$ , dBA) MOECC exclusionary sound level limits for a POR in a Class 1 area are summarized in Table 3 below:

**Table 3: Points of Reception Sound Level Limits for Class 1 Area**

<b>Time Period</b>	<b>Class 1 POW MOE Exclusionary Sound Level Limit (dBA)</b>	<b>Class 1 Outdoor MOE Exclusionary Sound Level Limit (dBA)</b>
Daytime (07:00-19:00)	50	50
Evening (19:00-23:00)	50	50
Night-time (23:00-07:00)	45	N/A

A field study was carried out to characterize existing noise levels in the Site-vicinity study area. Continuous noise monitoring was carried out at three locations within the Site-vicinity study area to determine the existing noise levels for normal operations during daytime (0700 to 1900), evening (1900 to 2300) and night-time (0600 to 0700) periods, and for essential operations during night-time (2300 to 0600) periods, at sensitive Points of Reception (PORs). The monitoring lasted from August 23, 2013 through to August 29, 2013. Noise data was logged continuously on an hourly basis for the duration of the monitoring. The locations where noise monitoring was carried out are shown in Figure 4 and summarised in Table 4.



**Table 4: Summary of Noise Monitoring Locations**

<b>Monitoring Location</b>	<b>Address</b>	<b>Monitor UTM Coordinates</b>
Meas Loc #1	6150 Chemin Thunder Road	464943, 5021708
Meas Loc #2	5368 Boundary Road	465339, 5021249
Meas Loc #3	5716 Boundary Road	465969, 5019628

The existing acoustic environment in the Site-vicinity study area is dominated primarily by road traffic noise. Tables 5 and 6 summarize the minimum hourly noise levels measured at each of the monitoring locations (see Figure 4) which were used as the sound level limits for this assessment. The noise monitoring data that shows the hourly variation in sound level during the monitoring period is available in Attachment H. For the vacant lot located to the east of the Facility (VL03 – see Figure 3), the minimum background sound level due to road traffic was calculated using hourly traffic data for Highway 417. The sound energy exposure was determined using STAMSON v5.04 – ORNAMENT, the computerized road traffic noise prediction model provided by the MOECC. The minimum hourly noise level predictions for location VL03 are summarized in Table 7. Details of a STAMSON calculation are included in Attachment I.

The proposed operating hours for outdoor waste receiving and processing are from 6:00 am to 7:00 pm Monday to Saturday. Outdoor activities for the organic processing at the primary reactor cells are limited to 7:00 am to 7:00 pm. The proposed operating hours for indoor operations for the MRF and C&D processing facilities are from 6:00 am to 11:00 pm Monday to Saturday. In order to biodegrade organic material the compost processing pad will either incorporate physical compost turners or an aerated static pile system (ASP). The primary noise sources associated with the ASP are the fans used to force air through the composting mass. To remain conservative, both options have been included in the predictions for normal operations. If compost turners are used their operation will be limited from 0600 to 1900 hours. If the ASP system is preferred it will operate 24 hours per day, therefore the ASP system has also been included in the essential operations scenario. Equipment associated with leachate management, biogas and power generation is required to operate 24 hours per day 365 days of the year. As such the assessment has been based on the following operating scenarios:

**Normal Operations (waste receiving and processing) – 0600 to 2300 hours Monday to Saturday**

For normal operations during daytime hours the minimum 1 hour  $L_{eq}$  monitored from 0700 to 1900 hours (excluding Sunday) has been used for each location. During this time period the Facility is assumed to be fully operating. For on-Site truck activity the total daily number of trucks associated with the waste processing facilities is 156 entering and 156 exiting the site. To be conservative, a 10 hour day has been assumed and a 1.45% peaking factor has been applied, resulting in a total of 23 trucks per hour entering and exiting the Site.

For normal operations during evening hours the minimum 1 hour  $L_{eq}$  monitored from 1900 to 2300 hours (excluding Sunday) has been used for each location. During this time period operations are limited to activities indoors within the MRF and C&D processing facility. For on-Site truck activity a maximum of 4 trucks per hour (associated with the leachate pre-treatment facility) has been used. On-Site truck activity associated with waste receiving and processing is limited from 0600 to 1900 hours.





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For normal operations during night-time hours the minimum 1 hour  $L_{eq}$  monitored from 0600 to 0700 hours (excluding Sunday) has been used for each location. During this time period the initial phase of mobile equipment will be to start the equipment, allow it to idle, and perform a pre-operational system check. To remain conservative all equipment is assumed to be fully operating. Outdoor activities for the organic processing at the primary reactor cells are limited to 7:00 am to 7:00 pm and therefore are not included in the assessment of normal operations during night-time hours (0600 to 0700 hours). For on-Site truck activity the maximum number of trucks expected from 0600 to 0700 hours is 22. To be conservative, a 1.45% peaking factor has been applied resulting in 32 trucks per hour.

**Essential Operations (leachate management, bio-gas and power generation) – 24 hours per day, 365 days per year.**

Equipment associated with leachate management, biogas and power generation is required to operate 24 hours per day. For essential operations the minimum 1 hour  $L_{eq}$  monitored from 2300 to 0600 hours (including Sunday) has been used for each location. Equipment operating during this time period is indicated in Table 1. For on-Site truck activity a maximum of 4 trucks per hour (associated with the leachate pre-treatment facility) has been used.

