




# CarbonFree Fort Frances Project

## Acoustic Assessment Report

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## Revision History

Revision	Date	Status	Update
0	2026-03-13	Approved For Use	Issued for Use
1	2026-05-29	Approved For Use	Incorporation of updated inverter orientation in the design. Incorporation of additional inverter locations and updated site layout. Updated noise model and Section 3.8, Table 3-2: Noise Source Summary Table. Updated Section 5 - Mitigation Measures Summary. Updated Section 7.3 - Noise Modelling Results

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This report has been prepared by Hatch Ltd. (Hatch) for the sole and exclusive use of CarbonFree Fort Frances Ltd. (the “Client”) for the purpose of assisting the Client in making decisions with respect to the development of a proposed solar photovoltaic project and shall not be (a) used for any other purpose, or (b) provided to, relied upon or used by any third party.

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5. The noise impact evaluation is based on a conservative assumption that the Facility will operate at full power capacity for at least 1 hour during the evening and night periods. Due to the solar facility’s dependency on sun exposure, it is anticipated that inverters will not operate at full capacity during evening and night periods. As a result, the inverter fan duty cycle and associated inverter sound power level is anticipated to be lower than the sound power levels identified in this report. A review of the maximum inverter and subsequent noise output during evening and night hours will be incorporated in a future addendum to this report.

## Table of Concordance

The following table of concordance describes the scope of the report herein as per the requirements identified in Table 1 of O. Reg. 359/09 [1].

Item	Document	Requirement per Table 1 of O. Reg. 359/09	Project Type
8	Noise study report	Report to be prepared in accordance with Appendix A of the publication of the Ministry of the Environment and Climate Change entitled, "Basic Comprehensive Certificates of Approval (Air) – User Guide", dated April 2004, as amended from time to time and available from the Ministry.	Class 3 solar facility

## Abbreviations and Definitions

AAR	Acoustic Assessment Report
AC	Alternating Current
dB	Decibel
dBA	A-weighted sound level
DC	Direct Current
IEEE	Institute of Electrical and Electronics Engineers
km	Kilometre
kV	Kilovolt
Leq	Equivalent sound level
m/s	Metre per second
MECP	Ministry of the Environment, Climate, and Parks
MVA	Megavolt-ampere
MW	Megawatt
NEMA	National Electrical Manufacturers Association
NPC	Noise Pollution Control
O. Reg.	Ontario Regulation
INV	Inverter System (combined inverter and medium-voltage transformer)
POR	Point of Reception
PV	Photovoltaic
PWC	Predictable Worst Case
REA	Renewable Energy Approval

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- Appendix E    Foliage Description**
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## 1. Introduction

CarbonFree Fort Frances Ltd. (CarbonFree) is proposing to develop a 167 megawatt (MW) Class 3 solar photovoltaic (PV) project adjacent to Highway 611 in the unincorporated township of Miscampbell, approximately 7.5 kilometres (km) northwest of Fort Frances.

The proposed CarbonFree Fort Frances Project (hereinafter referred to as 'the Facility') is a renewable energy generation facility which will use solar PV technology to generate electricity. Electricity generated by solar PV panels will be converted from direct current (DC) to alternating current (AC) by inverters and then stepped up (via pad-mounted inverters, medium-voltage transformers and a main substation transformer) to 230 kilovolts (kV) prior to being connected to the existing Hydro One Networks Inc. transmission line.

The Project aims to contribute to the government of Ontario's goal of accelerating new electricity generation from renewable sources to support the province's growing energy needs. Accordingly, CarbonFree intends to enter into an agreement for the sale or supply of electricity, the quantity of which will be commensurate with the nameplate capacity of the facility.

Construction of the Project will commence in early 2027 once the Renewable Energy Approval (REA) and other required permits have been obtained. This Acoustic Assessment Report (AAR) provides an evaluation of the community noise impact of the Facility under predictable worst-case (PWC) noise-emitting operating conditions.

### 1.1 Approach to Noise Assessment

The AAR follows the Province of Ontario regulations and guidelines: O. Reg. 359/09 [1], PIBS 8472e – "Technical Guide to Renewable Energy Approvals" [2], PIBS 4391e01 – "Basic Comprehensive Certificates of Approval (Air)" [3], and NPC-300 [4]. The Facility's noise performance limit is established as the higher of the 1-hour a-weighted equivalent sound level (Leq) identified for the applicable exclusion limit or the background sound level. No background measurements were taken, so the noise limit has been set to the applicable exclusion limit based on the surrounding receptor classifications. A review of the surrounding community identifies all noise sensitive receptors as Class 3.

A community noise model of the Facility has been developed to assess the noise impact of the nearest points of reception (PORs). The noise study area for modelling was extended 1 km from the outermost noise sources consistent with the approach outlined in the "Technical Guide to Renewable Energy Approvals" [2]. Participating and non-participating receptors were identified including receptors for vacant lots. Acoustic modelling was completed on a PWC basis that determined the equivalent 1-hour noise impact on the identified PORs. There are no other surrounding solar facilities within 1 km of the boundary of the Facility.

## 1.2 Vibration Sources

The Facility does not have any significant stationary or moving ground-borne vibration sources. As such, a vibration assessment is not required.

## 2. Facility Description

The Facility is located adjacent to Highway 611 in the unincorporated township of Miscampbell, approximately 7.5 km northwest of Fort Frances (see Appendix A).

The proposed 167 MW solar facility is comprised of approximately 346-, 008-, 625-W solar panels grouped into three arrays, each array isolated by its own switchgear. The panels are routed into 42 SunGrow SG4400, 4.4 megavolt-ampere (MVA) inverter/transformer modules spread across the three arrays. Each switchgear feeds the proposed high-voltage substation located to the north of the facility. The Facility is designed to operate during daylight hours, 7 days a week. The proposed layout of the Facility is included in Appendix B.

### 2.1 Operational Flexibility

The Facility is seeking the inclusion of operational flexibility with its REA application as described under Section 9 of PIBS 8472e [2]. Operational flexibility allows the Facility to make limited modifications to its operations or works without having to seek an amendment to the REA. These permissible operational flexibility changes include:

- Noise from site maintenance equipment including vegetation control, panel washing, snow clearing, access road and infrastructure maintenance.
- In-kind equipment replacements (panels, tracker motors, inverter systems, transformer, switches, etc.).
- Decreasing the number of project components.

## 3. Noise Source Summary

### 3.1 Panel Arrays

Panel racks will be fitted with a single axis tracker. The proposed Facility will have motor per tracker. A sample tracker is provided in Appendix C. The tracker motor operates briefly to tilt the panels into an optimal position for solar radiation exposure. Due to their relatively small size and brief operation, the tracker motors are considered insignificant community noise emission sources.

### 3.2 Inverter With Integrated Medium-Voltage Transformer

The 4.4 MW AC inverters convert the DC supplied by the PV modules to AC. A 4.4 MVA, 3-phase, liquid-filled transformer will then 'step up' the voltage to 34.5 kV. Each installation will consist of a SunGrow Solar Inverter Skid SG4400 or equivalent inverter system (INV) that combines the inverter and medium-voltage transformer in single container skid.

Noise from the inverter system comes from its air-cooling fans while noise from its medium-voltage transformer is largely from the magnetostriction hum. Due to the tonal nature of the magnetostriction hum, a 5 decibel (dB) tonal penalty is added to the noise emission of entire inverter system. Full calculations can be found in Appendix C.

### **3.3 Switchgear**

The local panel array and substation switchgears are a combination of switches, fuses and circuit breakers used to safely isolate arrays or the entire facility for maintenance. Switchgear control panel cooling fans are small and are located indoors. Therefore, the switchgears are considered insignificant community noise emission sources.

### **3.4 Substation Transformer**

The Facility contains one large 186 MVA transformer that will 'step up' the voltage from 34.5 kV to 230 kV. The substation transformer noise was calculated using the NEMA TP-80050 standard [5] with a 5 dB tonal penalty added for its magnetostriction hum. Calculations to characterize the sound emission of the substation transformer can be found in Appendix C. Transformer noise was modelled as a point source at half the height of the transformer.

Additional substation yard components such as the switchgear, communication tower, and line reactors are considered insignificant noise sources.

### **3.5 Other Nearby Solar Facilities and External Anthropic Noise Sources**

There are no adjacent solar facilities within 1 km of the Facility. As such, a cumulative noise impact study that incorporates adjacent solar facilities, as recommended in Ontario's Technical Guide to Renewable Energy Approvals [2], is not required.

A desktop review of Access Environment did not identify any Environmental Compliance Approvals for industrial applications within 1 km of the Facility. The land-use map included with Appendix A identifies that the site is surrounded by agricultural land. As such, additional external anthropic noise may include farming equipment. However, these external anthropic noise sources need not be included with the AAR.

### **3.6 Ancillary Distribution Lines**

Aboveground ancillary distribution lines connecting the local panel switchgears to the substation will not emit significant amounts of isolator corona noise due to a relatively low AC line current and voltage (34.5 kV). Therefore, the noise from the ancillary distribution lines is considered insignificant.

### 3.7 Excluded Noise Sources

Insignificant and non-applicable noise sources were excluded from this assessment. Table 3-1 lists noise sources insignificant or outside the scope of this assessment.

**Table 3-1: Excluded Noise Sources**

Source	Reason for Exclusion
Vehicular Traffic	Noise exclusions identified in accordance with O. Reg 359/09 [1] and the Technical Guide to Renewable Energy Approvals [2]
Maintenance and Service Activities	
Emergency Conditions	
Construction and Decommissioning	

### 3.8 Noise Source Summary Table

Table 3-2 lists the significant noise sources from the Facility. The noise source layout is presented in Appendix B.

**Table 3-2: Noise Source Summary Table**

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV01_In	Inverter System No 01 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459741	5390725
INV01_Out	Inverter System No 01 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459741	5390725
INV01_TR	Inverter System No 01 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459741	5390725
INV02_In	Inverter System No 02 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459709	5390686
INV02_Out	Inverter System No 02 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459709	5390686
INV02_TR	Inverter System No 02 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459709	5390686
INV03_In	Inverter System No 03 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459924	5390724
INV03_Out	Inverter System No 03 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459924	5390724
INV03_TR	Inverter System No 03 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	459924	5390724
INV04_In	Inverter System No 04 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459997	5390684
INV04_Out	Inverter System No 04 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459997	5390684
INV04_TR	Inverter System No 04 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459997	5390684
INV05_In	Inverter System No 05 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460122	5390719
INV05_Out	Inverter System No 05 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460122	5390719
INV05_TR	Inverter System No 05 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460122	5390719

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV06_In	Inverter System No 06 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460114	5390678
INV06_Out	Inverter System No 06 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460114	5390678
INV06_TR	Inverter System No 06 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460114	5390678
INV07_In	Inverter System No 07 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458919	5389822
INV07_Out	Inverter System No 07 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458919	5389822
INV07_TR	Inverter System No 07 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458919	5389822
INV08_In	Inverter System No 08 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458928	5389782
INV08_Out	Inverter System No 08 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458928	5389782
INV08_TR	Inverter System No 08 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458928	5389782
INV09_In	Inverter System No 09 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459085	5389820
INV09_Out	Inverter System No 09 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459085	5389820
INV09_TR	Inverter System No 09 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459085	5389820
INV10_In	Inverter System No 10 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459095	5389782
INV10_Out	Inverter System No 01 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459095	5389782
INV10_TR	Inverter System No 10 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459095	5389782
INV11_In	Inverter System No 11 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459272	5389820

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV11_Out	Inverter System No 11 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459272	5389820
INV11_TR	Inverter System No 11 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459272	5389820
INV12_In	Inverter System No 12 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459262	5389780
INV12_Out	Inverter System No 12 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459262	5389780
INV12_TR	Inverter System No 12 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459262	5389780
INV13_In	Inverter System No 13 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459420	5389806
INV13_Out	Inverter System No 13 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459420	5389806
INV13_TR	Inverter System No 13 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459420	5389806
INV14_In	Inverter System No 14 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459552	5389819
INV14_Out	Inverter System No 14 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459552	5389819
INV14_TR	Inverter System No 14 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459552	5389819
INV015_In	Inverter System No 15 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459624	5389817
INV015_Out	Inverter System No 15 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459624	5389817
INV015_TR	Inverter System No 15 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459624	5389817
INV16_In	Inverter System No 16 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460897	5389753
INV16_Out	Inverter System No 16 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460897	5389753

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV16_TR	Inverter System No 16 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460897	5389753
INV17_In	Inverter System No 17 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461063	5389752
INV17_Out	Inverter System No 17 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461063	5389752
INV17_TR	Inverter System No 17 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461063	5389752
INV18_In	Inverter System No 18 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461201	5389752
INV18_Out	Inverter System No 18 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461201	5389752
INV18_TR	Inverter System No 18 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461201	5389752
INV19_In	Inverter System No 19 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461364	5389752
INV19_Out	Inverter System No 19 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461364	5389752
INV19_TR	Inverter System No 19 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461364	5389752
INV20_In	Inverter System No 20 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461509	5389752
INV20_Out	Inverter System No 20 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461509	5389752
INV20_TR	Inverter System No 20 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461509	5389752
INV21_In	Inverter System No 21 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461662	5389752
INV21_Out	Inverter System No 21 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461662	5389752

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV21_TR	Inverter System No 21 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461662	5389752
INV22_In	Inverter System No 22 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461766	5389743
INV22_Out	Inverter System No 22 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461766	5389743
INV22_TR	Inverter System No 22 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461766	5389743
INV23_In	Inverter System No 23 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461541	5389698
INV23_Out	Inverter System No 23 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461541	5389698
INV23_TR	Inverter System No 23 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461541	5389698
INV24_In	Inverter System No 24 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461537	5389544
INV24_Out	Inverter System No 24 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461537	5389544
INV24_TR	Inverter System No 24 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461537	5389544
INV25_In	Inverter System No 25 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389481
INV25_Out	Inverter System No 25 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389481
INV25_TR	Inverter System No 25 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389481
INV26_In	Inverter System No 26 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5389198
INV26_Out	Inverter System No 26 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5389198

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV26_TR	Inverter System No 26 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5389198
INV27_In	Inverter System No 27 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5388926
INV27_Out	Inverter System No 27 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5388926
INV27_TR	Inverter System No 27 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461575	5388926
INV28_In	Inverter System No 28 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461011	5389263
INV28_Out	Inverter System No 28 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461011	5389263
INV28_TR	Inverter System No 28 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	U	461011	5389263
INV29_In	Inverter System No 29 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460800	5389256
INV29_Out	Inverter System No 29 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460800	5389256
INV29_TR	Inverter System No 29 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460800	5389256
INV30_In	Inverter System No 30 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460645	5389248
INV30_Out	Inverter System No 30 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460645	5389248
INV30_TR	Inverter System No 30 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460645	5389248
INV31_In	Inverter System No 31 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460641	5389381
INV31_Out	Inverter System No 31 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460641	5389381

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV31_TR	Inverter System No 31 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460641	5389381
INV32_In	Inverter System No 32 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460634	5389717
INV32_Out	Inverter System No 32 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460634	5389717
INV32_TR	Inverter System No 32 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460634	5389717
INV33_In	Inverter System No 33 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460619	5389758
INV33_Out	Inverter System No 33 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460619	5389758
INV33_TR	Inverter System No 33 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	460619	5389758
INV34_In	Inverter System No 34 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459387	5389623
INV34_Out	Inverter System No 34 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459387	5389623
INV34_TR	Inverter System No 34 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459387	5389623
INV35_In	Inverter System No 35 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458666	5389828
INV35_Out	Inverter System No 35 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458666	5389828
INV35_TR	Inverter System No 35 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458666	5389828
INV36_In	Inverter System No 36 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458672	5389766
INV36_Out	Inverter System No 36 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458672	5389766

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV36_TR	Inverter System No 36 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	458672	5389766
INV37_In	Inverter System No 37 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459841	5389803
INV37_Out	Inverter System No 37 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459841	5389803
INV37_TR	Inverter System No 37 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459841	5389803
INV38_In	Inverter System No 38 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459976	5389433
INV38_Out	Inverter System No 38 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459976	5389433
INV38_TR	Inverter System No 38 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459976	5389433
INV39_In	Inverter System No 39 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389351
INV39_Out	Inverter System No 39 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389351
INV39_TR	Inverter System No 39 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389351
INV40_In	Inverter System No 40 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389331
INV40_Out	Inverter System No 40 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389331
INV40_TR	Inverter System No 40 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389331
INV41_In	Inverter System No 41 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389218
INV41_Out	Inverter System No 41 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389218

Source ID	Equipment Description	NV dB Library Source	Sound Power (Lw) Un-weighted Octave Band Spectrum, Hz (dB)									Overall (dBA)	Source Location	Sound Characteristic	Noise Control Measure	UTM Zone 16	
			31.5	63	125	250	500	1,000	2,000	4,000	8,000					E	N
INV41_TR	Inverter System No 41 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	461575	5389218
INV42_In	Inverter System No 42 Air Inlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459523	5390934
INV42_Out	Inverter System No 42 Air Outlet	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459523	5390934
INV42_TR	Inverter System No 42 Transformer	INV	85	82	87	87	90	83	83	88	75	92	O	S, T	B	459523	5390934
ST01	Substation Transformer	TR186	107	113	115	110	110	104	99	94	87	110	O	S, T	B	459689	5390922

\*Spectra and Overall levels do NOT include tonal penalties. A 5 dB tonal penalty is added in the model for all sources with tonal sound characteristics.  
 1. O: located/installed outside the building, including on the roof, I: located/installed inside the building.  
 2. S: Steady; Q: Quasi Steady Impulsive; B: Buzzing; T: Tonal; C: Cyclic.  
 3. S: Silencer, Acoustic Louvre, Muffler; A: Acoustics lining, Plenum; B: Barrier, Berm, Screening; L: Lagging; E: Acoustic Enclosure; O: Other; U: Uncontrolled.

