



**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

File No. 161011028  
July 5, 2013

Prepared for:

**Saturn Power Inc.**  
100 Mill Street, Unit F  
New Hamburg ON N3A 2K6

Prepared by:

**Stantec Consulting Ltd.**  
300-675 Cochrane Drive, West Tower  
Markham, ON L3R 0B8

July 5, 2013



## Version Control

### David Brown Solar Park Acoustic Assessment Report

VERSION	DATE	DESCRIPTION	PREPARED BY
1	January 29, 2013	Acoustic assessment in support of an application for REA application with selected equipment units	Kana Ganesh and Keni Mallinen
2	JULY 5, 2013	As above and revised to include adjacent solar farms in response to comments received from MOE June 20, 2013.	Kana Ganesh





## **Executive Summary**

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Stantec Consulting Ltd. has been retained by Saturn Power Inc. (Saturn) to prepare an acoustic assessment report for a proposed 10 MW solar energy generation facility known as the David Brown Solar Park. The Facility will be located within the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario. The project site spans approximately 140 acres of land bounded by Highway 401 to the north, a Canadian National (CN) Railway corridor to the south, Dickinson Drive to the East and the extension of Farrans Point Road to the west. This acoustic assessment report has been prepared in support of an application for a Renewable Energy Approvals (REA) in accordance with Ontario Regulation 359/09.

This acoustic assessment report was prepared in accordance with the MOE documents “Supporting Information for the Preparation of an Acoustic Assessment Report, November 2003; Basic Comprehensive Certificate of Approval, April 2004 and subsequent amendments”.

The Facility layout, the main noise sources of concern and sound power levels were determined based on the information provided by planners and equipment manufacturer. The source sound power levels were used as an input to prediction model based on ISO – 9613 standard. The model considers sound emission under predictable worst-case operating conditions to quantify the noise emissions from the Facility. The resulting sound levels at the sensitive points of reception were assessed for compliance against assessment criteria that was established following the guidelines provided in MOE publications NPC-232.

The assessment indicated that the sound contribution from the proposed Facility during the predictable worst case operation will be within the MOE noise criteria without requiring additional noise control.



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**ACOUSTIC ASSESSMENT REPORT CHECK-LIST**

Company Name: **Saturn Power Inc.**

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Company Address: **100 Mill Street, Unit F**

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**New Hamburg, Ontario**

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Location of Facility: **Plan 279, Part Block A, Part Lots 20 to 24, Concession 2**

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**Township of South Stormont, Ontario**

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

**Company Contact**

Name: **David Patterson**

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Title: **Commercial Development Manager**

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Phone Number: **(519) 804-9163**

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Signature: 

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Date: **January 29/2015**

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**Technical Contact**

Name: **Julia Kossowski**


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Title: **Project Manager**

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Phone Number: **(519) 569-4338**

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Signature: 

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Date: **Jan 29/2013**

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*Recreated from MOE Publication PIBS 5356e*