**Table 5: Summary of Noise Monitoring Data Normal Operations (0600 to 2300 hours Monday to Saturday)**

Location	Daytime (0700 to 1900 hours)		Evening (1900 to 2300 hours)		Night-time (0600 to 0700 hours)	
	Lowest Hourly $L_{eq}$ dBA	Date and Time	Lowest Hourly $L_{eq}$ dBA	Date and Time	Lowest Hourly $L_{eq}$ dBA	Date and Time
Meas Loc #1	58	Saturday, August 24, 2013 from 1400 to 1500 hours	56	Monday, August 26, 2013 from 2200 to 2300 hours	58	Monday, August 26, 2013 from 0600 to 0700 hours
Meas Loc #2	65	Saturday, August 24, 2013 from 0800 to 0900 hours	61	Monday, August 26, 2013 from 2200 to 2300 hours	63	Saturday, August 24, 2013 from 0600 to 0700 hours
Meas Loc #3	58	Saturday, August 24, 2013 from 1800 to 1900 hours	54	Monday, August 26, 2013 from 2200 to 2300 hours	56	Saturday, August 24, 2013 from 0600 to 0700 hours



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**Table 6: Summary of Noise Monitoring Data Essential Operations (24 hours per day 7 days per week)**

Location	Night-time (2300 to 0600 hours)	
	Lowest Hourly $L_{eq}$ dBA	Date and Time
Meas Loc #1	47	Monday, August 26, 2013 from 0100 to 0200 hours
Meas Loc #2	50	Wednesday, August 28, 2013 from 0300 to 0400 hours
Meas Loc #3	47	Saturday, August 24, 2013 from 0300 to 0400 hours

**Table 7: Summary of Minimum Background Sound Level Due to Road Traffic (applicable to VL03)**

Location	Daytime (0700 to 1900 hours)	Evening (1900 to 2300 hours)	Night-time Normal Operations (0600 to 0700 hours)	Night-time Essential Operations (2300 to 0600 hours)
VL03	57	55	54	45



## 6.0 IMPACT ASSESSMENT

### 6.1 Methodology

Golder generated noise impact predictions for the identified sensitive PORs (including vacant lots zoned for future noise sensitive land use), using noise measurements at an existing Miller facility and Golder’s database of similar sources. Predictions for Outdoor Points of Reception (receptors at 1.5 metres above ground within 30 metres of the building façade) and “Plane of Window” (receptors at 4.5 metres representing a second storey window of a noise sensitive space) were made as defined in NCP-300.

Sound pressure measurements were carried out on July 25, 2013 at an existing Miller Waste Management Facility located at 100 Garfield Wright Boulevard, East Gwillimbury, Ontario. Measurements were made for all external noise sources at the Material Recovery Facility (MRF) and were used to represent similar external noise sources at the proposed MRF and Construction and Demolition (C&D) processing facility. Golder’s database of similar noise sources was used for equipment that does not currently operate at the East Gwillimbury location or was not operating at the time of site measurements.

Weather conditions during the site visit are presented in Table 8 below:

**Table 8: Weather Conditions During Site Visit**

Date	Condition	Temperature	Wind Direction (from)	Wind Speed
July 25, 2013	Cloudy	21°C	N	15 km/hour

Weather data during the visit is provided in Attachment F. Measurements were made using a Larson Davis 2900+ (Serial #0983) sound level meter/real-time analyzer. All measuring equipment used in this study meets the MOE requirements, and calibration certificates are provided in Attachment E.

The predictive analysis was carried out using the commercially available software package Cadna/A V 4.3.143. Geometrical spreading, attenuation from barriers, ground effect and air absorption were included in the analysis as determined from ISO 9613 (part 2), which is the current standard used for outdoor sound propagation predictions. It should be noted this standard makes provisions to include a correction to address downwind or ground based temperature inversion conditions. Noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with MOECC accepted practice.

As described in ISO 9613 (part 2), ground factor values that represent the ground effect on sound levels range between 0 and 1. Based on the specific Site conditions, the ground factor values used in the modelling were a ground factor value of 0.5 for the site property, and a ground factor value of 0.8 for the landfill and surrounding areas.

### 6.2 Results – Facility Operations

The Facility’s noise emissions were modelled to predict the noise impact on the identified PORs during a predictable worst case 1-hour operation, as described in Section 5.0.

Table 9 provides detailed noise impact predictions from each source at each POR (POW receptors). The table also includes the approximate distance to each source. A sample calculation is provided in Attachment G.