## 4. Points of Reception

PORs representing the worst-case community noise sensitive dwellings and vacant lots were identified around the Facility. In accordance with O. Reg. 359/09 [1] and the Technical Guide to Renewable Energy Approvals [2], the noise study area extent for POR identification was set to 1 km from each of the noise sources.

All PORs, participating receptors and vacant lots within 1 km of a Facility noise source were identified and included in the noise assessment. Though O. Reg. 359/09 [1] Clause (6) notes that a “noise receptor does not include a location on a parcel of land if any part of the renewable energy generation facility will be located on that parcel of land once the facility is installed, constructed or expanded,” these participating receptors are identified herein, but noise compliance for them have not been evaluated.

Each POR was modelled at 1.5 m above ground for single-storey dwellings or 4.5 m above ground for two-storey dwellings to represent a plane of window on the building façade. Building façade POR IDs are identified with a “f” suffix. Outdoor living areas are modelled at 1.5 m above ground within 30 m of a façade of the dwelling. Outdoor living POR IDs are identified with an “o” suffix. Table 4-1 lists the PORs impacted by the Facility. The layout of identified PORs is shown in Appendix D.

**Table 4-1: Point of Reception Locations**

POR ID	Description	UTM Coordinates (Zone 16)	
		Easting	Northing
<b>Points of Reception</b>			
RN01_f	ON-611 Existing residential dwelling	459001	5391603
RN01_o		459014	5391575
RN02_f	199 ON-611 Existing residential dwelling	459330	5391869
RN02_o		459338	5391841
RN03_f	200 ON-611 Existing residential dwelling	459518	5391699
RN03_o		459518	5391669
RN04_f	190 ON-611 Existing residential dwelling	459709	5391904
RN04_o		459709	5391875
RN05_f	189 ON-611 Existing residential dwelling	460050	5391839
RN05_o		460033	5391815
RN06_f	182 ON-611 Existing residential dwelling	460299	5391627
RN06_o		460284	5391601
RN07_f	130 Best Road Existing residential dwelling	460870	5391742
RN07_o		460861	5391713

POR ID	Description	UTM Coordinates (Zone 16)	
		Easting	Northing
RN08_f	136 Highway 611	460182	5391104
RN08_o	Existing residential dwelling	460183	5391084
RN09_f	182 Highway 611	460289	5390881
RN09_o	Existing residential dwelling	460268	5390883
RN10_f	ON-611	460331	5390747
RN10_o	Existing residential dwelling	460303	5390735
RN11_f	212 Highway 611	460306	5390480
RN11_o	Existing residential dwelling	460275	5390481
RN12_f	Kliner Road	461161	5390200
RN12_o	Existing residential dwelling	461160	5390188
RN13_f	178 McFee Road	460185	5390140
RN13_o	Existing residential dwelling	460156	5390125
RN14_f	200 McFee Road	459313	5390245
RN14_o	Existing residential dwelling	459313	5390217
RN15_f	McFee Road	458626	5390467
RN15_o	Existing residential dwelling	458638	5390494
RN16_f	204 Highway 611	460194	5389782
RN16_o	Existing residential dwelling	460175	5389782
RN17_f	ON-611	460182	5389330
RN17_o	Existing residential dwelling	460160	5389351
RN18_f	205 Highway 611	460189	5389201
RN18_o	Existing residential dwelling	460170	5389224
RN19_f	206 Highway 611	460200	5388823
RN19_o	Existing residential dwelling	460228	5388836
RN20_f	577 ON-611	460209	5388711
RN20_o	Existing residential dwelling	460217	5388741
RN21_f	168 Frog Creek Road	460087	5388622
RN21_o	Existing residential dwelling	460089	5388651
RN22_f	169 Frog Creek Road	459895	5388541
RN22_o	Existing residential dwelling	459894	5388571
RN23_f	170 Frog Creek Road	459849	5388645
RN23_o	Existing residential dwelling	459849	5388673
RN24_f	171 Frog Creek Road	459638	5388623
RN24_o	Existing residential dwelling	459638	5388653
RN25_f	172 Frog Creek Road	459558	5388628
RN25_o	Existing residential dwelling	459558	5388658

POR ID	Description	UTM Coordinates (Zone 16)	
		Easting	Northing
RN26_f	173 Frog Creek Road	459486	5388615
RN26_o	Existing residential dwelling	459486	5388646
RN27_f	175 Frog Creek Road	459475	5388548
RN27_o	Existing residential dwelling	459485	5388572
RN28_f	659 Frog Creek Road	459385	5388737
RN28_o	Existing residential dwelling	459388	5388767
RN29_f	174 Frog Creek Road	459361	5388539
RN29_o	Existing residential dwelling	459368	5388568
RN30_f	209 Frog Creek Road	461267	5388518
RN30_o	Existing residential dwelling	461267	5388548
RN31_f	Frog Creek Road	461610	5388529
RN31_o	Existing residential dwelling	461609	5388553
RN32_f	991 Frog Creek Road	461942	5388595
RN32_o	Existing residential dwelling	461930	5388627
RN33_f	775 Hill Road	461910	5388330
RN33_o	Existing residential dwelling	461893	5388358
RN34_f	724 Hill Road	462020	5388092
RN34_o	Existing residential dwelling	461999	5388112
RN35_f	242 Hill Road	461913	5387949
RN35_o	Existing residential dwelling	461896	5387955
RN36_f	679 Hill Road	461863	5387817
RN36_o	Existing residential dwelling	461855	5387846
RN37_f	678 Hill Road	462032	5387835
RN37_o	Existing residential dwelling	462003	5387842
RN38_f	Frog Creek Road	462087	5388687
RN38_o	Existing residential dwelling	462052	5388692
RN39_f	659 Frog Creek Road	462170	5388657
RN39_o	Existing residential dwelling	462152	5388683
RN40_f	659 Frog Creek Road	462155	5388537
RN40_o	Existing residential dwelling	462126	5388551
RN41_f	945 Frog Creek Road	462202	5388611
RN41_o	Existing residential dwelling	462191	5388639
VN01	Vacant lot	459073	5391871
VN02	Vacant lot	460333	5391851
VN03	Vacant lot	458597	5390155
VN04	Vacant lot	458585	5388650

POR ID	Description	UTM Coordinates (Zone 16)	
		Easting	Northing
VN05	Vacant lot	458610	5388530
VN06	Vacant lot	459980	5388648
VN07	Vacant lot	462018	5388506
VN08	Vacant lot	462014	5387982
VN09	Vacant lot	462602	5388623
VN10	Vacant lot	462702	5388623
<b>Participating Receptors</b>			
RP01_f	203 Highway 611 Existing residential dwelling	460194	5389901
RP01_o		460165	5389901
RP02_f	1229 Frog Creek Road Existing residential dwelling	461118	5388651
RP02_o		461118	5388679
VP01	Vacant lot	460201	5390240
VP02	Vacant lot	460320	5390139
VP03	Vacant lot	460315	5389330

## 5. Mitigation Measures Summary

Table 5-1 lists the preliminary noise mitigation features proposed to be incorporated into the design. The evaluation of the community noise impact presented in Section 7 includes these mitigation features. The locations of these noise mitigation features are identified in Appendix D.

**Table 5-1: Mitigation Summary Table**

Mitigation ID	Targeted Noise Source	Description	Details
NB01	ST01	Noise barrier around substation transformer	15 m tall, 35 m total length, 3-sides, minimum 20 kg/m <sup>2</sup>
NB02	INV03	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB03	INV05	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB04	INV06	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB05	INV35	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB06	INV36	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>

Mitigation ID	Targeted Noise Source	Description	Details
NB07	INV07	Noise barrier	5 m tall, 10 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB08	INV08	Noise barrier	5 m tall, 10 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB09	INV09	Noise barrier	5 m tall, 15 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB10	INV10	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB11	INV11	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB12	INV12	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB13	INV13	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB14	INV14	Noise barrier	5 m tall, 20 m total length, 3-side, minimum 20 kg/m <sup>2</sup>
NB15	INV37	Noise barrier	5 m tall, 20 m total length, 3-side, minimum 20 kg/m <sup>2</sup>
NB16	INV34	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB17	INV38	Noise barrier	5 m tall, 15 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB18	INV33	Noise barrier	5 m tall, 10 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB19	INV32	Noise barrier	5 m tall, 10 m total length, 2-side, minimum 20 kg/m <sup>2</sup>
NB20	INV31	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB21	INV30	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>
NB22	INV15	Noise barrier	5 m tall, 8 m total length, 1-side, minimum 20 kg/m <sup>2</sup>

## 6. Assessment Criteria

The MECP publications; NPC-300 - Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning provides guidance on control of industrial noise emissions for Ontario [4] and Technical Guide to Renewable Energy Approvals [2] provide noise limits according to the surrounding POR classification. Table 6-1 shows the Class 3 performance limits for rural receptors at different times of the day. A conservative assessment limit of 40 dBA was used at all receptor locations under the likely potential for the

Facility to operate, sometime throughout its lifecycle, at full power generation for at least 1 hour during the evening period.

**Table 6-1: Class 3 Performance Limits**

Class 3 Area	
Time Period	Sound Level Limit – Leq [1 hour] (dBA)
07:00 to 19:00 (Daytime)	45
19:00 to 23:00 (Evening)	40
23:00 to 07:00 (Nighttime)	40

## 7. Acoustic Assessment Summary

### 7.1 Analysis Methodology

To model the community noise impact of the project, a noise model was developed using CADNA-A software application. The ISO 9613-2 [7] algorithm was implemented using CADNA-A to evaluate the environmental noise exposure from stationary sources.

The assumptions used in the noise model are in accordance with Section 9.2 of the Technical Guide to Renewable Energy Approvals [2] and are as follows:

- The model is assessed at 10°C and 70% relative humidity.
- The noise study area extends 1 km from each noise source.
- Ground absorption was modelled with a global value of  $G=0.7$ .
- All equipment on-site operates continuously steady during daytime, and for at least 1 hour during evening and night periods without impulsive noise emissions. This assumption for some equipment is under review and may change following a detailed study into the dependency of equipment duty cycle and subsequent noise emissions on solar exposure.
- All equipment on-site operates continuously steady during daytime, and for at least 1 hour during evening and night periods without impulsive noise emissions. This assumption for some equipment is under review and may change following a detailed study into the dependency of equipment duty cycle and subsequent noise emissions on solar exposure.
- The substation transformer was modelled as a point source at half the height of the transformer and sound power data was estimated based on National Electrical Manufacturers Association (NEMA) [5] and Institute of Electrical and Electronics Engineers (IEEE) [6] standards.
- Foliage of trees surrounding the site was modelled following The ISO 9613-2 [7] guidelines. Vegetation images and description are provided in Appendix E.

## 7.2 Predictable Worst-Case Assessment Scenario

Acoustic modelling was completed on a PWC basis that determined the equivalent 1-hour noise impact on the identified noise PORs. The following worst-case scenario was analyzed as described in Table 7-1.

**Table 7-1: Assessment Scenarios**

Scenario	Description
Predictable Worst-Case (PWC)	42 INV units. One 186 MVA substation transformer. Inverter structure and preliminary mitigation modelled. All equipment operates simultaneously at design for 1 hour during the evening/nighttime period. Conservative noise limit of 40 dBA at all receptors, modelled 4.5 m above ground.

## 7.3 Noise Modelling Results

Table 7-2 summarizes the noise assessment results at each of the noise sensitive POR locations. Participating receptors are listed but not compared to the noise criteria as noted under Clause (6) of O. Reg. 359/09 [1] (Section 4). All applicable PORs are compliant with the NPC-300 40 dBA noise criteria for a Class 3 receptors during the evening and nighttime periods. To visualize the predicted noise emissions from the Facility, refer to the noise contour plot in Appendix D.

**Table 7-2: Acoustic Assessment Summary Table**

POR ID	Description	Sound Level (dBA)		Verified by Acoustic Audit	Performance Limit (dBA)		Compliance (Yes/No)
		Day	Night/Evening		Day	Night/Evening	
<b>Points of Reception (Non-Participating)</b>							
RN01_f	ON-611	29	29	No	45	40	Yes
RN01_o	Existing residential dwelling	29	29	No	45	40	Yes
RN02_f	199 ON-611	27	27	No	45	40	Yes
RN02_o	Existing residential dwelling	27	27	No	45	40	Yes
RN03_f	200 ON-611	24	24	No	45	40	Yes
RN03_o	Existing residential dwelling	24	24	No	45	40	Yes
RN04_f	190 ON-611	28	28	No	45	40	Yes
RN04_o	Existing residential dwelling	28	28	No	45	40	Yes
RN05_f	189 ON-611	28	28	No	45	40	Yes
RN05_o	Existing residential dwelling	28	28	No	45	40	Yes
RN06_f	182 ON-611	24	24	No	45	40	Yes
RN06_o	Existing residential dwelling	22	22	No	45	40	Yes
RN07_f	130 Best Road	24	24	No	45	40	Yes

POR ID	Description	Sound Level (dBA)		Verified by Acoustic Audit	Performance Limit (dBA)		Compliance (Yes/No)
		Day	Night/ Evening		Day	Night/ Evening	
RN07_o	Existing residential dwelling	25	25	No	45	40	Yes
RN08_f	136 Highway 611	34	34	No	45	40	Yes
RN08_o	Existing residential dwelling	34	34	No	45	40	Yes
RN09_f	182 Highway 611	39	39	No	45	40	Yes
RN09_o	Existing residential dwelling	39	39	No	45	40	Yes
RN10_f	ON-611	39	39	No	45	40	Yes
RN10_o	Existing residential dwelling	39	39	No	45	40	Yes
RN11_f	212 Highway 611	38	38	No	45	40	Yes
RN11_o	Existing residential dwelling	38	38	No	45	40	Yes
RN12_f	Kliner Road	38	38	No	45	40	Yes
RN12_o	Existing residential dwelling	37	37	No	45	40	Yes
RN13_f	178 McFee Road	38	38	No	45	40	Yes
RN13_o	Existing residential dwelling	38	38	No	45	40	Yes
RN14_f	200 McFee Road	39	39	No	45	40	Yes
RN14_o	Existing residential dwelling	39	39	No	45	40	Yes
RN15_f	McFee Road	35	35	No	45	40	Yes
RN15_o	Existing residential dwelling	33	33	No	45	40	Yes
RN16_f	204 Highway 611	39	39	No	45	40	Yes
RN16_o	Existing residential dwelling	39	39	No	45	40	Yes
RN17_f	ON-611	39	39	No	45	40	Yes
RN17_o	Existing residential dwelling	39	39	No	45	40	Yes
RN18_f	205 Highway 611	38	38	No	45	40	Yes
RN18_o	Existing residential dwelling	38	38	No	45	40	Yes
RN19_f	206 Highway 611	38	38	No	45	40	Yes
RN19_o	Existing residential dwelling	37	37	No	45	40	Yes
RN20_f	577 ON-611	36	36	No	45	40	Yes
RN20_o	Existing residential dwelling	36	36	No	45	40	Yes
RN21_f	168 Frog Creek Road	34	34	No	45	40	Yes
RN21_o	Existing residential dwelling	34	34	No	45	40	Yes
RN22_f	169 Frog Creek Road	32	32	No	45	40	Yes
RN22_o	Existing residential dwelling	33	33	No	45	40	Yes
RN23_f	170 Frog Creek Road	33	33	No	45	40	Yes
RN23_o	Existing residential dwelling	33	33	No	45	40	Yes
RN24_f	171 Frog Creek Road	32	32	No	45	40	Yes