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

**ACOUSTIC ASSESSMENT REPORT CHECKLIST**

	Required Information	Submitted	Explanation/Reference
<b>1.0</b>	<b>Introduction</b> (Project Background and Overview)	<input checked="" type="checkbox"/> Yes	Section 1.0
<b>2.0</b>	<b>Facility Description</b>		
	2.1 Operating hours of facility and significant Noise Sources	<input checked="" type="checkbox"/> Yes	Section 2.0
	2.2 Site Plan identifying all significant Noise Sources	<input checked="" type="checkbox"/> Yes	Figure 2.1
<b>3.0</b>	<b>Noise Source Summary</b>		
	3.1 <b>Noise Source Summary Table</b>	<input checked="" type="checkbox"/> Yes	Table 3.1
	3.2 Source noise emissions specifications	<input checked="" type="checkbox"/> Yes	Appendix B
	3.3 Source power/capacity ratings	<input checked="" type="checkbox"/> Yes	Appendix B
	3.4 Noise control equipment description and acoustical specifications	<input checked="" type="checkbox"/> Yes	N/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	Table 6.1
	4.2 Point(s) of Reception (POR) list and description	<input checked="" type="checkbox"/> Yes	Section 4.0/ Appendix C
	4.3 Land-use Zoning Plan	<input checked="" type="checkbox"/> Yes	Appendix A
	4.4 Scaled Area Location Plan	<input checked="" type="checkbox"/> Yes	Figure 1.1
	4.5 Procedure used to assess noise impacts at each POR	<input checked="" type="checkbox"/> Yes	Section 6.0
	4.6 List of parameters/assumptions used in calculations	<input checked="" type="checkbox"/> Yes	Section 6.1, 6.2
<b>5.0</b>	<b>Acoustics Assessment Summary</b>		
	5.1 <b>Acoustic Assessment Summary Table</b>	<input checked="" type="checkbox"/> Yes	Section 6.0, Table 6.2 & Appendix F
	5.2 Rationale for selecting applicable noise guideline limits	<input checked="" type="checkbox"/> Yes	Section 5.0
	5.3 Predictable Worst Case Impacts Operating Scenario	<input checked="" type="checkbox"/> Yes	Section 2.3, 6.2
<b>6.0</b>	<b>Conclusions</b>		
	Statement of compliance with the selected noise performance limits	<input checked="" type="checkbox"/> Yes	Section 7.0
<b>7.0</b>	<b>Appendices</b> (Provide details such as)		
	Listing of Insignificant Noise Sources	<input type="checkbox"/> Yes	Not Applicable
	Manufacturer's Noise Specifications	<input checked="" type="checkbox"/> Yes	Appendix B
	Calculations	<input checked="" type="checkbox"/> Yes	Appendix E
	Instrumentation	<input checked="" type="checkbox"/> Yes	Not Applicable
	Meteorology during Sound Level Measurements	<input type="checkbox"/> Yes	Not Applicable
	Raw Data from Measurements	<input type="checkbox"/> Yes	Not Applicable
	Drawings (Facility / Equipment)	<input checked="" type="checkbox"/> Yes	Appendix B

*Recreated from MOE Publication PIBS 5356e*

## **1.0 Introduction**

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Stantec Consulting Ltd. (Stantec) was retained by Saturn Power Inc. (Saturn) to conduct an acoustic assessment for a proposed 10 MW solar energy generation facility (the Facility). This acoustic assessment report has been prepared in support of Saturn's application for the Renewable Energy Approvals (REA) process.

The Facility will be located on approximately 140 acres of land bounded by Highway 401 to the north, the Canadian National (CN) Railway to the south, Dickinson Drive to the east and the extension of Farrans Point road to the west. The project site is situated on Plan 279, Part Block A, Part Lots 20 to 24, Concession 2, Township of South Stormont, and United Counties of Stormont, Dundas and Glengarry. An area map showing the site location is provided in **Figure 1.1**. A zoning map of the area surrounding the Facility is provided in **Appendix A**.

The subject land is zoned general industrial while the immediate surrounding areas are zoned heavy and medium industrial, flood plain and development reserve. The lands to the north of the 401 are zoned rural, agricultural and flood plain. The area's acoustical environment can be best described as a combination of Class 2 (suburban) and Class 3 (Rural) in accordance with the MOE publications NPC-205 and NPC-232.

This assessment considers 719 receptors with approximately 80 receptors within a setback of 1 km of the Facility property line.

### **1.1 BACKGROUND**

The Ontario Regulation 359/09 made under *Environmental Protection Act* (Renewable Energy Approvals ["REA"] under Part V.0.1 of the Act), stipulates current requirements for renewable energy projects under the REA process. According to the project classification provided under Section 4 of the O.Reg 359/09, all ground mounted solar facilities with a name plate capacity greater than 10 kW will require a noise study report to support REA approvals. Section 13 of the O.Reg 359/09 requires that such noise studies for Class 3 facilities should be conducted in accordance with "*Basic Comprehensive Certificate of Approval, April 2004 and subsequent amendments*".

This acoustic assessment report is prepared based on the requirements described in current MOE noise forms and guidelines including the following documents:

- NPC-233, Information to be Submitted for Approval of Stationary Sources of Sound, October 1995;
- Basic Comprehensive Certificates of Approval, User Guide v2.0, Appendix A, "Supporting Information to be Submitted for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A", April 2004;

- NPC-205, Sound Level limits for stationary sources in Class 1 & 2 Areas; and,
- NPC-232, Sound Level limits for stationary sources in Class 3 (rural) areas.