Table 9: Point of Reception Noise Impact

Source ID	VL01				VL02				VL03				POR01				POR02									
	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	
A_001	852	16	16	16	16	850	16	16	16	16	140	41	41	41	41	1250	12	12	12	12	1881	6	6	6	6	6
A_002	607	9	9	9		855	12	12	12		565	0	0	0		971	4	4	4		1715	0	0	0	0	0
A_003	595	10	10	10		835	12	12	12		555	0	0	0		963	5	5	5		1703	0	0	0	0	0
A_004	584	16	16	16		817	13	13	13		546	0	0	0		955	6	6	6		1691	4	4	4	4	4
A_005	614	16	16	16		825	12	12	12		503	12	12	12		990	10	10	10		1719	4	4	4	4	4
A_006	656	15	15	15		849	12	12	12		461	12	12	12		1035	10	10	10		1758	4	4	4	4	4
A_007	759	5	5	5		923	12	12	12		384	20	20	20		1141	0	0	0		1858	0	0	0	0	0
A_008	697	14	14	14		873	12	12	12		422	19	19	19		1078	10	10	10		1797	4	4	4	4	4
A_009	789	0	0	0		958	0	0	0		389	14	14	14		1169	0	0	0		1890	0	0	0	0	0
A_010	776	0	0	0		957	0	0	0		414	0	0	0		1153	0	0	0		1879	0	0	0	0	0
A_011	729	0	0	0		928	0	0	0		454	0	0	0		1103	0	0	0		1834	0	0	0	0	0
A_012	678	0	0	0		898	0	0	0		502	0	0	0		1048	0	0	0		1785	0	0	0	0	0
A_013	630	0	0	0		872	0	0	0		551	0	0	0		994	0	0	0		1737	0	0	0	0	0
A_014	459	18	18	18		795	13	13	13		746	0	0	0		792	13	13	13		1558	5	5	5	5	5
A_015	437	19	19	19		766	13	13	13		736	0	0	0		778	13	13	13		1539	5	5	5	5	5
A_016	414	19	19	19		735	13	13	13		726	0	0	0		763	13	13	13		1519	6	6	6	6	6
A_017	431	19	19	19		735	13	13	13		697	10	10	10		787	13	13	13		1537	5	5	5	5	5
A_018	471	18	18	18		749	13	13	13		647	10	10	10		835	12	12	12		1579	5	5	5	5	5
A_019	510	17	17	17		765	13	13	13		602	10	10	10		879	12	12	12		1618	5	5	5	5	5
A_020	535	0	0	0		782	0	0	0		583	11	11	11		905	0	0	0		1642	0	0	0	0	0
A_021	551	0	0	0		809	0	0	0		595	5	5	5		915	0	0	0		1659	0	0	0	0	0
A_022	570	0	0	0		838	0	0	0		608	4	4	4		928	0	0	0		1678	0	0	0	0	0
A_023	563	0	0	0		839	0	0	0		624	0	0	0		918	0	0	0		1670	0	0	0	0	0
A_024	517	0	0	0		820	0	0	0		679	0	0	0		863	0	0	0		1622	0	0	0	0	0
A_025	484	0	0	0		808	0	0	0		722	0	0	0		821	0	0	0		1585	0	0	0	0	0
A_026	695	32	32	32		902	30	30	30		476	30	30	30		1067	28	28	28		1800	22	22	22	22	22
A_027	498	36	36	36		795	31	31	31		671	28	28	28		850	30	30	30		1604	23	23	23	23	23
A_028	812	20	20	20		941	15	15	15		308	7	7	7		1200	14	14	14		1902	1	1	1	1	1
A_029	364	47	47	47		463	44	44	44		632	35	35	35		760	39	39	39		1409	33	33	33	33	33
A_030	373	46	46	46		404	46	46	46		646	35	35	35		761	39	39	39		1379	33	33	33	33	33
A_031	363	53	53	53		475	50	50	50		630	41	41	41		760	45	45	45		1414	38	38	38	38	38
A_032	363	46	46	46		486	44	44	44		628	36	36	36		761	39	39	39		1420	32	32	32	32	32
A_033	482	44	44	44		546	43	43	43		511	36	36	36		879	38	38	38		1525	32	32	32	32	32
A_034	546	43	43	43		618	42	42	42		444	35	35	35		944	37	37	37		1599	32	32	32	32	32
A_035	485	52	52	52		587	50	50	50		506	43	43	43		883	45	45	45		1547	37	37	37	37	37
A_036	489	28	28	28		579	27	27	27		502	21	21	21		887	22	22	22		1546	15	15	15	15	15
A_037	475	45	45	45		550	44	44	44		517	37	37	37		872	38	38	38		1523	32	32	32	32	32
A_038	482	37	37	37		563	35	35	35		509	27	27	27		880	30	30	30		1533	22	22	22	22	22
A_039	474	45	45	45		569	43	43	43		516	37	37	37		872	38	38	38		1532	32	32	32	32	32
A_040	504	6	6	6		818	0	0	0		702	1	1	1		844	4	4	4		1606	0	0	0	0	0
A_041	676	2	2	2		899	0	0	0		509	5	5	5		1044	0	0	0		1783	0	0	0	0	0
A_042	614	19	19	19		845	16	16	16		535	18	18	18		984	14	14	14		1721	8	8	8	8	8
A_043	646	18	18	18		862	16	16	16		502	21	21	21		1019	14	14	14		1752	8	8	8	8	8
A_044	684	18	18	18		884	16	16	16		465	22	22	22		1060	14	14	14		1789	8	8	8	8	8
A_045	725	18	18	18		909	15	15	15		427	23	23	23		1104	13	13	13		1828	8	8	8	8	8
A_046	763	17	17	17		933	15	15	15		396	23	23	23		1143	13	13	13		1863	8	8	8	8	8
A_047	453	22	22	22		772	17	17	17		718	13	13	13		797	16	16	16		1556	10	10	10	10	10
A_048	490	21	21	21		785	17	17	17		668	14	14	14		844	16	16	16		1597	9	9	9	9	9
A_049	533	20	20	20		802	16	16	16		616	15	15	15		895	15	15	15		1641	9	9	9	9	9
A_050	473	22	22	22		758	17	17	17		658	14	14	14		833	16	16	16		1580	9	9	9	9	9
A_051	508	16	16	16		808	16	16	16		675	14	14	14		857	16	16	16		1614	9	9	9	9	9
A_052	824	17	17	17		952	12	12	12		304	26	26	26		1212	13	13	13		1915	7	7	7	7	7
A_053	453	22	22	22		395	23	23	23		605	14	14	14		832	16	16	16		1414	10	10	10	10	10
A_054	438	22	22	22		371	24	24	24		629	14	14	14		813	16	16	16		1389	11	11	11	11	11
A_055	619	19	19	19		671	18	18	18		372	19	19	19		1017	14	14	14		1667	9	9	9	9	9
A_056	637	19	19	19		665	13	13	13		356	24	24	24		1034	14	14	14		1673	9	9	9	9	9
A_057	573	20	20	20		510	21	21	21		475	16	16	16		959	15	15	15		1545	10	10	10	10	10
A_058	613	19	19	19		544	20	20	20		438	17	17	17		1001	14	14	14		1584	9	9	9	9	9
A_059	813	0	0	0		929	0	0	0		284	0	0	0		1203	0	0	0		1899	0	0	0	0	0
A_060	455	19	19	19		512	22	22	22		542	17	17	17		851	15	15	15		1491	12	12	12	12	12