POR ID	Description	Sound Level (dBA)		Verified by Acoustic Audit	Performance Limit (dBA)		Compliance (Yes/No)
		Day	Night/Evening		Day	Night/Evening	
RN24_o	Existing residential dwelling	32	32	No	45	40	Yes
RN25_f	172 Frog Creek Road	32	32	No	45	40	Yes
RN25_o	Existing residential dwelling	32	32	No	45	40	Yes
RN26_f	173 Frog Creek Road	32	32	No	45	40	Yes
RN26_o	Existing residential dwelling	32	32	No	45	40	Yes
RN27_f	175 Frog Creek Road	33	33	No	45	40	Yes
RN27_o	Existing residential dwelling	31	31	No	45	40	Yes
RN28_f	659 Frog Creek Road	33	33	No	45	40	Yes
RN28_o	Existing residential dwelling	33	33	No	45	40	Yes
RN29_f	174 Frog Creek Road	33	33	No	45	40	Yes
RN29_o	Existing residential dwelling	31	31	No	45	40	Yes
RN30_f	209 Frog Creek Road	39	39	No	45	40	Yes
RN30_o	Existing residential dwelling	38	38	No	45	40	Yes
RN31_f	Frog Creek Road	36	36	No	45	40	Yes
RN31_o	Existing residential dwelling	38	38	No	45	40	Yes
RN32_f	991 Frog Creek Road	36	36	No	45	40	Yes
RN32_o	Existing residential dwelling	37	37	No	45	40	Yes
RN33_f	775 Hill Road	36	36	No	45	40	Yes
RN33_o	Existing residential dwelling	34	34	No	45	40	Yes
RN34_f	724 Hill Road	33	33	No	45	40	Yes
RN34_o	Existing residential dwelling	31	31	No	45	40	Yes
RN35_f	242 Hill Road	32	32	No	45	40	Yes
RN35_o	Existing residential dwelling	30	30	No	45	40	Yes
RN36_f	679 Hill Road	28	28	No	45	40	Yes
RN36_o	Existing residential dwelling	29	29	No	45	40	Yes
RN37_f	678 Hill Road	30	30	No	45	40	Yes
RN37_o	Existing residential dwelling	28	28	No	45	40	Yes
RN38_f	Frog Creek Road	35	35	No	45	40	Yes
RN38_o	Existing residential dwelling	36	36	No	45	40	Yes
RN39_f	659 Frog Creek Road	35	35	No	45	40	Yes
RN39_o	Existing residential dwelling	35	35	No	45	40	Yes
RN40_f	659 Frog Creek Road	34	34	No	45	40	Yes
RN40_o	Existing residential dwelling	34	34	No	45	40	Yes
RN41_f	945 Frog Creek Road	35	35	No	45	40	Yes

POR ID	Description	Sound Level (dBA)		Verified by Acoustic Audit	Performance Limit (dBA)		Compliance (Yes/No)
		Day	Night/Evening		Day	Night/Evening	
RN41_o	Existing residential dwelling	35	35	No	45	40	Yes
VN01	Vacant lot	27	27	No	45	40	Yes
VN02	Vacant lot	26	26	No	45	40	Yes
VN03	Vacant lot	38	38	No	45	40	Yes
VN04	Vacant lot	33	33	No	45	40	Yes
VN05	Vacant lot	32	32	No	45	40	Yes
VN06	Vacant lot	36	36	No	45	40	Yes
VN07	Vacant lot	37	37	No	45	40	Yes
VN08	Vacant lot	32	32	No	45	40	Yes
VN09	Vacant lot	34	34	No	45	40	Yes
VN10	Vacant lot	33	33	No	45	40	Yes
<b>Participating Receptors</b>							
RP01_f	203 Highway 611	39	39	No	45	40	N/A
RP01_o	Existing residential dwelling	39	39	No	45	40	N/A
RP02_f	1229 Frog Creek Road	39	39	No	45	40	N/A
RP02_o	Existing residential dwelling	40	40	No	45	40	N/A
VP01	Vacant lot	40	40	No	45	40	N/A
VP02	Vacant lot	39	39	No	45	40	N/A
VP03	Vacant lot	40	40	No	45	40	N/A

## 8. Conclusion

An acoustic assessment of the proposed Fort Frances 167 MW Class 3 solar PV facility has been completed. Based on this AAR's approach and noise mitigations included with the design, the proposed Project is expected to be compliant with the community noise limits identified in the MECP Technical Guide to Renewable Energy Approvals [2] and Environmental Noise Guidelines NPC-300 [4] for the PWC operating condition.

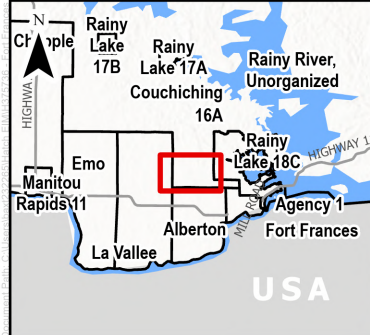
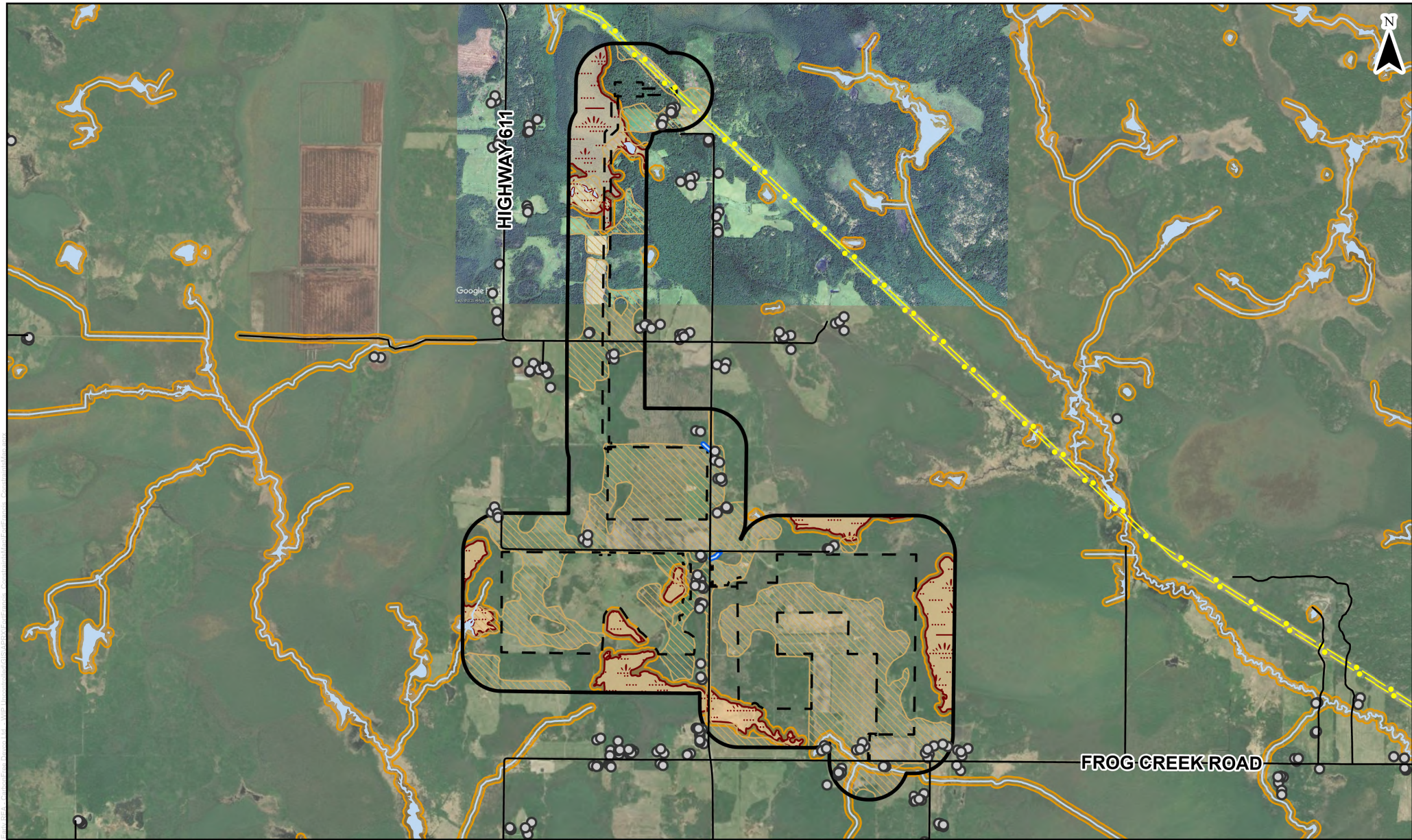
## 9. References

- [1] Province of Ontario, O. Reg. 359/09 - Renewable Energy Approvals under Part V.0.1 of the Environmental Protection Act, 2016.
- [2] Province of Ontario, PIBS 8472e – Technical Guide to Renewable Energy Approvals, 2013.
- [3] Province of Ontario, PIBS 4391e01 – Basic Comprehensive Certificates of Approval (Air), 2011.

- [4] Ontario Ministry of the Environment, Climate, and Parks (MECP), NPC-300 - Environmental Noise Guideline – Stationary and Transportation Sources, 2013.
- [5] National Electrical Manufacturers Association, “NEMA TP-80050-2013 (R2024): Transformers, Step Voltage Regulators, and Reactors,” NEMA, Rosslyn, VA, USA, 2013.
- [6] Institute of Electrical and Electronics Engineers, C57.12.90 Standard Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers, 2010.
- [7] International Organization for Standardization, “ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation,” ISO, Geneva, Switzerland, 1996.

# Appendix A

## Zoning/Land-Use Siting Map



**LEGEND**

- Building
- Transmission Line
- Road
- Unnamed Watercourse
- Watercourse
- Agricultural Lands
- Project Location
- Study Area (300m Buffer)
- Setback
- Waterbody
- Wetland

**NOTES:**

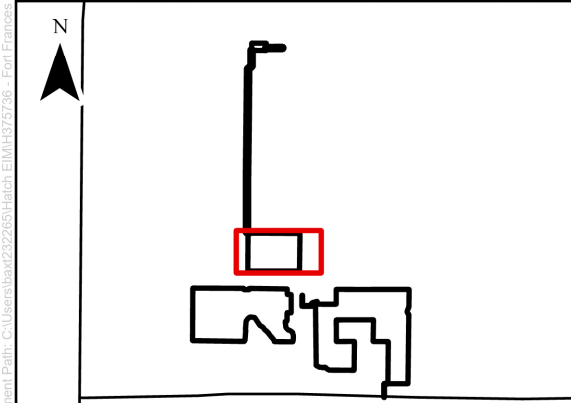
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0 250 500 1,000  
1:40,000 m

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<b>FIGURE TITLE:</b> Project Location				
<b>CLIENT:</b> CarbonFree Fort Frances LTD				
<b>DWG BY:</b> V. BAXTER	<b>CHK BY:</b> C. SEHL	<b>FIG NO.:</b> 1	<b>REV NO.:</b> A	<b>HATCH</b>
<b>DATE:</b> 02/03/26	<b>PAGE:</b> 1			

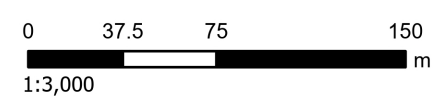
# Appendix B

## Site and Noise Source Layout



- LEGEND**
- Point Source
  - PV Array
  - Road
  - Vertical Area Source
  - Inverter Casing
  - Project Location

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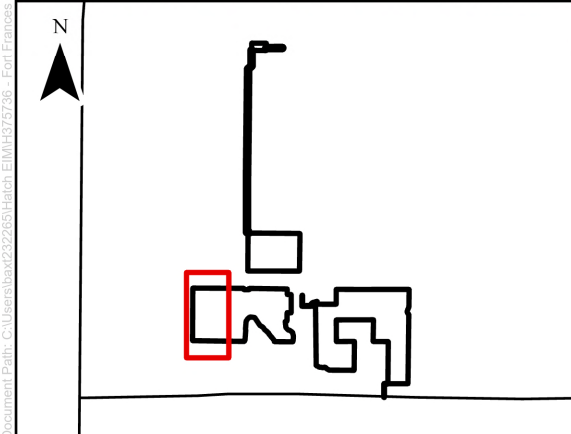
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Fort Frances Solar Project

**FIGURE TITLE:** Noise Source Layout

**CLIENT:** CarbonFree Fort Frances LTD

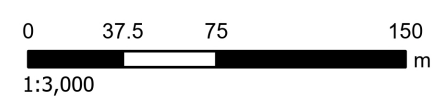
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<b>DATE:</b> 29/05/26	<b>PAGE:</b> 1 of 8		





- LEGEND**
- PV Array
  - Road
  - Vertical Area Source
  - Inverter Casing
  - Project Location

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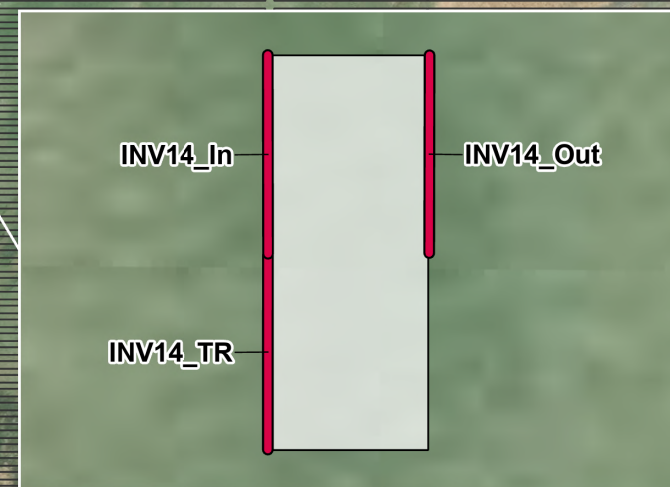
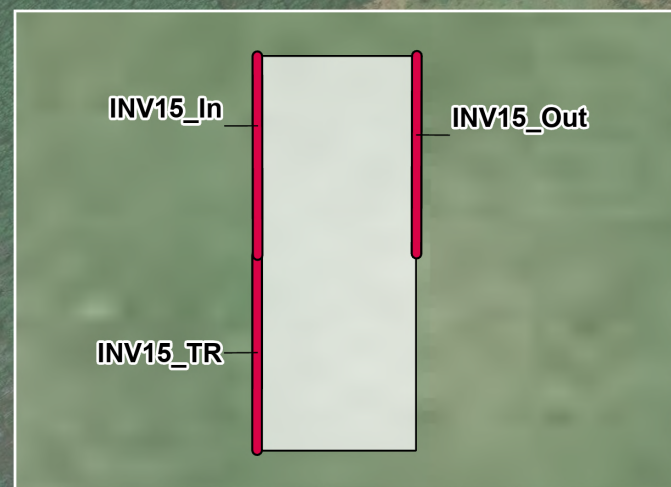
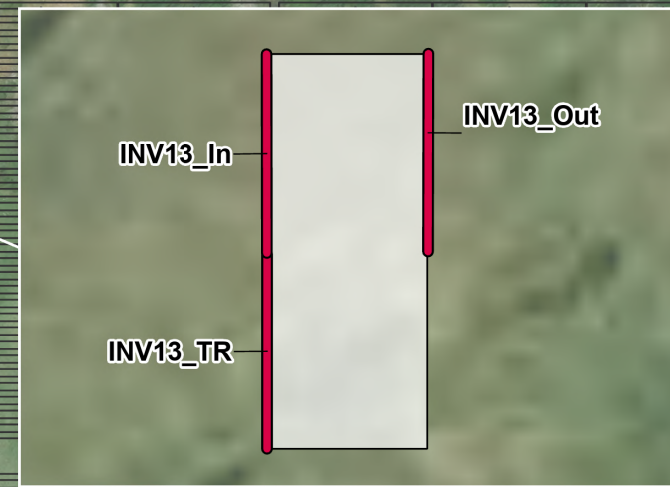
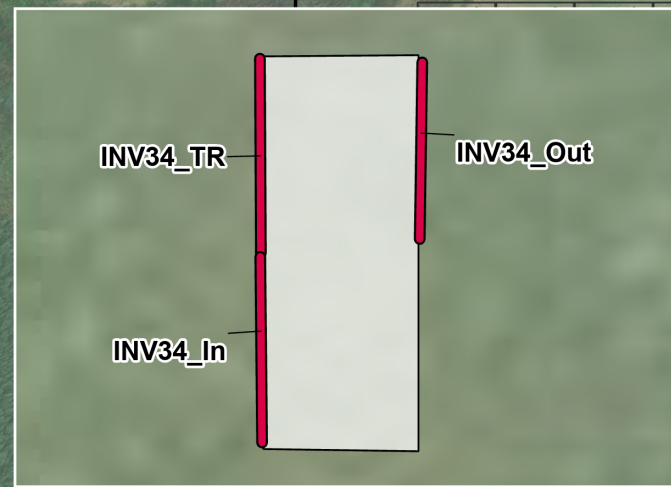
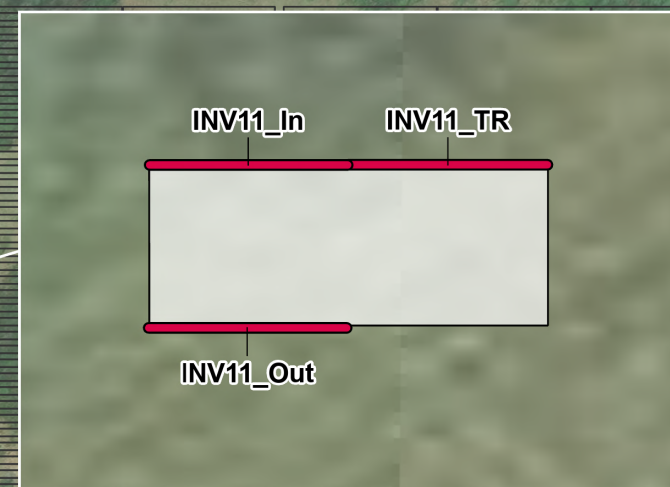
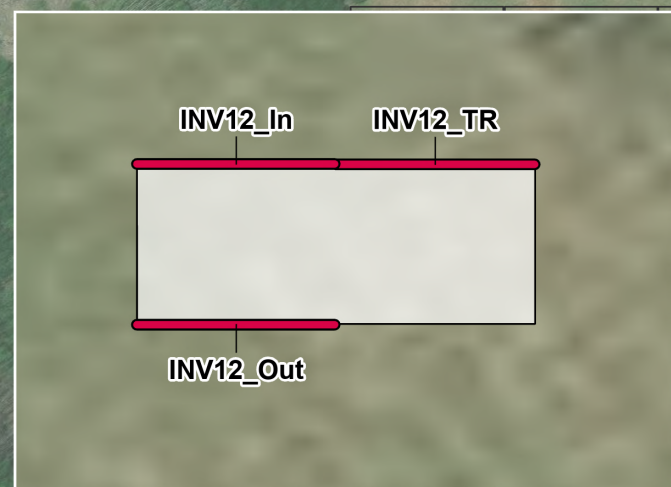


**PROJECT:** Acoustic Assessment Report  
Fort Frances Solar Project

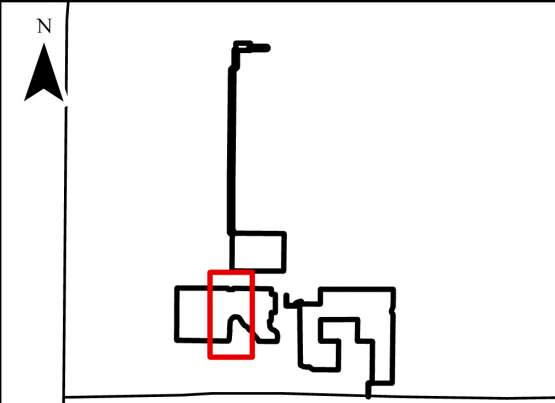
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**CLIENT:** CarbonFree Fort Frances LTD

<b>DWG BY:</b> V. BAXTER	<b>CHK BY:</b> M. ANDARGIE	<b>FIG NO.:</b> 1	<b>REV NO.:</b> 1	
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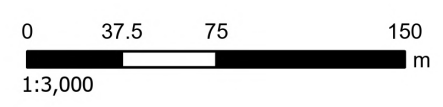


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- LEGEND**
- PV Array
  - Road
  - Vertical Area Source
  - Inverter Casing
  - Project Location

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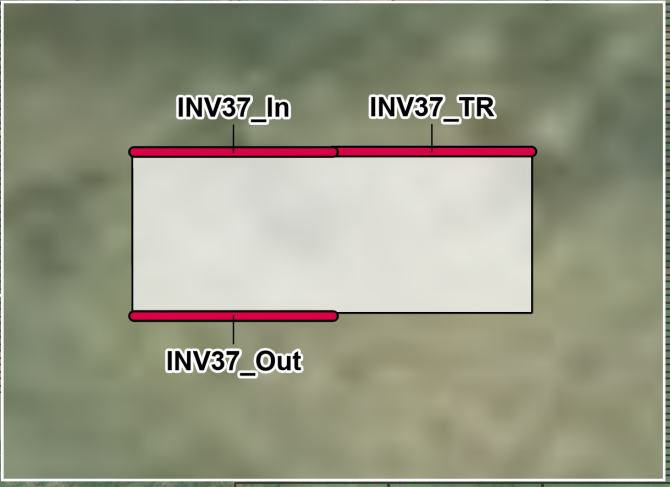
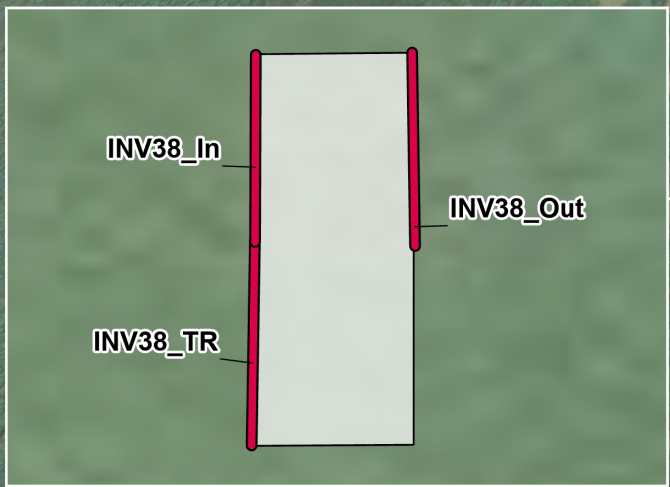
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Fort Frances Solar Project

**FIGURE TITLE:** Noise Source Layout

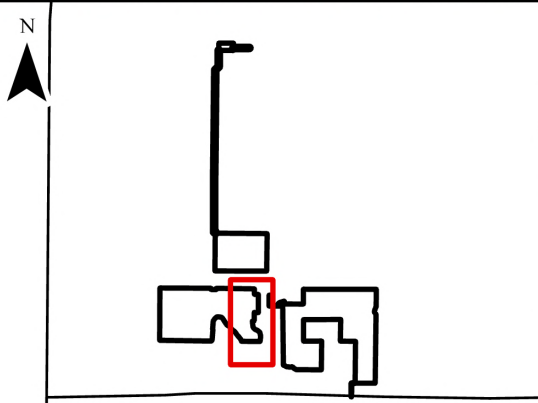
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<b>DATE:</b> 28/05/26	<b>PAGE:</b> 3 of 8		





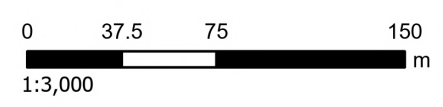
HIGHWAY-611



- LEGEND**
- PV Array
  - Road
  - Vertical Area Source
  - Inverter Casing
  - Project Location

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**PROJECT:** Acoustic Assessment Report  
Fort Frances Solar Project

**FIGURE TITLE:** Noise Source Layout

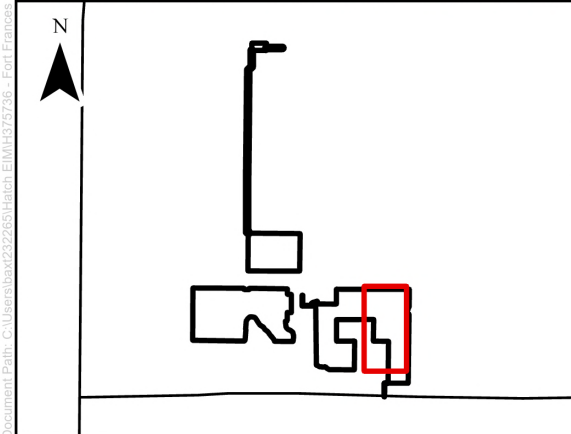
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<b>DATE:</b> 28/05/26	<b>PAGE:</b> 4 of 8		







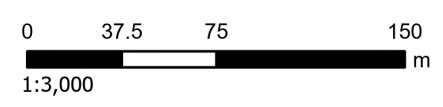


**LEGEND**

- PV Array
- Vertical Area Source
- Inverter Casing
- ⌈ Project Location

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**PROJECT:** Acoustic Assessment Report  
Fort Frances Solar Project

**FIGURE TITLE:** Noise Source Layout

**CLIENT:** CarbonFree Fort Frances LTD

<b>DWG BY:</b> V. BAXTER	<b>CHK BY:</b> M. ANDARGIE	<b>FIG NO.:</b> 1	<b>REV NO.:</b> 1
<b>DATE:</b> 28/05/26	<b>PAGE:</b> 7 of 8		





# **Appendix C**

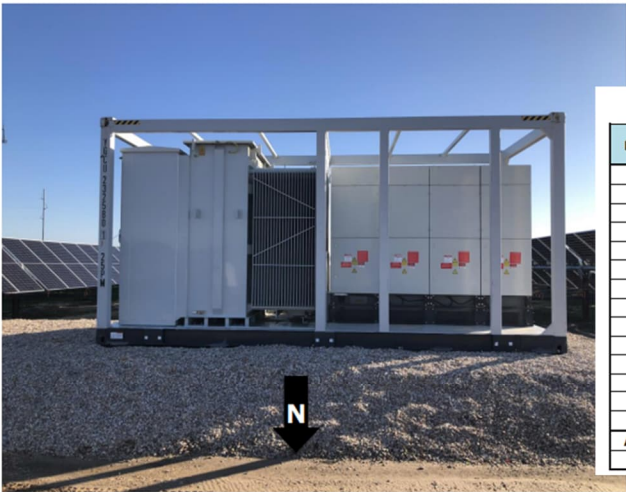
## **Noise Source Sound Power Levels and Equipment Vendor Information**

Equipment Type	Solar Inverter Skid	NV dB	INV	Project Tags	INV xx
Manufacturer	Sungrow	Date	25/2/2026		
Power	4400 kW	Source	Sungrow SG4400UD 2025-05-08 Test report		
Flow	- (m <sup>3</sup> /s)				
Pres	- kPA				
Temperature	- (°C)				

	31.5	63	125	250	500	1000	2000	4000	8000	OVL(A)
<b>Derived Lw</b>	90	87	91	92	95	88	88	93	80	97

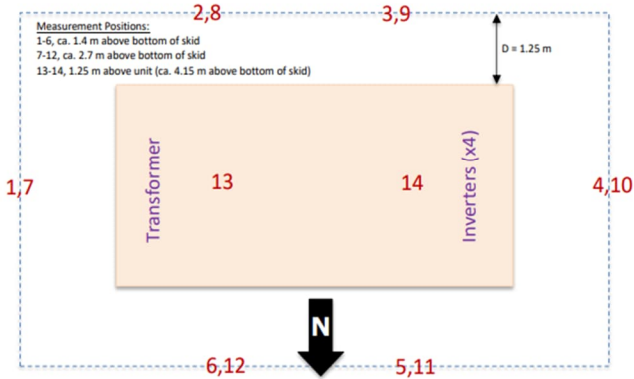
**Figure 1. Photo of Solar Inverter Skid (Looking South)**



**Table 1. Sound Measurement Data, dB**

Position	Octave Band Center Frequency, Hz								dBA	dBZ, Calculated	
	31.5	63	125	250	500	1000	2000	4000			8000
1	67.9	64.7	67.9	61	54	47.3	46.7	51.8	36	58.5	72.3
2	64.9	65	69.1	70.3	75	68.5	68.3	67.3	59.7	75.8	78.9
3	68.5	65.9	71.5	77.4	80	72.2	72.9	71.6	63.8	80.4	83.7
4	65.4	63.8	67.3	67.2	67.8	61.7	63	67.4	53.5	71.5	75.0
5	62.9	64.3	66.8	67.9	66.5	61.5	64.7	78.8	62.5	79.9	80.1
6	60	65.8	68.9	62.4	58.7	58.1	60	68.4	53	70.4	73.8
7	61.4	63.1	69.1	56.3	53.8	46.5	47.2	49.9	35.2	57.5	70.9
8	66.1	63.9	70.9	68.3	75.1	68.3	66.8	65.9	55.6	75.2	78.7
9	67.8	65.7	71.4	76.3	77.9	71.6	69.5	67.1	56.5	78	82.0
10	64.9	62.9	70.4	66.8	67.2	60.9	61.9	65.3	51.9	70.2	75.1
11	63.9	63.2	68.2	67	64.6	59.5	64.6	74.2	60.4	75.8	77.0
12	59.4	64.7	66.2	64.9	59	55.7	57.5	68.9	52.5	70.5	73.2
13	69.1	62.3	71.6	62.1	64.8	59.7	58.5	66.2	49	69.3	75.4
14	76.3	68.1	68.6	68.1	70.8	64.9	63.5	68.8	53.2	73.3	79.4
<b>Average</b>	<b>68.1</b>	<b>64.8</b>	<b>69.5</b>	<b>70.3</b>	<b>72.7</b>	<b>65.9</b>	<b>65.9</b>	<b>70.8</b>	<b>57.6</b>	<b>75.1</b>	<b>78.3</b>
<b>Lw</b>	<b>90.0</b>	<b>86.7</b>	<b>91.4</b>	<b>92.2</b>	<b>94.6</b>	<b>87.8</b>	<b>87.7</b>	<b>92.6</b>	<b>79.5</b>	<b>97.0</b>	<b>100.2</b>

**Figure 2. Measurement Positions, Overhead View**



Equipment Type	110 kV BIL 186 MVA Transformer	NV dB	TR_186	Project Tags	ST01
Manufacturer	Larson Electronics	Date	2025.03.04		
Power	186 MVA	Source	NEMA TR1-1993 (R2000), Oil Filled - Forced Air		
Flow	(m <sup>3</sup> /s)		Larson Electronics 186 MVA 110 kV BIL MT-PSTC-GSU		
Pres	kPA				
Temperature	(°C)				

Derived Lw	31.5	63	125	250	500	1000	2000	4000	8000	OVL
	107	113	115	110	110	104	99	94	87	110

From Handbook of Noise and Vibration Control (Crocker, 2007, page 1335-1336, Eq. 18 and Table 20)

Average LpA	82 dBA	Based on NEMA TR1-1993 (R2000), Table 0-4, Dry type ventilated forced air cooled
Estimated surface area	402.9 m <sup>2</sup>	Estimated based on IEEE Std C57.12.90-2010

	31.5	63	125	250	500	1000	2000	4000	8000	OVL
										(dBA)

### STEP 1: Correction factors

C1 Outdoors, indoors in mechanical room over 140 m <sup>3</sup>	-11	-5	-3	-8	-8	-14	-19	-24	-31	
C2 - Indoors	-11	-2	3	-2	-2	-11	-19	-24	-31	
C3 - Serious Noise Problems	-11	-2	3	2	2	-4	-9	-14	-21	

### STEP 2: Sound Power Level calculated as Lw=Average LpA + Awt + 10\*log(Estimated surface area) + C + 10

C1 based [dB]	107	113	115	110	110	104	99	94	87	110
C2 based [dB]	107	116	121	116	116	107	99	94	87	115
C3 based [dB]	107	116	121	120	120	114	109	104	97	120
A-weightings	-39.4	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	

Table 1  
Audible Sound Levels for Oil-Immersed Power Transformers

Average Sound Level L <sub>w</sub> Decibels	Equivalent Two-Winding Rating*											
	350 kV BIL and Below			450, 550, 650 kV BIL			750 and 825 kV BIL			900 and 1050 kV BIL		
	1	2	3	1	2	3	1	2	3	1	2	3
57	700											
58	1000											
59			700									
60	1500		1000									
61	2000											
62	2500		1500									
63	3000		2000									
64	4000		2500									
65	5000		3000									
66	6000		4000									
67	7000	3750	5000	3750	4000	3125						
68	10000	7500	6000	5000	5000	3750						
69	15000	15000	7500	7500	6000	5000						
70	15000	15000	10000	7500	7500	5000						
71	20000	16667	12500	9375	10000	7500						
72	25000	20000	20000	15000	12500	12500						
73	30000	26667	25000	20000	16667	15000	12500					
74	40000	33333	33333	25000	20000	20000	16667	15000				
75	50000	40000	41667	30000	25000	25000	20000	20000	20000	16667		
76	60000	53333	50000	40000	33333	33333	30000	26667	25000	20000	20000	
77	80000	66667	66667	50000	45000	41667	40000	33333	30000	26667	25000	
78	100000	80000	83333	60000	53333	50000	50000	40000	41667	40000	33333	33333
79	106667	100000	80000	66667	66667	60000	63333	50000	50000	40000	41667	
80	133333	133333	100000	80000	83333	80000	66667	66667	60000	53333	50000	
81		166667	106667	100000	100000	80000	83333	80000	66667	66667		
82	200000		133333	133333	106667	100000	100000	80000	83333			
83	300000		200000	166667	133333	133333	106667	100000	100000			
84	400000		300000	250000	200000	200000	166667	150000	133333			
85			400000	300000	300000	250000	250000	200000	200000			
86				400000	400000	300000	300000	250000	250000			
87												
88												
89												
90												
91												

Larson Electronics LLC  
9419 E US HWY 175, Kemp, TX 75143  
Phone: 800.369.6671



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Email: sales@LarsonElectronics.com  
Fax: 903.498.3364

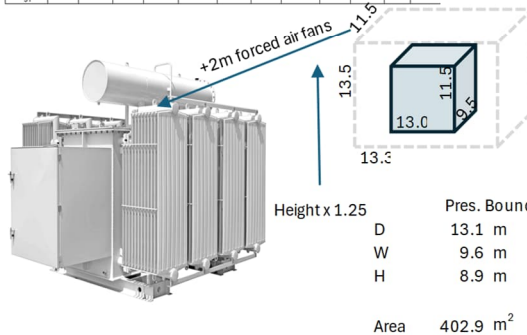
Secondary Neutral Chopped Wave Impulse Level (Crest): 120 KV  
Secondary Neutral Low Frequency Level (RMS): 34 KV  
Tertiary Winding Capacity: N/A  
Tertiary Winding Voltage: N/A  
Tertiary Winding Phasor: N/A  
Tertiary Winding Voltage Class: N/A  
Tertiary Winding Voltage BIL: N/A

Complies with NEMA 260-1996  
Complies with ASTM D5871  
Complies with CSA C88  
Complies with CSA C802-3  
Complies with CSA C227.5  
Complies with CSA C88-16  
Complies with CSA C88-1

Frequency: 60 Hz  
Temperature Rise: 65°C  
Insulation Rating: Class A Insulation  
Cooling Class: ONAN/ONAF/ONAF  
Forced Air (Fans): Included, Two-Stage, Totally Enclosed, Individually Protected Type  
Fan Blades Of One-Piece Cast aluminum, Galvanized Fan Guards, Fan Motors Are Totally Enclosed And Furnished Without Centrifugal Switches, Fans are Krenz-Vent efficient and maintenance free. Fans are driven by totally enclosed weatherproof, ball bearing induction motors, rated 115/230 volts, single phase, 60 hertz, connected to present a balanced load (50/50) to a 208Y/120 three phase supply

Tank Cover Access Handhole: Included  
Transformer Foundation Dimensions: TBD  
Transformer Overall Dimensions: 492.13" x 287.40" x 279.53"  
Dry Weight (w/o Oil): 324,079.53 lbs  
Total Weight (Liquid Filled): 508,826.90 lbs

\*Please note that numbers are approximate and subject to change



#### 13.5.5 Sound power level calculation (L<sub>w</sub>)

The sound power level shall be computed for each frequency band (A-weighted, one-third octave band, or discrete frequency) using Equation (3-4).

$$L_w = L_p + 10 \cdot \log_{10}(S) \quad (3-4)$$

The measurement surface area S is the vertical area (in square meters or square feet) enveloping the transformer (measurement surface) on which the sound measurement points are located plus the horizontal plane bounded by the vertical measurement surface.