Table 9: Point of Reception Noise Impact

Source ID	VL01				VL02				VL03				POR01				POR02									
	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	
A_062	627	22	22	22	22	668	19	19	19	19	364	27	27	27	27	1025	17	17	17	17	17	1669	12	12	12	12
A_063	425	25	25	25	25	367	27	27	27	27	638	16	16	16	16	801	19	19	19	19	19	1380	14	14	14	14
A_064	884	6	6	6	6	902	6	6	6	6	110	32	32	32	32	1282	3	3	3	3	3	1925	0	0	0	0
A_065	883	11	11	11	11	898	11	11	11	11	110	33	33	33	33	1281	8	8	8	8	8	1923	5	5	5	5
A_066	883	11	11	11	11	895	11	11	11	11	110	33	33	33	33	1281	8	8	8	8	8	1921	5	5	5	5
A_067	882	11	11	11	11	892	11	11	11	11	109	33	33	33	33	1280	8	8	8	8	8	1919	5	5	5	5
A_068	881	11	11	11	11	889	11	11	11	11	110	33	33	33	33	1279	8	8	8	8	8	1917	5	5	5	5
A_069	881	11	11	11	11	887	11	11	11	11	110	33	33	33	33	1279	8	8	8	8	8	1915	5	5	5	5
A_070	880	11	11	11	11	883	11	11	11	11	110	33	33	33	33	1278	8	8	8	8	8	1913	5	5	5	5
A_071	891	9	9	9	9	927	7	7	7	7	124	34	34	34	34	1288	6	6	6	6	6	1943	2	2	2	2
A_072	648	14	14	14	14	872	11	11	11	11	516	11	11	11	11	1018	9	9	9	9	9	1755	2	2	2	2
A_073	632	14	14	14	14	844	11	11	11	11	499	14	14	14	14	1007	9	9	9	9	9	1738	3	3	3	3
A_074	710	13	13	13	13	889	11	11	11	11	422	18	18	18	18	1091	8	8	8	8	8	1811	2	2	2	2
A_075	727	7	7	7	7	918	10	10	10	10	441	18	18	18	18	1103	8	8	8	8	8	1831	2	2	2	2
A_076	479	17	17	17	17	792	12	12	12	12	703	7	7	7	7	823	11	11	11	11	11	1583	4	4	4	4
A_077	456	18	18	18	18	761	12	12	12	12	692	8	8	8	8	808	12	12	12	12	12	1562	4	4	4	4
A_078	506	16	16	16	16	780	12	12	12	12	630	9	9	9	9	869	11	11	11	11	11	1614	4	4	4	4
A_079	528	10	10	10	10	811	12	12	12	12	641	8	8	8	8	884	11	11	11	11	11	1636	3	3	3	3
A_080	829	12	12	12	12	950	6	6	6	6	289	22	22	22	22	1218	7	7	7	7	7	1917	2	2	2	2
A_081	434	18	18	18	18	381	19	19	19	19	623	8	8	8	8	812	11	11	11	11	11	1395	5	5	5	5
A_082	457	17	17	17	17	385	19	19	19	19	611	9	9	9	9	833	11	11	11	11	11	1408	5	5	5	5
A_083	531	16	16	16	16	476	17	17	17	17	514	11	11	11	11	917	10	10	10	10	10	1504	4	4	4	4
A_084	616	14	14	14	14	651	10	10	10	10	376	14	14	14	14	1013	9	9	9	9	9	1654	3	3	3	3
A_085	826	0	0	0	0	938	0	0	0	0	272	0	0	0	0	1217	0	0	0	0	0	1911	0	0	0	0
A_086	639	14	14	14	14	685	11	11	11	11	352	14	14	14	14	1037	9	9	9	9	9	1685	3	3	3	3
A_087	893	3	3	3	3	925	1	1	1	1	117	30	30	30	30	1290	0	0	0	0	0	1942	0	0	0	0
A_088	436	26	26	26	26	587	19	19	19	19	560	23	23	23	23	833	24	24	24	24	24	1515	10	10	10	10
A_089	605	22	22	22	22	687	21	21	21	21	389	21	21	21	21	1003	16	16	16	16	16	1667	9	9	9	9
A_090	870	16	16	16	16	909	10	10	10	10	141	33	33	33	33	1267	12	12	12	12	12	1923	2	2	2	2
A_091	868	11	11	11	11	901	5	5	5	5	136	29	29	29	29	1265	7	7	7	7	7	1917	0	0	0	0
A_092	550	42	42	42	42	457	44	44	44	44	526	23	23	23	23	929	29	29	29	29	29	1497	29	29	29	29
A_093	148	28	28	28	28	556	15	15	15	15	909	4	4	4	4	502	16	16	16	16	16	1247	6	6	6	6
A_094	543	26	26	26	26	452	32	32	32	32	532	11	11	11	11	923	17	17	17	17	17	1491	16	16	16	16
A_095	879	10	10	10	10	897	5	5	5	5	115	30	30	30	30	1277	10	10	10	10	10	1921	7	7	7	7
A_096	879	10	10	10	10	894	5	5	5	5	115	30	30	30	30	1276	2	2	2	2	2	1919	7	7	7	7
A_097	878	9	9	9	9	892	5	5	5	5	114	30	30	30	30	1276	2	2	2	2	2	1917	7	7	7	7
A_098	877	9	9	9	9	889	5	5	5	5	114	30	30	30	30	1275	2	2	2	2	2	1915	7	7	7	7
A_099	877	9	9	9	9	885	5	5	5	5	114	30	30	30	30	1275	2	2	2	2	2	1913	7	7	7	7
A_100	877	5	5	5	5	883	5	5	5	5	114	30	30	30	30	1275	2	2	2	2	2	1911	7	7	7	7
A_101	876	5	5	5	5	880	5	5	5	5	114	30	30	30	30	1274	2	2	2	2	2	1909	7	7	7	7
A_102	475	37	37	37	37	527	36	36	36	36	521	30	30	30	30	871	31	31	31	31	31	1510	24	24	24	24
A_103	700	30	30	30	30	762	22	22	22	22	296	32	32	32	32	1098	25	25	25	25	25	1758	14	14	14	14
A_104	692	23	23	23	23	672	18	18	18	18	317	25	25	25	25	1087	18	18	18	18	18	1702	7	7	7	7
A_105	692	12	12	12	12	681	6	6	6	6	312	14	14	14	14	1088	7	7	7	7	7	1707	0	0	0	0
A_106	699	27	27	27	27	755	20	20	20	20	295	30	30	30	30	1097	22	22	22	22	22	1754	11	11	11	11
A_107	697	14	14	14	14	746	8	8	8	8	295	17	17	17	17	1095	9	9	9	9	9	1748	0	0	0	0
A_108	77 / 439	50	50	50	50	506 / 770	36	36	36	36	700 / 1419	25	25	25	25	115 / 697	46	46	46	46	46	870 / 1400	29	29	29	29
A_109	304 / 347	31	31	31	31	544 / 637	24	24	24	24	700 / 708	16	16	16	16	697 / 722	22	22	22	22	22	1401 / 1455	14	14	14	14
A_110	347 / 521	31	31	31	31	637 / 841	25	25	25	25	708 / 767	16	16	16	16	722 / 856	26	26	26	26	26	1455 / 1622	17	17	17	17
A_111	501 / 521	0	0	0	0	815 / 840	0	0	0	0	700 / 712	0	0	0	0	843 / 855	0	0	0	0	0	1604 / 1621	0	0	0	0
A_112	522 / 688	9	9	9	9	841 / 919	8	8	8	8	522 / 712	9	9	9	9	856 / 1053	11	11	11	11	11	1622 / 1796	6	6	6	6
A_113	673 / 689	0	0	0	0	896 / 920	0	0	0	0	507 / 522	0	0	0	0	1042 / 1054	0	0	0	0	0	1780 / 1796	0	0	0	0
A_114	615 / 816	28	28	28	28	722 / 998	20	20	20	20	312 / 522	31	31	31	31	1011 / 1192	22	22	22	22	22	1689 / 1920	11	11	11	11
A_115	604 / 614	9	9	9	9	686 / 722	8	8	8	8	390 / 392	9	9	9	9	1002 / 1010	10	10	10	10	10	1666 / 1689	0	0	0	0
A_116	439 / 614	30	30	30	30	608 / 721	21	21	21	21	393 / 564	23	23	23	23	834 / 1009	23	23	23	23	23	1525 / 1688	11	11	11	11
A_117	433 / 439	20	20	20	20	586 / 607	10	10	10	10	564 / 564	11	11	11	11	830 / 834	13	13	13	13	13	1513 / 1524	0	0	0	0
A_118	304 / 439	34	34	34	34	543 / 608	26	26	26	26	564 / 700	22	22	22	22	697 / 834	26	26	26	26	26	1400 / 1525	18	18	18	18
A_119	193 / 422	27	27	27	27	618 / 832	18	18	18	18	708 / 1000	9	9	9	9	490 / 722	20	20	20	20	20	1258 / 1478	10	10	10	10
A_120	75 / 541	41	41	41	41	313 / 767	31	31	31	31	534 / 1418	16	16	16	16	112 / 920	36	36	36	36						