Alternatively, for large transformers, the measurement surface area is approximately equal to 125% of the vertical area enveloping the transformer (measurement surface).


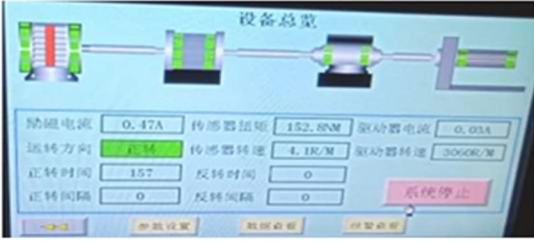



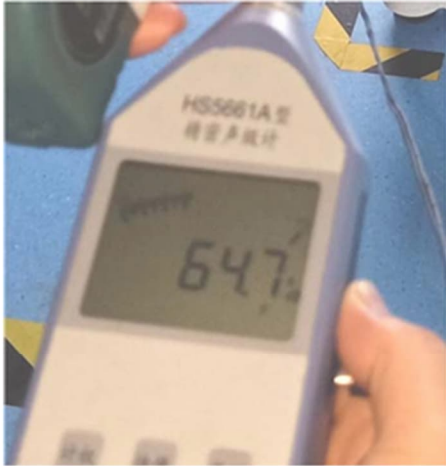
## Nextracker Motor Sound Summary

Each Nextracker row uses a 24V DC motor powered by a Nextracker controller (SPC). To track the Sun, the motor operates for five to ten seconds every few minutes. The noise level of the motors is tested by the manufacturer. Test reports from the manufacturer indicate that the sound power level is approximately ~65dB. The sound level produced is low and essentially indistinguishable to surrounding site noises such as inverters, transformers, and HVAC units.

Below is a Motor test report from Nextracker Vendor.

Distance	Sound Level	Equivalent Sound
3m (9.8 ft)	~ 65dB	Normal Conversation, Quiet Suburb
30m (98 ft)	~ 45dB	Light Rain, Bird calls
300m (980 ft)	~ 25dB	Leaves Rustling, Whisper

Applicator	Lu Weijian	Department	Technical	Date	2020.04.14
Sample name		Drawing No.		Sample No.	2
Test purpose	Test gearbox motor can meet the noise standard				
Test process	<p>1. The test motor shall be isolated from the aging table to prevent it from being affected by the noise of the aging table. The torque shall be set to 150N.m for 10min forward rotation, 1min stop, 10min reverse and 1min stop, work for 2 cycles. The noise meter should be 1m to the under test motor.</p> <p>2. Acceptable standard: Noise during the test shall be <math>\leq 65\text{dB}</math></p>				
Test equipment	300N.m dynamometer, noise meter				
Test cycle	1 day				
Process Description	<p>1. Clamp the sample motor and test the corresponding data according to the above test methods</p> <p>1-1 Ambient noise 56.1dB</p>  <p>1-2 Dynamometer parameter setting 150N.m</p>  <p>1-3 Test the motor noise when running as required, and the horizontal distance from the motor is 1m</p>  <p>1-4 Motor noise test result: 64.7dB</p>				

			
<p>Test report</p>	<p>No. B1 Motor noise 64.7 dB; No. F1 Motor noise 63.2 dB;</p>		
<p>Test result</p>	<p>According to the test results show that the stable operation of electric motor noise can meet the performance requirements;</p>		
<p>Operator</p>	<p>Sun Jieying</p>	<p>Audit</p>	<p>Lu Weijian</p>

# Appendix D

## POR Noise Impact Table and Noise Contour Plot

**Point of Reception Noise Impact Table**

Receptor ID	Top Noise Sources										Source ID	
	1	2	3	4	5	6	7	8	9	10		Partial Level
RN01_f	ST01	INV35_In	INV03_In	INV04_In	INV05_In	INV06_In	INV36_In	INV01_In	INV35_TR	INV03_TR		
	28 dBA	12 dBA	12 dBA	12 dBA	12 dBA	12 dBA	12 dBA	11 dBA	11 dBA	11 dBA		
	848 m	1805 m	1275 m	1355 m	1428 m	1447 m	1866 m	1148 m	1805 m	1275 m		
RN01_o	ST01	INV03_In	INV04_In	INV05_In	INV06_In	INV09_In	INV10_In	INV11_In	INV35_In	INV01_In		
	29 dBA	10 dBA	10 dBA	10 dBA	10 dBA	10 dBA	10 dBA	10 dBA	9 dBA	9 dBA		
	819 m	1246 m	1327 m	1401 m	1419 m	1757 m	1795 m	1774 m	1781 m	1119 m		
RN02_f	ST01	INV01_In	INV03_In	INV01_TR	INV04_In	INV05_In	INV03_TR	INV06_In	INV04_TR	INV05_TR		
	23 dBA	17 dBA	16 dBA	16 dBA	16 dBA	15 dBA	15 dBA	15 dBA	14 dBA	14 dBA		
	955 m	1216 m	1291 m	1216 m	1360 m	1397 m	1291 m	1426 m	1360 m	1397 m		
RN02_o	ST01	INV01_In	INV03_In	INV01_TR	INV04_In	INV05_In	INV03_TR	INV06_In	INV04_TR	INV05_TR		
	23 dBA	17 dBA	16 dBA	16 dBA	16 dBA	15 dBA	15 dBA	15 dBA	15 dBA	14 dBA		
	926 m	1187 m	1262 m	1187 m	1332 m	1369 m	1262 m	1398 m	1332 m	1369 m		
RN03_f	ST01	INV05_In	INV06_In	INV04_In	INV03_In	INV01_In	INV05_TR	INV06_TR	INV04_TR	INV03_TR		
	22 dBA	10 dBA	10 dBA	10 dBA	9 dBA	9 dBA	9 dBA	9 dBA	8 dBA	8 dBA		
	766 m	1152 m	1182 m	1123 m	1057 m	999 m	1152 m	1182 m	1123 m	1057 m		
RN03_o	ST01	INV01_In	INV03_In	INV01_TR	INV06_In	INV04_In	INV05_In	INV03_TR	INV02_In	INV04_TR		
	22 dBA	9 dBA	8 dBA	8 dBA	8 dBA	8 dBA	8 dBA	8 dBA	7 dBA	7 dBA		
	736 m	970 m	1029 m	970 m	1156 m	1095 m	1126 m	1029 m	1001 m	1095 m		
RN04_f	ST01	INV01_In	INV03_In	INV02_In	INV04_In	INV05_In	INV01_TR	INV06_In	INV03_TR	INV02_TR		
	22 dBA	17 dBA	17 dBA	17 dBA	16 dBA	16 dBA	16 dBA	16 dBA	16 dBA	16 dBA		
	988 m	1179 m	1199 m	1217 m	1253 m	1255 m	1179 m	1291 m	1199 m	1217 m		
RN04_o	ST01	INV01_In	INV03_In	INV02_In	INV04_In	INV05_In	INV01_TR	INV06_In	INV03_TR	INV02_TR		
	21 dBA	18 dBA	17 dBA	17 dBA	17 dBA	17 dBA	16 dBA	16 dBA	16 dBA	16 dBA		
	959 m	1150 m	1171 m	1188 m	1225 m	1228 m	1150 m	1263 m	1171 m	1188 m		
RN05_f	ST01	INV05_In	INV06_In	INV02_In	INV05_TR	INV06_TR	INV02_TR	INV03_Out	INV01_Out	INV04_Out		
	20 dBA	18 dBA	17 dBA	17 dBA	17 dBA	16 dBA	16 dBA	15 dBA	14 dBA	14 dBA		
	1048 m	1123 m	1163 m	1202 m	1123 m	1163 m	1202 m	1123 m	1156 m	1156 m		
RN05_o	ST01	INV05_In	INV06_In	INV02_In	INV05_TR	INV06_TR	INV02_TR	INV03_Out	INV01_Out	INV03_In		
	20 dBA	18 dBA	18 dBA	17 dBA	17 dBA	17 dBA	16 dBA	15 dBA	14 dBA	14 dBA		
	1019 m	1101 m	1140 m	1174 m	1101 m	1140 m	1174 m	1097 m	1129 m	1097 m		
RN06_f	ST01	INV06_In	INV06_TR	INV06_Out	INV02_In	INV02_TR	INV04_Out	INV33_Out	INV32_Out	INV16_Out		
	16 dBA	14 dBA	13 dBA	13 dBA	12 dBA	11 dBA	10 dBA	10 dBA	9 dBA	9 dBA		
	1041 m	966 m	966 m	966 m	1110 m	1110 m	990 m	1895 m	1939 m	1967 m		
RN06_o	ST01	INV02_In	INV33_Out	INV32_Out	INV02_TR	INV16_Out	INV06_In	INV37_Out	INV15_Out	INV14_Out		
	16 dBA	10 dBA	10 dBA	9 dBA	9 dBA	9 dBA	9 dBA	8 dBA	8 dBA	8 dBA		
	1012 m	1080 m	1872 m	1916 m	1080 m	1947 m	938 m	1852 m	1902 m	1926 m		
RN07_f	ST01	INV02_In	INV05_Out	INV06_Out	INV02_TR	INV04_Out	INV03_Out	INV01_Out	INV16_Out	INV17_Out		
	20 dBA	14 dBA	13 dBA	13 dBA	13 dBA	12 dBA	12 dBA	11 dBA	9 dBA	9 dBA		
	1571 m	1569 m	1267 m	1305 m	1569 m	1371 m	1390 m	1519 m	1990 m	1999 m		

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RN07_o	ST01	INV02_In	INV05_Out	INV06_Out	INV02_TR	INV04_Out	INV03_Out	INV01_Out	INV16_Out	INV17_Out
	20 dBA	14 dBA	13 dBA	13 dBA	13 dBA	12 dBA	12 dBA	11 dBA	9 dBA	9 dBA
	1549 m	1543 m	1239 m	1277 m	1543 m	1343 m	1363 m	1494 m	1961 m	1971 m
RN08_f	INV05_Out	INV04_Out	INV06_Out	INV03_Out	INV05_TR	INV05_In	INV06_TR	INV06_In	INV02_In	INV02_TR
	26 dBA	24 dBA	24 dBA	24 dBA	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA
	390 m	459 m	431 m	460 m	390 m	390 m	431 m	431 m	631 m	631 m
RN08_o	INV05_Out	INV04_Out	INV06_Out	INV03_Out	INV05_TR	INV06_TR	INV05_In	INV06_In	INV02_In	INV02_TR
	27 dBA	25 dBA	24 dBA	24 dBA	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA
	371 m	441 m	412 m	444 m	371 m	412 m	371 m	412 m	619 m	619 m
RN09_f	INV05_Out	INV06_Out	INV04_Out	INV03_Out	INV02_In	ST01	INV05_TR	INV02_TR	INV06_TR	INV05_In
	37 dBA	36 dBA	32 dBA	31 dBA	28 dBA	27 dBA	27 dBA	26 dBA	26 dBA	26 dBA
	233 m	268 m	352 m	397 m	611 m	767 m	233 m	611 m	268 m	233 m
RN09_o	INV05_Out	INV06_Out	INV04_Out	INV03_Out	INV02_In	INV05_TR	ST01	INV02_TR	INV06_TR	INV05_In
	38 dBA	36 dBA	33 dBA	31 dBA	28 dBA	28 dBA	27 dBA	27 dBA	27 dBA	26 dBA
	220 m	256 m	336 m	379 m	593 m	220 m	747 m	593 m	256 m	220 m
RN10_f	INV05_Out	INV06_Out	INV04_Out	INV03_Out	INV02_In	INV02_TR	INV05_In	ST01	INV06_In	INV05_TR
	39 dBA	38 dBA	33 dBA	30 dBA	28 dBA	26 dBA	26 dBA	26 dBA	26 dBA	25 dBA
	211 m	228 m	339 m	407 m	624 m	624 m	211 m	829 m	228 m	211 m
RN10_o	INV05_Out	INV06_Out	INV04_Out	INV03_Out	INV05_In	INV02_In	INV06_In	INV05_TR	ST01	INV06_TR
	40 dBA	39 dBA	34 dBA	31 dBA	28 dBA	27 dBA	27 dBA	27 dBA	26 dBA	26 dBA
	181 m	197 m	309 m	379 m	181 m	595 m	197 m	181 m	804 m	197 m
RN11_f	INV06_Out	INV05_Out	INV04_Out	INV03_Out	INV02_In	INV06_In	INV05_In	ST01	INV02_TR	INV06_TR
	35 dBA	34 dBA	32 dBA	29 dBA	27 dBA	26 dBA	26 dBA	25 dBA	25 dBA	23 dBA
	276 m	301 m	370 m	453 m	632 m	276 m	301 m	905 m	632 m	276 m
RN11_o	INV05_Out	INV06_Out	INV04_Out	INV06_In	INV05_In	INV03_Out	ST01	INV02_In	INV02_TR	INV06_TR
	35 dBA	33 dBA	29 dBA	27 dBA	27 dBA	26 dBA	26 dBA	25 dBA	24 dBA	24 dBA
	283 m	255 m	344 m	255 m	283 m	427 m	878 m	602 m	602 m	255 m
RN12_f	INV18_Out	INV17_Out	INV19_Out	INV16_Out	INV20_Out	INV23_Out	INV31_In	INV29_In	INV21_Out	INV33_Out
	28 dBA	28 dBA	26 dBA	26 dBA	24 dBA	23 dBA	22 dBA	22 dBA	22 dBA	22 dBA
	450 m	459 m	492 m	520 m	567 m	758 m	971 m	950 m	673 m	699 m
RN12_o	INV18_Out	INV17_Out	INV19_Out	INV16_Out	INV20_Out	INV23_Out	INV21_Out	INV31_In	INV33_Out	INV32_Out
	27 dBA	27 dBA	26 dBA	25 dBA	24 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	438 m	447 m	482 m	509 m	559 m	752 m	666 m	960 m	691 m	706 m
RN13_f	INV37_Out	INV33_Out	INV38_In	INV32_Out	INV15_Out	INV06_In	ST01	INV06_Out	INV05_In	INV14_Out
	28 dBA	26 dBA	26 dBA	25 dBA	24 dBA	24 dBA	24 dBA	24 dBA	24 dBA	23 dBA
	481 m	578 m	737 m	617 m	647 m	543 m	1034 m	543 m	582 m	709 m
RN13_o	INV37_Out	INV38_In	INV33_Out	INV15_Out	INV32_Out	INV06_In	ST01	INV14_Out	INV05_In	INV06_Out
	29 dBA	26 dBA	26 dBA	25 dBA	25 dBA	25 dBA	24 dBA	24 dBA	24 dBA	23 dBA
	451 m	715 m	591 m	615 m	629 m	555 m	1027 m	677 m	594 m	555 m
RN14_f	INV11_Out	INV08_In	INV12_Out	INV09_Out	INV14_Out	ST01	INV08_TR	INV11_In	INV37_In	INV10_Out
	30 dBA	30 dBA	29 dBA	29 dBA	29 dBA	29 dBA	29 dBA	28 dBA	28 dBA	28 dBA
	427 m	602 m	468 m	483 m	490 m	719 m	602 m	427 m	689 m	512 m