Table 9: Point of Reception Noise Impact

Source ID	POR03				POR04				POR05				POR06							
	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)
A_001	1872	12	12	12	12	1359	10	10	10	10	1281	18	18	18	18	1377	17	17	17	17
A_002	1880	3	3	3		1046	4	4	4		902	5	5	5		976	6	6	6	
A_003	1862	3	3	3		1040	4	4	4		901	5	5	5		977	4	4	4	
A_004	1845	3	3	3		1035	4	4	4		900	5	5	5		979	4	4	4	
A_005	1859	3	3	3		1073	10	10	10		942	2	2	2		1022	0	0	0	
A_006	1886	3	3	3		1119	9	9	9		989	2	2	2		1069	0	0	0	
A_007	1964	2	2	2		1225	0	0	0		1094	0	0	0		1172	0	0	0	
A_008	1913	3	3	3		1163	9	9	9		1035	2	2	2		1114	0	0	0	
A_009	1999	0	0	0		1251	0	0	0		1115	0	0	0		1190	0	0	0	
A_010	1997	0	0	0		1234	0	0	0		1094	0	0	0		1168	9	9	9	
A_011	1965	0	0	0		1182	0	0	0		1041	0	0	0		1114	9	9	9	
A_012	1931	0	0	0		1125	0	0	0		982	0	0	0		1055	10	10	10	
A_013	1899	0	0	0		1069	0	0	0		923	0	0	0		997	10	10	10	
A_014	1782	4	4	4		856	12	12	12		702	14	14	14		776	13	13	13	
A_015	1756	4	4	4		846	12	12	12		700	14	14	14		778	13	13	13	
A_016	1728	4	4	4		836	12	12	12		700	14	14	14		782	13	13	13	
A_017	1735	4	4	4		862	12	12	12		728	9	9	9		811	2	2	2	
A_018	1761	4	4	4		913	11	11	11		781	7	7	7		863	0	0	0	
A_019	1785	4	4	4		959	11	11	11		829	6	6	6		911	0	0	0	
A_020	1805	0	0	0		984	0	0	0		852	0	0	0		933	0	0	0	
A_021	1830	0	0	0		991	0	0	0		852	0	0	0		930	0	0	0	
A_022	1857	0	0	0		1000	0	0	0		854	0	0	0		928	0	0	0	
A_023	1855	0	0	0		989	0	0	0		840	1	1	1		914	11	11	11	
A_024	1825	0	0	0		930	0	0	0		779	3	3	3		852	12	12	12	
A_025	1802	0	0	0		886	0	0	0		732	6	6	6		805	12	12	12	
A_026	1938	21	21	21		1146	27	27	27		1006	23	23	23		1080	28	28	28	
A_027	1801	22	22	22		920	29	29	29		775	31	31	31		852	30	30	30	
A_028	1982	0	0	0		1289	14	14	14		1166	8	8	8		1246	7	7	7	
A_029	1499	32	32	32		875	38	38	38		833	39	39	39		942	37	37	37	
A_030	1444	33	33	33		883	38	38	38		861	38	38	38		974	37	37	37	
A_031	1509	37	37	37		874	43	43	43		828	44	44	44		936	43	43	43	
A_032	1520	31	31	31		874	37	37	37		824	38	38	38		931	37	37	37	
A_033	1587	32	32	32		992	37	37	37		937	31	31	31		1042	36	36	36	
A_034	1660	25	25	25		1053	36	36	36		985	37	37	37		1085	36	36	36	
A_035	1627	37	37	37		991	43	43	43		922	44	44	44		1024	43	43	43	
A_036	1620	15	15	15		996	20	20	20		930	22	22	22		1032	20	20	20	
A_037	1592	32	32	32		984	37	37	37		926	36	36	36		1030	37	37	37	
A_038	1604	22	22	22		990	28	28	28		929	29	29	29		1033	28	28	28	
A_039	1610	31	31	31		981	37	37	37		917	38	38	38		1019	37	37	37	
A_040	1817	0	0	0		910	6	6	6		756	22	22	22		829	25	25	25	
A_041	1932	0	0	0		1120	0	0	0		976	12	12	12		1049	22	22	22	
A_042	1875	7	7	7		1062	14	14	14		923	15	15	15		1000	14	14	14	
A_043	1896	7	7	7		1099	13	13	13		961	9	9	9		1038	14	14	14	
A_044	1921	7	7	7		1141	13	13	13		1005	9	9	9		1081	8	8	8	
A_045	1948	7	7	7		1186	13	13	13		1051	8	8	8		1127	8	8	8	
A_046	1974	7	7	7		1226	12	12	12		1092	8	8	8		1168	7	7	7	
A_047	1767	8	8	8		866	16	16	16		720	17	17	17		798	16	16	16	
A_048	1791	8	8	8		916	15	15	15		773	17	17	17		851	16	16	16	
A_049	1819	8	8	8		969	15	15	15		829	16	16	16		907	15	15	15	
A_050	1767	8	8	8		909	15	15	15		774	17	17	17		855	16	16	16	
A_051	1814	8	8	8		926	15	15	15		777	17	17	17		852	16	16	16	
A_052	1994	7	7	7		1301	12	12	12		1177	7	7	7		1257	6	6	6	
A_053	1435	10	10	10		959	15	15	15		948	15	15	15		1062	14	14	14	
A_054	1411	11	11	11		941	15	15	15		936	15	15	15		1051	14	14	14	
A_055	1711	9	9	9		1126	13	13	13		1053	14	14	14		1152	13	13	13	
A_056	1702	9	9	9		1145	13	13	13		1079	14	14	14		1179	13	13	13	
A_057	1540	10	10	10		1083	13	13	13		1055	14	14	14		1165	13	13	13	
A_058	1569	9	9	9		1124	13	13	13		1094	13	13	13		1203	12	12	12	
A_059	1969	0	0	0		1295	0	0	0		1177	0	0	0		1259	0	0	0	
A_060	1554	12	12	12		966	14	14	14		918	14	14	14		1025	15	15	15	

Table 9: Point of Reception Noise Impact

Source ID	POR03				POR04				POR05					POR06						
	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)
A_062	1706	12	12	12	12	1135	16	16	16	16	1066	17	17	17	17	1165	16	16	16	16
A_063	1408	14	14	14	14	928	18	18	18	18	923	18	18	18	18	1038	17	17	17	17
A_064	1926	0	0	0	0	1388	2	2	2	2	1301	3	3	3	3	1393	2	2	2	2
A_065	1922	5	5	5	5	1388	8	8	8	8	1302	8	8	8	8	1394	8	8	8	8
A_066	1918	5	5	5	5	1387	8	8	8	8	1302	8	8	8	8	1395	8	8	8	8
A_067	1915	5	5	5	5	1387	8	8	8	8	1303	8	8	8	8	1396	8	8	8	8
A_068	1911	5	5	5	5	1387	8	8	8	8	1303	8	8	8	8	1397	8	8	8	8
A_069	1908	5	5	5	5	1387	8	8	8	8	1304	8	8	8	8	1397	8	8	8	8
A_070	1904	5	5	5	5	1386	8	8	8	8	1304	8	8	8	8	1398	8	8	8	8
A_071	1955	2	2	2	2	1391	5	5	5	5	1296	6	6	6	6	1385	5	5	5	5
A_072	1904	2	2	2	2	1095	8	8	8	8	955	4	4	4	4	1030	3	3	3	3
A_073	1878	2	2	2	2	1088	8	8	8	8	955	4	4	4	4	1033	3	3	3	3
A_074	1928	1	1	1	1	1174	8	8	8	8	1043	3	3	3	3	1121	2	2	2	2
A_075	1957	1	1	1	1	1184	2	2	2	2	1046	3	3	3	3	1121	2	2	2	2
A_076	1791	2	2	2	2	891	10	10	10	10	743	12	12	12	12	819	11	11	11	11
A_077	1762	2	2	2	2	881	10	10	10	10	741	12	12	12	12	821	11	11	11	11
A_078	1795	2	2	2	2	944	10	10	10	10	807	12	12	12	12	887	10	10	10	10
A_079	1824	2	2	2	2	956	10	10	10	10	810	12	12	12	12	886	10	10	10	10
A_080	1991	0	0	0	0	1308	6	6	6	6	1187	2	2	2	2	1267	1	1	1	1
A_081	1422	5	5	5	5	939	10	10	10	10	930	10	10	10	10	1045	9	9	9	9
A_082	1424	5	5	5	5	961	10	10	10	10	954	10	10	10	10	1068	8	8	8	8
A_083	1511	4	4	4	4	1040	9	9	9	9	1016	9	9	9	9	1127	8	8	8	8
A_084	1690	3	3	3	3	1124	8	8	8	8	1058	9	9	9	9	1159	8	8	8	8
A_085	1978	0	0	0	0	1309	0	0	0	0	1191	0	0	0	0	1273	0	0	0	0
A_086	1723	3	3	3	3	1145	8	8	8	8	1072	9	9	9	9	1171	8	8	8	8
A_087	1952	0	0	0	0	1394	0	0	0	0	1300	0	0	0	0	1390	0	0	0	0
A_088	1623	9	9	9	9	937	23	23	23	23	860	24	24	24	24	960	23	23	23	23
A_089	1728	8	8	8	8	1108	21	21	21	21	1027	22	22	22	22	1124	21	21	21	21
A_090	1939	2	2	2	2	1370	11	11	11	11	1276	12	12	12	12	1366	11	11	11	11
A_091	1929	0	0	0	0	1369	6	6	6	6	1278	7	7	7	7	1368	6	6	6	6
A_092	1485	23	23	23	23	1056	28	28	28	28	1042	22	22	22	22	1154	20	20	20	20
A_093	1484	4	4	4	4	592	15	15	15	15	517	16	16	16	16	625	14	14	14	14
A_094	1481	10	10	10	10	1050	15	15	15	15	1036	15	15	15	15	1148	9	9	9	9
A_095	1922	0	0	0	0	1383	10	10	10	10	1296	10	10	10	10	1388	10	10	10	10
A_096	1918	0	0	0	0	1383	10	10	10	10	1297	10	10	10	10	1389	10	10	10	10
A_097	1915	0	0	0	0	1383	10	10	10	10	1298	10	10	10	10	1390	10	10	10	10
A_098	1911	0	0	0	0	1383	10	10	10	10	1298	10	10	10	10	1391	10	10	10	10
A_099	1908	7	7	7	7	1382	10	10	10	10	1299	10	10	10	10	1392	10	10	10	10
A_100	1905	7	7	7	7	1382	10	10	10	10	1300	10	10	10	10	1393	10	10	10	10
A_101	1901	7	7	7	7	1382	1	1	1	1	1301	10	10	10	10	1394	10	10	10	10
A_102	1569	24	24	24	24	986	29	29	29	29	936	25	25	25	25	1042	29	29	29	29
A_103	1800	13	13	13	13	1203	24	24	24	24	1117	25	25	25	25	1211	24	24	24	24
A_104	1699	7	7	7	7	1203	16	16	16	16	1147	17	17	17	17	1250	16	16	16	16
A_105	1709	0	0	0	0	1203	6	6	6	6	1144	7	7	7	7	1246	0	0	0	0
A_106	1792	10	10	10	10	1202	21	21	21	21	1119	22	22	22	22	1213	21	21	21	21
A_107	1783	0	0	0	0	1201	8	8	8	8	1121	9	9	9	9	1216	8	8	8	8
A_108	1322 / 1554	21	19	19	19	81 / 797	45	43	43	43	220 / 723	42	40	40	40	323 / 826	38	37	37	37
A_109	1555 / 1638	9	7	7	7	798 / 809	19	17	17	17	703 / 723	22	21	21	21	797 / 826	21	20	20	20
A_110	1638 / 1838	15	14	14	14	809 / 918	25	23	23	23	693 / 758	27	25	25	25	767 / 828	26	24	24	24
A_111	1814 / 1837	0	0	0	0	909 / 918	9	7	7	7	756 / 758	15	14	14	14	828 / 829	14	13	13	13
A_112	1838 / 1951	2	0	0	0	918 / 1127	16	14	14	14	758 / 978	24	22	22	22	828 / 1049	23	22	22	22
A_113	1928 / 1951	0	0	0	0	1119 / 1127	0	0	0	0	975 / 978	2	1	1	1	1049 / 1049	5	4	4	4
A_114	1763 / 2038	10	9	9	9	1111 / 1270	21	20	20	20	978 / 1126	23	22	22	22	1049 / 1207	23	21	21	21
A_115	1728 / 1764	0	0	0	0	1107 / 1111	9	7	7	7	1019 / 1026	10	8	8	8	1112 / 1123	9	7	7	7
A_116	1641 / 1763	10	8	8	8	935 / 1110	22	21	21	21	852 / 1019	23	22	22	22	950 / 1112	22	21	21	21
A_117	1621 / 1640	0	0	0	0	933 / 935	11	10	10	10	852 / 857	12	11	11	11	950 / 957	11	10	10	10
A_118	1554 / 1641	11	10	10	10	797 / 935	25	23	23	23	723 / 852	26	24	24	24	826 / 950	24	23	23	23
A_119	1528 / 1760	7	7	7	7	564 / 809	19	19	19	19	446 / 703	21	21	21	21	520 / 797	20	20	20	20
A_120	1318 / 1588	12	12	12	12	81 / 1047	35	35	35	35	224 / 1033	32	32	32	32	327 / 1146	28	28	28	28