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RN14_o	INV12_Out	INV09_Out	INV08_In	INV10_Out	ST01	INV15_Out	INV08_TR	INV11_TR	INV11_Out	INV11_In
	29 dBA	29 dBA	28 dBA	28 dBA	28 dBA	28 dBA	28 dBA	27 dBA	27 dBA	27 dBA
	440 m	457 m	580 m	486 m	747 m	506 m	580 m	398 m	398 m	398 m
RN15_f	INV07_In	INV08_In	INV07_TR	INV09_In	INV10_In	INV08_TR	INV35_Out	INV09_TR	INV35_In	INV11_In
	28 dBA	27 dBA	27 dBA	27 dBA	26 dBA	26 dBA	26 dBA	25 dBA	25 dBA	25 dBA
	708 m	748 m	708 m	793 m	830 m	748 m	639 m	793 m	639 m	913 m
RN15_o	INV07_In	INV08_In	INV07_TR	INV09_In	ST01	INV08_TR	INV35_Out	INV10_In	INV35_In	INV09_TR
	26 dBA	25 dBA	25 dBA	24 dBA	24 dBA	24 dBA	24 dBA	24 dBA	24 dBA	24 dBA
	728 m	768 m	728 m	809 m	988 m	768 m	666 m	846 m	666 m	809 m
RN16_f	INV38_In	INV37_Out	INV38_Out	INV33_Out	INV32_Out	INV15_In	INV31_In	INV15_TR	INV33_TR	INV33_In
	32 dBA	32 dBA	30 dBA	30 dBA	29 dBA	29 dBA	28 dBA	28 dBA	28 dBA	27 dBA
	412 m	353 m	412 m	426 m	446 m	571 m	601 m	571 m	426 m	426 m
RN16_o	INV37_Out	INV38_In	INV38_Out	INV33_Out	INV15_In	INV32_Out	INV15_TR	INV31_In	INV14_In	INV33_TR
	33 dBA	33 dBA	31 dBA	29 dBA	29 dBA	29 dBA	28 dBA	28 dBA	28 dBA	27 dBA
	335 m	401 m	401 m	445 m	552 m	464 m	552 m	614 m	624 m	445 m
RN17_f	INV38_In	INV38_TR	INV38_Out	INV31_In	INV30_TR	INV32_In	INV33_In	INV31_Out	INV30_Out	INV32_TR
	40 dBA	39 dBA	38 dBA	33 dBA	31 dBA	30 dBA	30 dBA	30 dBA	29 dBA	29 dBA
	230 m	230 m	230 m	462 m	471 m	596 m	612 m	462 m	471 m	596 m
RN17_o	INV38_In	INV38_TR	INV38_Out	INV31_In	INV30_TR	INV31_Out	INV32_In	INV30_Out	INV33_In	INV32_TR
	40 dBA	40 dBA	39 dBA	31 dBA	29 dBA	28 dBA	28 dBA	28 dBA	28 dBA	27 dBA
	201 m	201 m	201 m	482 m	497 m	482 m	599 m	497 m	614 m	599 m
RN18_f	INV38_In	INV38_TR	INV31_In	INV30_TR	INV38_Out	INV30_Out	INV39_Out	INV31_Out	INV32_In	INV33_In
	35 dBA	34 dBA	30 dBA	30 dBA	30 dBA	29 dBA	28 dBA	28 dBA	27 dBA	26 dBA
	315 m	315 m	487 m	459 m	315 m	459 m	484 m	487 m	682 m	705 m
RN18_o	INV38_In	INV38_TR	INV38_Out	INV31_In	INV30_TR	INV30_Out	INV31_Out	INV39_Out	INV32_In	INV33_In
	36 dBA	35 dBA	31 dBA	30 dBA	30 dBA	28 dBA	28 dBA	28 dBA	27 dBA	26 dBA
	285 m	285 m	285 m	496 m	476 m	476 m	496 m	511 m	677 m	698 m
RN19_f	INV39_Out	INV38_In	INV30_TR	INV31_In	INV38_TR	INV30_Out	INV38_Out	INV28_In	INV28_TR	INV32_In
	30 dBA	29 dBA	28 dBA	28 dBA	28 dBA	26 dBA	25 dBA	25 dBA	25 dBA	24 dBA
	458 m	649 m	616 m	711 m	649 m	616 m	649 m	1379 m	922 m	994 m
RN19_o	INV39_Out	INV30_TR	INV38_In	INV31_In	INV38_TR	INV30_Out	INV31_Out	INV28_In	INV28_TR	INV32_In
	30 dBA	27 dBA	27 dBA	26 dBA	26 dBA	26 dBA	24 dBA	23 dBA	23 dBA	22 dBA
	428 m	588 m	648 m	684 m	648 m	588 m	684 m	1351 m	892 m	971 m
RN20_f	INV39_Out	INV30_TR	INV38_In	INV31_In	INV38_TR	INV30_Out	INV28_In	INV28_TR	INV38_Out	INV31_Out
	28 dBA	25 dBA	25 dBA	25 dBA	24 dBA	24 dBA	22 dBA	22 dBA	22 dBA	22 dBA
	503 m	693 m	758 m	797 m	758 m	693 m	1383 m	974 m	758 m	797 m
RN20_o	INV39_Out	INV30_TR	INV38_In	INV31_In	INV38_TR	INV30_Out	INV38_Out	INV28_In	INV28_TR	INV31_Out
	28 dBA	26 dBA	26 dBA	25 dBA	25 dBA	24 dBA	23 dBA	23 dBA	23 dBA	22 dBA
	480 m	664 m	733 m	768 m	733 m	664 m	733 m	1371 m	950 m	768 m
RN21_f	INV38_In	INV39_Out	INV38_TR	INV30_TR	INV31_In	INV38_Out	INV30_Out	INV28_TR	INV32_In	INV34_In
	24 dBA	24 dBA	23 dBA	23 dBA	23 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	818 m	654 m	818 m	840 m	940 m	818 m	840 m	1125 m	1224 m	1222 m

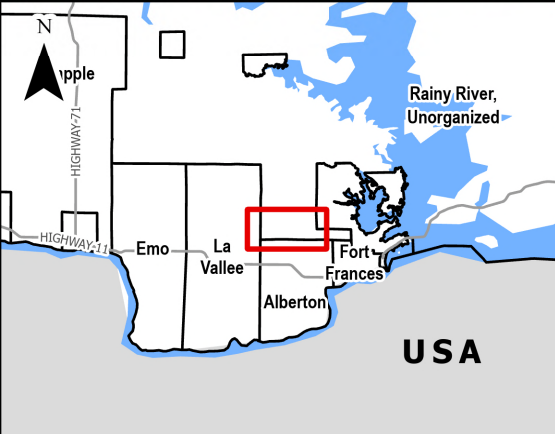
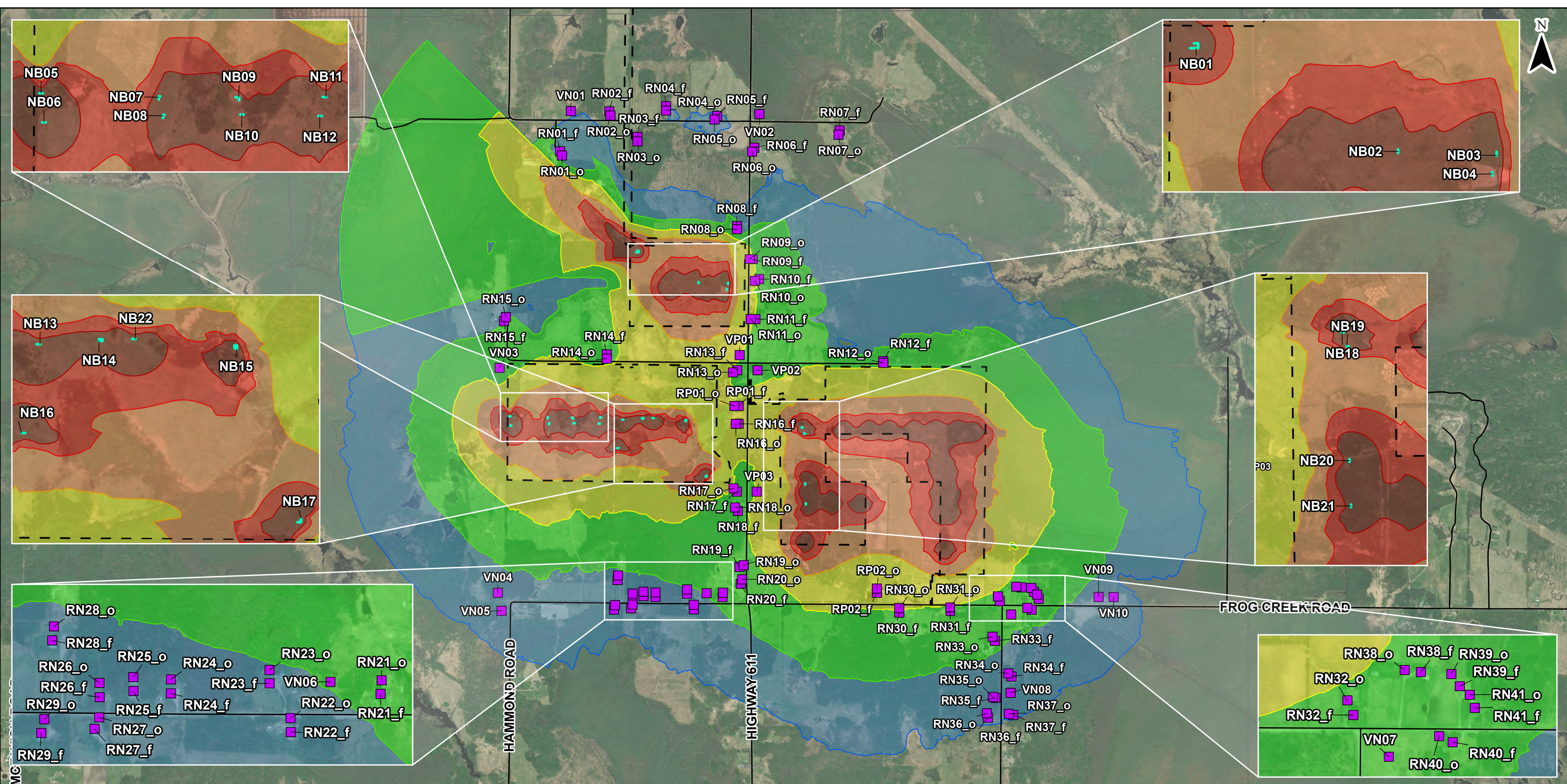
Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RN21_o	INV38_In	INV39_Out	INV38_TR	INV30_TR	INV31_In	INV38_Out	INV30_Out	INV28_TR	INV28_In	INV31_Out
	25 dBA	25 dBA	24 dBA	23 dBA	23 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA
	790 m	636 m	790 m	816 m	915 m	790 m	816 m	1106 m	1511 m	915 m
RN22_f	INV38_In	INV38_TR	INV39_Out	INV31_In	INV30_TR	INV38_Out	INV34_In	INV15_In	INV34_TR	INV14_In
	23 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA
	896 m	896 m	859 m	1124 m	1032 m	896 m	1196 m	1305 m	1196 m	1323 m
RN22_o	INV38_In	INV38_TR	INV39_Out	INV31_In	INV30_TR	INV38_Out	INV34_In	INV15_In	INV34_TR	INV14_In
	24 dBA	23 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	19 dBA	19 dBA	19 dBA
	866 m	866 m	844 m	1102 m	1012 m	866 m	1169 m	1275 m	1169 m	1294 m
RN23_f	INV38_In	INV38_TR	INV38_Out	INV31_In	INV34_In	INV30_TR	INV39_Out	INV15_In	INV34_TR	INV37_In
	25 dBA	24 dBA	22 dBA	21 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	798 m	798 m	798 m	1081 m	1082 m	999 m	850 m	1193 m	1082 m	1158 m
RN23_o	INV38_In	INV38_TR	INV38_Out	INV34_In	INV31_In	INV30_TR	INV39_Out	INV15_In	INV34_TR	INV14_In
	25 dBA	24 dBA	22 dBA	21 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	770 m	770 m	770 m	1056 m	1062 m	982 m	839 m	1165 m	1056 m	1183 m
RN24_f	INV38_In	INV38_TR	INV34_In	INV34_TR	INV38_Out	INV15_In	INV13_In	INV14_In	INV31_In	INV30_TR
	24 dBA	22 dBA	22 dBA	20 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA
	877 m	877 m	1031 m	1031 m	877 m	1194 m	1202 m	1198 m	1256 m	1185 m
RN24_o	INV38_In	INV38_TR	INV34_In	INV34_TR	INV38_Out	INV14_In	INV15_In	INV13_In	INV31_In	INV14_TR
	24 dBA	23 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA
	850 m	850 m	1002 m	1002 m	850 m	1168 m	1164 m	1173 m	1239 m	1168 m
RN25_f	INV38_In	INV38_TR	INV34_In	INV34_TR	INV13_In	INV38_Out	INV14_In	INV15_In	INV13_TR	INV08_In
	23 dBA	22 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA
	907 m	907 m	1010 m	1010 m	1186 m	907 m	1190 m	1190 m	1186 m	1315 m
RN25_o	INV38_In	INV38_TR	INV34_In	INV34_TR	INV38_Out	INV13_In	INV14_In	INV15_In	INV13_TR	INV14_TR
	24 dBA	22 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA
	881 m	881 m	980 m	980 m	881 m	1156 m	1161 m	1161 m	1156 m	1161 m
RN26_f	INV38_In	INV34_In	INV38_TR	INV34_TR	INV13_In	INV14_In	INV15_In	INV38_Out	INV13_TR	INV14_TR
	23 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA
	954 m	1013 m	954 m	1013 m	1193 m	1205 m	1210 m	954 m	1193 m	1205 m
RN26_o	INV38_In	INV34_In	INV38_TR	INV34_TR	INV13_In	INV14_In	INV15_In	INV38_Out	INV13_TR	INV14_TR
	23 dBA	22 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA
	928 m	983 m	928 m	983 m	1162 m	1175 m	1180 m	928 m	1162 m	1175 m
RN27_f	INV38_In	INV34_In	INV38_TR	INV34_TR	INV13_In	INV14_In	INV15_In	INV13_TR	INV14_TR	INV15_TR
	24 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	1017 m	1080 m	1017 m	1080 m	1260 m	1273 m	1278 m	1260 m	1273 m	1278 m
RN27_o	INV38_In	INV34_In	INV38_TR	INV34_TR	INV13_In	INV14_In	INV15_In	INV38_Out	INV13_TR	INV14_TR
	22 dBA	21 dBA	21 dBA	20 dBA	19 dBA	19 dBA	19 dBA	19 dBA	18 dBA	18 dBA
	991 m	1056 m	991 m	1056 m	1236 m	1248 m	1253 m	991 m	1236 m	1248 m
RN28_f	INV34_In	INV38_In	INV34_TR	INV38_TR	INV13_In	INV14_In	INV15_In	INV13_TR	INV38_Out	INV14_TR
	24 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	887 m	914 m	887 m	914 m	1070 m	1095 m	1107 m	1070 m	914 m	1095 m