Table 9: Point of Reception Noise Impact

Source ID	POR07				POR08				POR09				POR10							
	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)	Distance (m)	Normal Operations Daytime (0700 - 1900)	Normal Operations Evening (1900 - 2300)	Normal Operations Night-time (0600 - 0700)	Essential Operations Night-time (2300 - 0600)
A_001	1376	17	17	17	17	1386	17	17	17	17	1375	10	10	10	10	1785	7	7	7	7
A_002	966	6	6	6		970	7	7	7		933	11	11	11		1325	7	7	7	
A_003	968	5	5	5		973	5	5	5		939	5	5	5		1335	1	1	1	
A_004	971	4	4	4		976	4	4	4		946	5	5	5		1345	1	1	1	
A_005	1014	0	0	0		1019	0	0	0		989	0	0	0		1387	0	0	0	
A_006	1061	0	0	0		1066	0	0	0		1034	0	0	0		1428	0	0	0	
A_007	1163	0	0	0		1167	0	0	0		1129	0	0	0		1513	0	0	0	
A_008	1106	0	0	0		1111	0	0	0		1078	0	0	0		1469	0	0	0	
A_009	1179	0	0	0		1182	0	0	0		1140	0	0	0		1519	0	0	0	
A_010	1157	9	9	9		1160	9	9	9		1116	9	9	9		1494	5	5	5	
A_011	1103	9	9	9		1106	9	9	9		1064	9	9	9		1445	6	6	6	
A_012	1045	10	10	10		1048	10	10	10		1007	10	10	10		1392	6	6	6	
A_013	986	10	10	10		990	10	10	10		951	11	11	11		1340	7	7	7	
A_014	767	13	13	13		772	13	13	13		744	13	13	13		1152	8	8	8	
A_015	771	13	13	13		777	13	13	13		755	13	13	13		1168	8	8	8	
A_016	776	13	13	13		783	13	13	13		768	13	13	13		1185	8	8	8	
A_017	806	0	0	0		813	0	0	0		797	0	0	0		1213	0	0	0	
A_018	857	0	0	0		864	0	0	0		845	0	0	0		1256	0	0	0	
A_019	904	0	0	0		911	0	0	0		889	0	0	0		1297	0	0	0	
A_020	926	0	0	0		932	0	0	0		907	0	0	0		1312	0	0	0	
A_021	922	0	0	0		927	0	0	0		897	0	0	0		1297	0	0	0	
A_022	918	0	0	0		922	0	0	0		887	0	0	0		1281	0	0	0	
A_023	903	11	11	11		907	11	11	11		872	12	12	12		1266	7	7	7	
A_024	842	12	12	12		846	12	12	12		813	12	12	12		1213	8	8	8	
A_025	795	13	13	13		799	13	13	13		769	13	13	13		1173	8	8	8	
A_026	1070	28	28	28		1073	28	28	28		1033	28	28	28		1418	24	24	24	
A_027	843	30	30	30		848	30	30	30		820	30	30	30		1224	26	26	26	
A_028	1238	6	6	6		1243	5	5	5		1207	6	6	6		1593	3	3	3	
A_029	952	37	37	37		959	37	37	37		997	37	37	37		1437	33	33	33	
A_030	987	37	37	37		1005	30	30	30		1042	36	36	36		1484	33	33	33	
A_031	945	43	43	43		962	42	42	42		989	42	42	42		1428	38	38	38	
A_032	940	37	37	37		956	36	36	36		982	36	36	36		1420	32	32	32	
A_033	1048	36	36	36		1063	36	36	36		1079	36	36	36		1512	33	33	33	
A_034	1089	36	36	36		1102	36	36	36		1107	36	36	36		1534	32	32	32	
A_035	1028	43	43	43		1041	43	43	43		1051	43	43	43		1480	38	38	38	
A_036	1037	20	20	20		1051	20	20	20		1061	20	20	20		1491	16	16	16	
A_037	1036	37	37	37		1051	37	37	37		1066	36	36	36		1498	32	32	32	
A_038	1038	28	28	28		1052	28	28	28		1065	27	27	27		1497	23	23	23	
A_039	1024	37	37	37		1038	37	37	37		1050	37	37	37		1481	33	33	33	
A_040	818	25	25	25		822	25	25	25		790	25	25	25		1191	19	19	19	
A_041	1038	22	22	22		1041	22	22	22		1000	22	22	22		1385	17	17	17	
A_042	991	14	14	14		995	14	14	14		961	14	14	14		1355	11	11	11	
A_043	1029	14	14	14		1033	14	14	14		998	14	14	14		1389	10	10	10	
A_044	1072	14	14	14		1076	14	14	14		1039	14	14	14		1427	10	10	10	
A_045	1117	13	13	13		1121	13	13	13		1083	13	13	13		1468	10	10	10	
A_046	1159	7	7	7		1162	7	7	7		1123	13	13	13		1505	10	10	10	
A_047	790	16	16	16		796	16	16	16		773	17	17	17		1183	12	12	12	
A_048	843	16	16	16		848	16	16	16		822	16	16	16		1229	12	12	12	
A_049	898	15	15	15		903	15	15	15		875	15	15	15		1276	12	12	12	
A_050	848	16	16	16		855	16	16	16		833	16	16	16		1244	12	12	12	
A_051	842	16	16	16		847	16	16	16		816	16	16	16		1218	12	12	12	
A_052	1248	6	6	6		1253	6	6	6		1216	7	7	7		1600	4	4	4	
A_053	1076	14	14	14		1095	13	13	13		1133	13	13	13		1575	10	10	10	
A_054	1066	14	14	14		1086	13	13	13		1127	13	13	13		1570	10	10	10	
A_055	1154	13	13	13		1166	13	13	13		1167	13	13	13		1589	10	10	10	
A_056	1183	13	13	13		1195	13	13	13		1198	13	13	13		1621	9	9	9	
A_057	1175	13	13	13		1192	13	13	13		1217	12	12	12		1654	9	9	9	
A_058	1212	12	12	12		1228	12	12	12		1251	12	12	12		1686	9	9	9	
A_059	1251	0	0	0		1257	0	0	0		1224	0	0	0		1613	0	0	0	
A_060	1033	15	15	15		1048	15	15	15		1069	15	15	15		1504	12	12	12	