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RN28_o	INV34_In	INV38_In	INV34_TR	INV38_TR	INV13_In	INV14_In	INV15_In	INV13_TR	INV38_Out	INV14_TR
	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	857 m	889 m	857 m	889 m	1040 m	1065 m	1077 m	1040 m	889 m	1065 m
RN29_f	INV34_In	INV38_In	INV34_TR	INV38_TR	INV13_In	INV14_In	INV15_In	INV36_In	INV13_TR	INV14_TR
	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	1085 m	1086 m	1085 m	1086 m	1269 m	1294 m	1305 m	1408 m	1269 m	1294 m
RN29_o	INV34_In	INV34_TR	INV13_In	INV14_In	INV15_In	INV38_In	INV13_TR	INV36_In	INV14_TR	INV38_TR
	21 dBA	20 dBA	19 dBA	19 dBA	19 dBA	18 dBA	18 dBA	18 dBA	18 dBA	18 dBA
	1056 m	1056 m	1239 m	1264 m	1275 m	1058 m	1239 m	1386 m	1264 m	1058 m
RN30_f	INV27_Out	INV26_In	INV42_In	INV28_In	INV28_TR	INV39_In	INV26_TR	INV42_TR	INV41_In	INV29_In
	28 dBA	27 dBA	27 dBA	27 dBA	27 dBA	27 dBA	26 dBA	26 dBA	26 dBA	26 dBA
	746 m	1010 m	764 m	511 m	787 m	796 m	746 m	764 m	869 m	787 m
RN30_o	INV27_Out	INV26_In	INV42_In	INV28_In	INV28_TR	INV26_TR	INV39_In	INV42_TR	INV41_In	INV29_In
	28 dBA	26 dBA	26 dBA	25 dBA	25 dBA	25 dBA	25 dBA	25 dBA	24 dBA	24 dBA
	718 m	982 m	737 m	488 m	759 m	718 m	779 m	737 m	841 m	759 m
RN31_f	INV27_Out	INV26_In	INV42_In	INV26_TR	INV41_In	INV42_TR	INV40_In	INV39_In	INV41_TR	INV28_In
	27 dBA	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA
	669 m	952 m	689 m	669 m	802 m	689 m	822 m	1087 m	802 m	399 m
RN31_o	INV27_Out	INV26_In	INV26_TR	INV42_In	INV41_In	INV40_In	INV42_TR	INV28_In	INV28_TR	INV41_TR
	32 dBA	27 dBA	26 dBA	26 dBA	25 dBA	23 dBA	23 dBA	23 dBA	23 dBA	23 dBA
	645 m	928 m	645 m	665 m	778 m	798 m	665 m	375 m	928 m	778 m
RN32_f	INV27_Out	INV26_In	INV42_In	INV26_TR	INV42_TR	INV41_In	INV40_In	INV41_TR	INV28_In	INV28_TR
	28 dBA	26 dBA	26 dBA	25 dBA	24 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	705 m	958 m	722 m	705 m	722 m	822 m	840 m	822 m	494 m	1146 m
RN32_o	INV27_Out	INV26_In	INV42_In	INV26_TR	INV42_TR	INV41_In	INV40_In	INV41_TR	INV40_TR	INV28_In
	29 dBA	27 dBA	26 dBA	25 dBA	25 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA
	672 m	924 m	689 m	672 m	689 m	788 m	806 m	788 m	806 m	464 m
RN33_f	INV26_In	INV42_In	INV27_Out	INV26_TR	INV41_In	INV40_In	INV42_TR	INV28_In	INV28_TR	INV41_TR
	25 dBA	25 dBA	25 dBA	24 dBA	24 dBA	23 dBA	23 dBA	21 dBA	21 dBA	21 dBA
	1199 m	949 m	930 m	930 m	1055 m	1075 m	949 m	684 m	1295 m	1055 m
RN33_o	INV27_Out	INV26_In	INV42_In	INV26_TR	INV42_TR	INV41_In	INV40_In	INV41_TR	INV39_In	INV40_TR
	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	19 dBA	19 dBA	18 dBA	18 dBA	18 dBA
	898 m	1167 m	917 m	898 m	917 m	1024 m	1043 m	1024 m	1417 m	1043 m
RN34_f	INV26_In	INV42_In	INV26_TR	INV27_Out	INV42_TR	INV41_In	INV40_In	INV28_In	INV28_TR	INV41_TR
	22 dBA	22 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA
	1459 m	1211 m	1192 m	1192 m	1211 m	1316 m	1336 m	946 m	1546 m	1316 m
RN34_o	INV26_In	INV42_In	INV26_TR	INV42_TR	INV27_Out	INV41_In	INV40_In	INV41_TR	INV25_In	INV40_TR
	20 dBA	20 dBA	19 dBA	18 dBA	17 dBA	16 dBA	16 dBA	15 dBA	15 dBA	15 dBA
	1432 m	1183 m	1165 m	1183 m	1165 m	1290 m	1309 m	1290 m	1505 m	1309 m
RN35_f	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV27_Out	INV28_In	INV28_TR	INV42_TR	INV41_TR
	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	19 dBA	18 dBA	18 dBA	18 dBA	18 dBA
	1569 m	1313 m	1423 m	1442 m	1294 m	1294 m	1035 m	1593 m	1313 m	1423 m

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RN35_o	INV26_In	INV42_In	INV26_TR	INV41_In	INV40_In	INV42_TR	INV27_Out	INV41_TR	INV25_In	INV28_In
	19 dBA	19 dBA	17 dBA	17 dBA	17 dBA	16 dBA	16 dBA	16 dBA	14 dBA	14 dBA
	1559 m	1303 m	1284 m	1413 m	1433 m	1303 m	1284 m	1413 m	1630 m	1024 m
RN36_f	INV26_In	INV42_In	INV26_TR	INV41_In	INV40_In	INV41_TR	INV27_Out	INV42_TR	INV28_In	INV28_TR
	18 dBA	18 dBA	16 dBA	16 dBA	16 dBA	14 dBA	14 dBA	14 dBA	13 dBA	13 dBA
	1689 m	1430 m	1411 m	1541 m	1561 m	1541 m	1411 m	1430 m	1147 m	1678 m
RN36_o	INV26_In	INV42_In	INV26_TR	INV41_In	INV40_In	INV27_Out	INV41_TR	INV42_TR	INV28_In	INV28_TR
	18 dBA	18 dBA	17 dBA	16 dBA	16 dBA	15 dBA	15 dBA	14 dBA	13 dBA	13 dBA
	1658 m	1400 m	1380 m	1511 m	1531 m	1380 m	1511 m	1400 m	1116 m	1649 m
RN37_f	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV27_Out	INV28_In	INV28_TR	INV29_In
	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA	18 dBA	18 dBA	17 dBA	17 dBA	16 dBA
	1708 m	1456 m	1564 m	1583 m	1437 m	1456 m	1437 m	1183 m	1755 m	1755 m
RN37_o	INV26_In	INV42_In	INV27_Out	INV26_TR	INV41_In	INV40_In	INV42_TR	INV41_TR	INV40_TR	INV25_In
	18 dBA	17 dBA	16 dBA	16 dBA	16 dBA	16 dBA	16 dBA	14 dBA	14 dBA	13 dBA
	1693 m	1440 m	1421 m	1421 m	1549 m	1568 m	1440 m	1549 m	1568 m	1765 m
RN38_f	INV26_In	INV42_In	INV26_TR	INV42_TR	INV27_Out	INV41_In	INV40_In	INV30_In	INV41_TR	INV40_TR
	25 dBA	25 dBA	24 dBA	23 dBA	23 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA
	944 m	737 m	722 m	737 m	722 m	822 m	838 m	1407 m	822 m	838 m
RN38_o	INV26_In	INV42_In	INV26_TR	INV27_Out	INV42_TR	INV41_In	INV40_In	INV30_In	INV41_TR	INV40_TR
	26 dBA	26 dBA	24 dBA	24 dBA	24 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA
	921 m	710 m	695 m	695 m	710 m	797 m	813 m	1373 m	797 m	813 m
RN39_f	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV25_In	INV27_Out	INV41_TR	INV40_TR
	25 dBA	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA
	1016 m	817 m	898 m	914 m	803 m	817 m	1090 m	803 m	898 m	914 m
RN39_o	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV27_Out	INV25_In	INV41_TR	INV40_TR
	25 dBA	24 dBA	23 dBA	23 dBA	23 dBA	23 dBA	22 dBA	22 dBA	22 dBA	21 dBA
	984 m	786 m	867 m	882 m	772 m	786 m	772 m	1058 m	867 m	882 m
RN40_f	INV26_In	INV27_Out	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV41_TR	INV40_TR	INV30_In
	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	19 dBA
	1107 m	878 m	893 m	982 m	999 m	878 m	893 m	982 m	999 m	1534 m
RN40_o	INV27_Out	INV26_In	INV42_In	INV26_TR	INV42_TR	INV41_In	INV40_In	INV30_In	INV41_TR	INV28_In
	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA
	849 m	1081 m	865 m	849 m	865 m	955 m	971 m	1502 m	955 m	667 m
RN41_f	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV25_In	INV27_Out	INV41_TR	INV40_TR
	24 dBA	24 dBA	22 dBA	22 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA
	1072 m	872 m	954 m	970 m	858 m	872 m	1146 m	858 m	954 m	970 m
RN41_o	INV26_In	INV42_In	INV27_Out	INV42_TR	INV41_In	INV40_In	INV26_TR	INV25_In	INV41_TR	INV40_TR
	24 dBA	24 dBA	24 dBA	22 dBA	22 dBA	22 dBA	22 dBA	22 dBA	21 dBA	20 dBA
	1043 m	845 m	831 m	845 m	926 m	941 m	831 m	1117 m	926 m	941 m
RP01_f	INV37_Out	INV38_In	INV33_Out	INV32_Out	INV38_Out	INV31_In	INV15_Out	INV14_Out	INV31_Out	INV33_TR
	32 dBA	30 dBA	29 dBA	28 dBA	27 dBA	26 dBA	26 dBA	24 dBA	24 dBA	24 dBA
	367 m	517 m	449 m	477 m	517 m	686 m	576 m	647 m	686 m	449 m

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
RP01_o	INV37_Out	INV38_In	INV33_Out	INV32_Out	INV38_Out	INV15_Out	INV31_In	INV14_Out	INV31_Out	INV33_TR
	33 dBA	30 dBA	28 dBA	28 dBA	28 dBA	27 dBA	26 dBA	25 dBA	23 dBA	23 dBA
	339 m	504 m	476 m	504 m	504 m	547 m	704 m	618 m	704 m	476 m
RP02_f	INV39_In	INV28_In	INV28_TR	INV39_TR	INV27_Out	INV29_In	INV26_In	INV42_In	INV29_TR	INV30_In
	28 dBA	28 dBA	28 dBA	27 dBA	27 dBA	26 dBA	26 dBA	26 dBA	26 dBA	25 dBA
	599 m	533 m	621 m	599 m	712 m	621 m	947 m	728 m	684 m	684 m
RP02_o	INV39_In	INV28_In	INV28_TR	INV39_TR	INV29_In	INV26_In	INV42_In	INV29_TR	INV30_In	INV26_TR
	28 dBA	28 dBA	28 dBA	28 dBA	27 dBA	26 dBA	26 dBA	26 dBA	26 dBA	25 dBA
	582 m	520 m	593 m	582 m	593 m	922 m	706 m	658 m	658 m	691 m
VN01	ST01	INV01_In	INV01_TR	INV03_In	INV03_TR	INV04_In	INV05_In	INV02_Out	INV04_TR	INV06_In
	23 dBA	16 dBA	16 dBA	16 dBA	15 dBA	15 dBA	15 dBA	14 dBA	14 dBA	14 dBA
	1040 m	1326 m	1326 m	1428 m	1428 m	1504 m	1558 m	1344 m	1504 m	1583 m
VN02	ST01	INV02_In	INV05_Out	INV02_TR	INV03_Out	INV04_Out	INV06_Out	INV01_Out	INV03_TR	INV06_In
	21 dBA	17 dBA	16 dBA	16 dBA	16 dBA	16 dBA	16 dBA	15 dBA	8 dBA	8 dBA
	1224 m	1321 m	1152 m	1321 m	1199 m	1214 m	1193 m	1272 m	1199 m	1193 m
VN03	INV35_Out	INV07_In	INV08_In	INV07_TR	INV36_Out	INV08_TR	INV35_In	INV09_In	INV10_In	INV09_TR
	33 dBA	33 dBA	32 dBA	32 dBA	31 dBA	31 dBA	30 dBA	30 dBA	29 dBA	29 dBA
	334 m	463 m	498 m	463 m	396 m	498 m	334 m	592 m	622 m	592 m
VN04	INV08_In	INV07_In	INV10_In	INV09_In	INV12_In	INV08_TR	INV11_In	INV07_TR	INV10_TR	INV13_In
	22 dBA	22 dBA	22 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA
	1183 m	1218 m	1241 m	1272 m	1317 m	1183 m	1356 m	1218 m	1241 m	1426 m
VN05	INV08_In	INV07_In	INV10_In	INV09_In	INV12_In	INV11_In	INV08_TR	INV07_TR	INV10_TR	INV09_TR
	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	19 dBA
	1292 m	1328 m	1343 m	1375 m	1410 m	1450 m	1292 m	1328 m	1343 m	1375 m
VN06	INV38_In	INV38_TR	INV31_In	INV30_TR	INV39_Out	INV38_Out	INV34_In	INV28_TR	INV28_In	INV15_In
	27 dBA	26 dBA	24 dBA	24 dBA	24 dBA	23 dBA	23 dBA	22 dBA	22 dBA	22 dBA
	785 m	785 m	987 m	897 m	732 m	785 m	1141 m	1201 m	1620 m	1222 m
VN07	INV26_In	INV42_In	INV27_Out	INV26_TR	INV42_TR	INV41_In	INV40_In	INV41_TR	INV40_TR	INV28_In
	26 dBA	26 dBA	26 dBA	25 dBA	24 dBA	24 dBA	24 dBA	22 dBA	22 dBA	21 dBA
	1070 m	838 m	821 m	821 m	838 m	935 m	954 m	935 m	954 m	610 m
VN08	INV26_In	INV42_In	INV41_In	INV40_In	INV26_TR	INV42_TR	INV27_Out	INV28_In	INV28_TR	INV41_TR
	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	18 dBA	18 dBA	18 dBA
	1562 m	1311 m	1418 m	1438 m	1292 m	1311 m	1292 m	1042 m	1627 m	1418 m
VN09	INV26_In	INV42_In	INV41_In	INV40_In	INV25_In	INV26_TR	INV42_TR	INV30_In	INV24_In	INV41_TR
	22 dBA	22 dBA	22 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	20 dBA	20 dBA
	1338 m	1186 m	1247 m	1258 m	1408 m	1176 m	1186 m	1910 m	1510 m	1247 m
VN10	INV26_In	INV42_In	INV41_In	INV40_In	INV25_In	INV26_TR	INV42_TR	INV24_In	INV41_TR	INV40_TR
	21 dBA	21 dBA	21 dBA	21 dBA	20 dBA	20 dBA	20 dBA	19 dBA	19 dBA	19 dBA
	1416 m	1274 m	1331 m	1342 m	1486 m	1265 m	1274 m	1583 m	1331 m	1342 m
VP01	INV06_Out	INV05_Out	INV04_Out	INV02_In	INV06_In	INV02_TR	INV03_Out	INV05_In	INV37_Out	INV38_In
	30 dBA	29 dBA	29 dBA	29 dBA	28 dBA	28 dBA	27 dBA	27 dBA	27 dBA	26 dBA
	446 m	484 m	488 m	664 m	446 m	664 m	557 m	484 m	567 m	838 m

Receptor ID	Top Noise Sources									
	1	2	3	4	5	6	7	8	9	10
VP02	INV33_Out	INV32_Out	INV38_In	INV37_Out	INV02_In	INV31_In	INV06_Out	INV02_TR	INV05_Out	INV06_In
	29 dBA	28 dBA	27 dBA	26 dBA	26 dBA	26 dBA	24 dBA	24 dBA	24 dBA	24 dBA
	484 m	526 m	785 m	586 m	821 m	823 m	577 m	821 m	613 m	577 m
VP03	INV31_In	INV38_In	INV30_TR	INV38_TR	INV31_Out	INV30_Out	INV38_Out	INV32_In	INV33_In	INV32_TR
	36 dBA	35 dBA	35 dBA	34 dBA	34 dBA	33 dBA	33 dBA	32 dBA	31 dBA	31 dBA
	330 m	354 m	341 m	354 m	330 m	341 m	354 m	502 m	526 m	502 m



**LEGEND**

- Point of Reception
- Noise Barrier
- Road
- Project Location

**Noise Contour (dBA)**

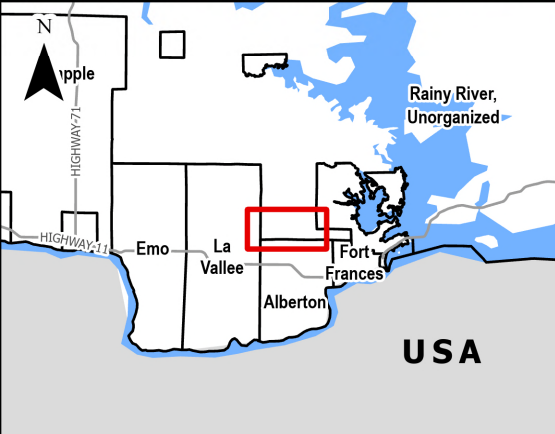
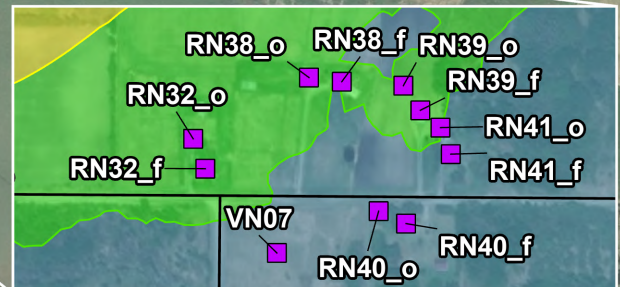
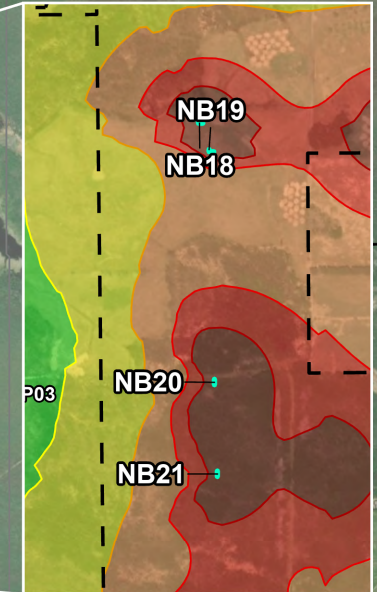
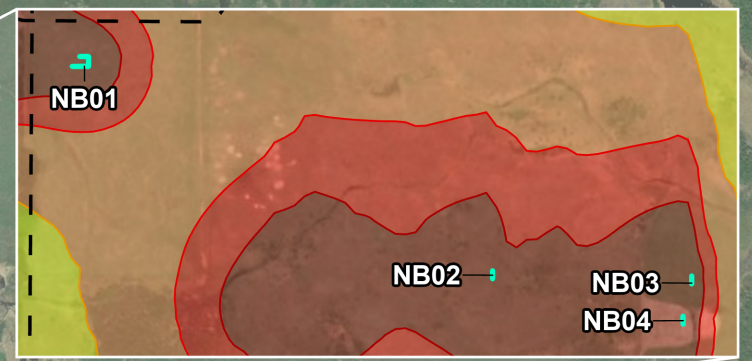
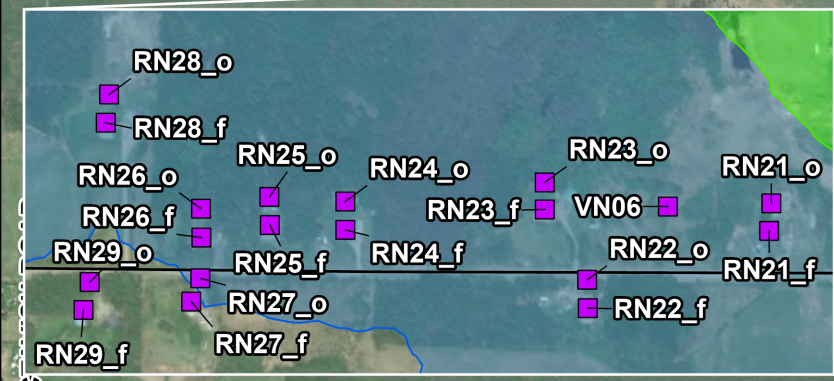
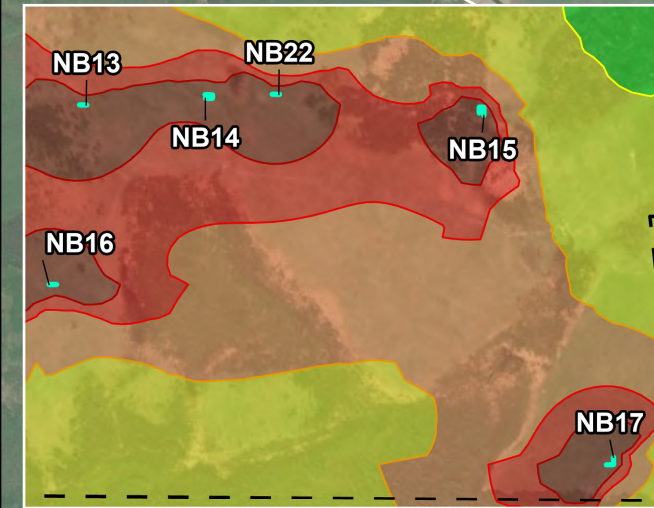
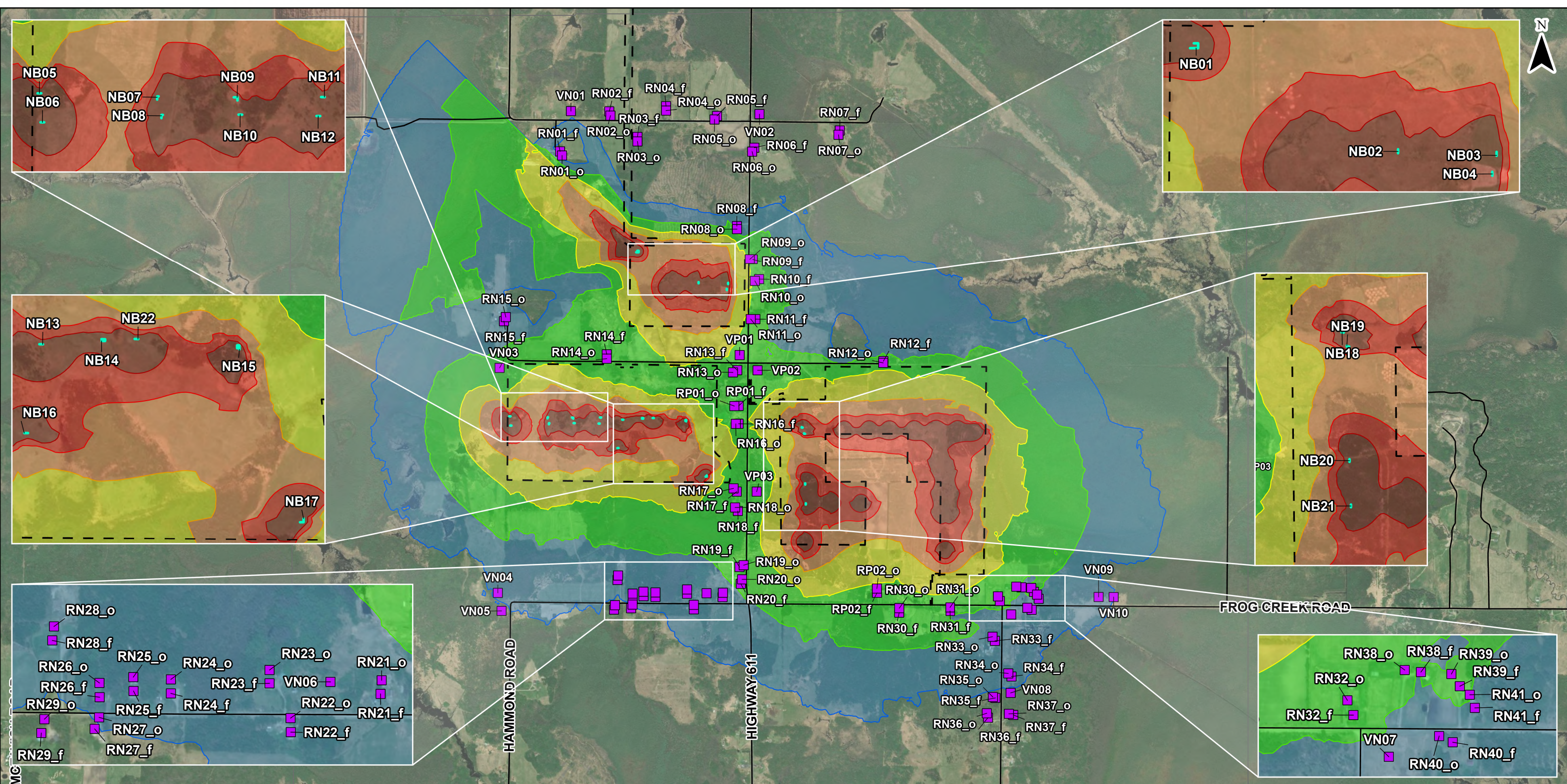
30-35	35-40	40-45	45-50	50-55	>55
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**NOTES:**

- Produced by Hatch, contains information licensed under the Open Government Licence – Ontario
- Spatial referencing: NAD 1983 UTM Zone 15N
- Noise contour was generated based on a 10 x 10m grid at a 4.5m elevation above ground

0 250 500 1,000  
 1:25,000 m

<b>PROJECT:</b> Acoustic Assessment Report Fort Frances Solar Project	
<b>FIGURE TITLE:</b> Noise Contours at 4.5m Above Ground	
<b>CLIENT:</b> CarbonFree Fort Frances LTD	
<b>DWG BY:</b> V. BAXTER	<b>CHK BY:</b> M. ANDARGIE
<b>DATE:</b> 29/05/26	<b>PAGE:</b> 1
<b>FIG NO.:</b> 2	<b>REV NO.:</b> 1
<b>HATCH</b>	



**LEGEND**

- Point of Reception
- Noise Barrier
- Road
- Project Location

**Noise Contour (dBA)**

30-35	35-40	40-45	45-50	50-55	>55
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**NOTES:**

- Produced by Hatch, contains information licensed under the Open Government Licence – Ontario
- Spatial referencing: NAD 1983 UTM Zone 15N
- Noise contour was generated based on a 10 x 10m grid at a 1.5m elevation above ground


0 250 500 1,000  
1:25,000 m

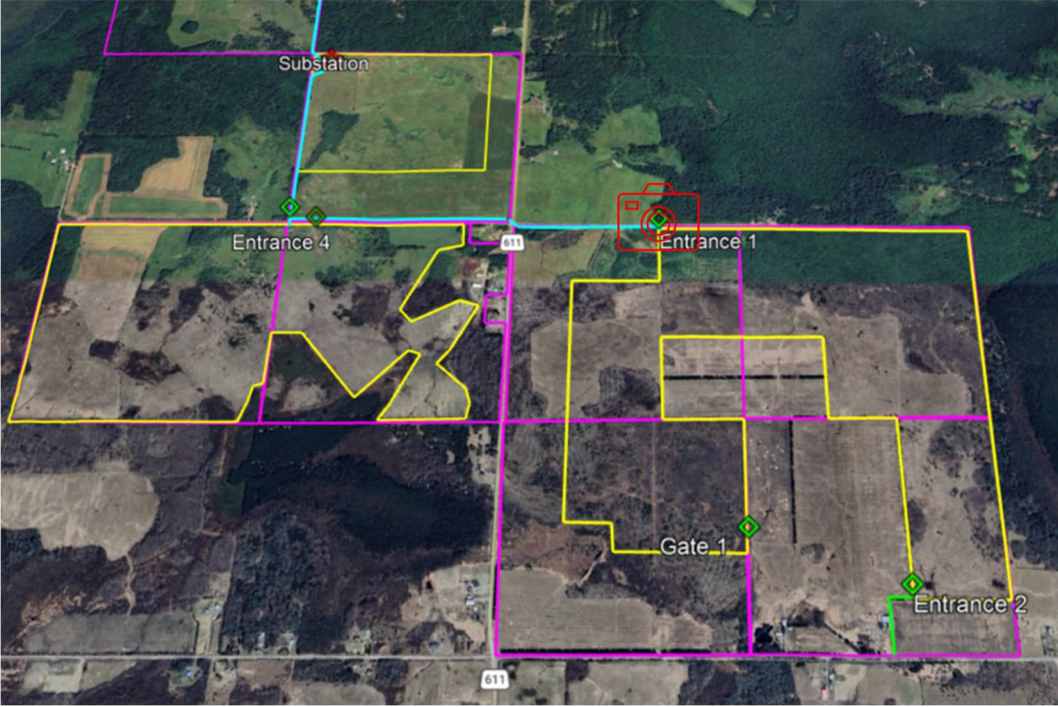
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<b>FIGURE TITLE:</b> Noise Contours at 1.5m Above Ground			
<b>CLIENT:</b> CarbonFree Fort Frances LTD			
<b>DWG BY:</b> V. BAXTER	<b>CHK BY:</b> M. ANDARGIE	<b>FIG NO.:</b> 3	<b>REV NO.:</b> 1
<b>DATE:</b> 29/05/26	<b>PAGE:</b> 1	<b>HATCH</b>	

# Appendix E

## Foliage Description

**Forest Images**

**Image 1** Location of road level pictures @ **RN12**: 



**Image 2** - Roadside view of forest line at Receptor **RN12** looking east on Kliner rd.

Forest on the solar side of the road is characterized by young (<20 yrs) second growth, pioneer deciduous species in very dense (5,000/Ha) growth pattern at 30' height.



**Image 3** - Receptor **RN 12** – looking west on Kliner Road

Forest on the receptor side of the road is characterized by mature, coniferous, dense trees predominated by white spruce, black spruce and white pine (approximately 1,000/Ha). Canopy height deciduous trees of poplar and birch species are intermixed with the conifers at 50 ft+ height.



**Image 4** – forest edge view looking east on Kliner Road 400 m west of **RN12**

Marked by second growth, young forest in the south (project) side and mature growth on the north side.



**Image 5** – Overhead view of **RN 12** oriented North (July 2024)

Showing the very dense growth of the second growth forest on the south side of Kliner Road and the mature forest canopy on the north side.



**Image 6** – Northwest remnant forest adjacent to **RN01**

Forest area is characterized as a mature mixed-wood remnant forest predominated by poplar, birch, white pine and white spruce species.



**Image 7 - Forest at north of project surrounding RN08**

Characterized by mature, mixed wood, continuous canopy forest area with limited wetland and rock outcrop areas predominated by poplar, birch, white pine, black and white spruce species.



**Image 8a – Forest at west of north array near RN14-15 (two images)**

Forest area is characterized as mixed maturity on the east side and mature on the south west side, with prominent wetlands interspersed amongst upland forest area. Species include poplar, birch, white cedar, pine and spruce species.



**Image 8b** – July 2025 of south side mature hardwood (poplar, birch) forest **RN14-15**



# Appendix F

## Acoustic Assessment Report Checklist

## ACOUSTIC ASSESSMENT REPORT CHECK-LIST


Company Name: CarbonFree Fort Frances Ltd.

Company Address: 1 St Clair Ave W#801  
Toronto, Ontario M4T 1Y5

Location of Facility: Fort Frances, Ontario

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:	<u>Doug Deeks</u>
Name:	<u>Doug Deeks</u>
Title:	<u>Vice President - Projects</u>
Phone Number:	<u>647-608-9680</u>
Signature:	_____
Date:	_____

Technical Contact:	<u>Hatch Ltd</u>
Name:	<u>Mervyn Choy</u>
Representing:	<u>Hatch Ltd.</u>
Phone Number:	<u>289-326-2740</u>
Signature:	 _____
Date:	<u>May 29, 2026</u>

## 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	<a href="#">Section 1</a>
<b>2.0</b>	<b>Facility Description</b>		
	2.1 Operating hours of facility and significant Noise Sources	<input checked="" type="checkbox"/> Yes	<a href="#">Section 2</a>
	2.2 Site Plan identifying all significant Noise Sources	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix B</a>
<b>3.0</b>	<b>Noise Source Summary</b>		
	3.1 <b>Noise Source Summary Table</b>	<input checked="" type="checkbox"/> Yes	<a href="#">Table 3-4</a>
	3.2 Source noise emissions specifications	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix C</a>
	3.3 Source power/capacity ratings	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix C</a>
	3.4 Noise control equipment description and acoustical specifications	<input type="checkbox"/> Yes	<a href="#">Section 5</a>
<b>4.0</b>	<b>Point of Reception Noise Impact Calculations</b>		
	4.1 <b>Point of Reception Noise Impact Table</b>	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix D</a>
	4.2 Point(s) of Reception (POR) list and description	<input checked="" type="checkbox"/> Yes	<a href="#">Table 4-1</a>
	4.3 Land-use Zoning Plan	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix A</a>
	4.4 Scaled Area Location Plan	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix A / B</a>
	4.5 Procedure used to assess noise impacts at each POR	<input checked="" type="checkbox"/> Yes	<a href="#">Section 7.1</a>
	4.6 List of parameters/assumptions used in calculations	<input checked="" type="checkbox"/> Yes	<a href="#">Section 7.1</a>
<b>5.0</b>	<b>Acoustic Assessment Summary</b>		
	5.1 <b>Acoustic Assessment Summary Table</b>	<input checked="" type="checkbox"/> Yes	<a href="#">Table 7-2</a>
	5.2 Rationale for selecting applicable noise guideline limits	<input checked="" type="checkbox"/> Yes	<a href="#">Section 5</a>
	5.3 Predictable Worst Case Impacts Operating Scenario	<input checked="" type="checkbox"/> Yes	<a href="#">Section 7.2</a>
<b>6.0</b>	<b>Conclusions</b>		
	6.1 Statement of compliance with the selected noise performance limits	<input checked="" type="checkbox"/> Yes	<a href="#">Section 8</a>
<b>7.0</b>	<b>Appendices</b> (Provide details such as)	<input checked="" type="checkbox"/> Yes	
	Listing of Insignificant Noise Sources	<input checked="" type="checkbox"/> Yes	<a href="#">Section 3</a>
	Manufacture's Noise Specifications	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix C</a>
	Calculations	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix C</a>
	Instrumentation	<input type="checkbox"/> Yes	n/a
	Meteorology during Sound Level Measurements	<input type="checkbox"/> Yes	n/a
	Raw Data from Measurements	<input type="checkbox"/> Yes	n/a
	Drawings (Facility / Equipment)	<input checked="" type="checkbox"/> Yes	<a href="#">Appendix B</a>