- ### Legend
- Subject Property
  - Project Location
  - 120 m Zone of Investigation
  - Other Solar Farms
  - Transmission Line
  - Construction Laydown Area
  - Potential Constructable Area
  - Inverter Station
  - Fence
  - Access Road
  - Communication Tower
  - Proposed Distribution Line
  - Transformer Substation
  - Solar Panel
  - Point of Common Coupling

- ### Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
  2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
  3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



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Client/Project  
Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
1.1

Title  
**Area Map of  
David Brown Solar Park**





## **2.0 Facility Description**

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### **2.1 FACILITY LAYOUT**

As discussed, the David Brown Solar Park (solar park) is to be located between Highway 401 and the CN rail way, bounded on the east by Dickinson Drive and to the west by the extension of Farrens Point Road in the Township of South Stormont. A zoning plan and site plan of the facility are provided in **Appendix A**.

The Facility and its surrounding lands are zoned general and heavy industrial, flood plain, development reserve, rural and agricultural. The closest receptor is located to the south of the Facility (POR001) and is located approximately 185 m from the nearest facility equipment. An area map showing the Facility location and property boundaries are provided in **Figure 1.1**.

### **2.2 FACILITY DESCRIPTION**

The proposed site consists of approximately 140 acres of land (the foot print of the project is about 83 acres). The solar park will have a nameplate capacity of 10 MW and will consist of photovoltaic modules/panels. Panels would be installed on galvanized steel racks in rows, in an angle to capture optimal sunlight. The orientations of these panels are not expected to contribute to the sound propagation. The generated electrical power from these panels will be routed through inverters and transformers, which are considered noise sources at the Facility.

The facility will include 10 inverter-transformer units; each station is expected to serve to a cluster of solar panels around the stations. Each station will include two inverters, which will be housed inside enclosures. The sound from ventilation fans (if any), is considered insignificant compared to the inverter units. A 1 MVA step-up transformer associated with each station will be located just outside the inverter housing. One large 10 MVA transformer will also be located on-site at the transformer substation.

### **2.3 OPERATING SCENARIO**

The solar farm will operate throughout the year during the daylight hours; due to extended daylight hours during summer months, the facility could operate outside guideline daytime period, (i.e. 7:00am to 7:00pm). The facility is expected to operate 7 days a week throughout the year. The sources of noise are as described above (inverter stations and a transformer substation) and will be located within the property boundary. It was conservatively assumed that all equipment units will operate at full rated capacity during the predictable worst case hour.







- ### Legend
- Subject Property
  - Project Location
  - 120 m Zone of Investigation
  - Source
  - Construction Laydown Area
  - Potential Constructable Area
  - Inverter Station
  - Fence
  - Access Road
  - Communication Tower
  - Proposed Distribution Line
  - Transformer Substation
  - Solar Panel

- ### Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
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  3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



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Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
**2.1**

Title  
**Source Locations at  
David Brown Solar Park**





## 3.0 Noise Source Summary

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### 3.1 NOISE SOURCES

The noise sources for the Facility are the inverter units (10 units) and a substation (one substation). As discussed, the inverters will be housed inside an enclosure and the transformer associated with each station is to be located near the enclosure. Depending on the orientation of the enclosure, it is expected that the enclosure will provide some shielding to the transformer. However, this assessment conservatively assumes that enclosures provide no attenuation to inverters or transformers. In other words, the assessment considers inverters and transformers will be placed outside without the benefit of enclosures. Thus the Facility's dominant noise sources would consist of noise radiating from:

- Twenty (20) inverters – each of the ten (10) units will have two 500KW (Advanced Energy Solaron 500W) inverters inside an enclosure (it is conservatively assumed no attenuation is provided from the structure in the model);
- Ten (10) transformers rated at 1 MVA; one at each of the ten (10) inverter units; and,
- One (1) transformer rated at 10 MVA at the transformer substation.

Make and model of the units have not been selected at this stage of the design for this project and therefore assumptions have been made to estimate the potential impact at nearby receptors. Sound levels for the inverters were based on a conservative level from equipment manufacturer submittals from previous projects (Advanced Energy Solaron 500W). The sound level for the transformers was based on the provided rating, dimensional data from similar projects and engineering calculations. Each of the twenty (20) inverter units is represented with an overall sound power level of 92 dBA (87 dBA representing the 2 inverters + 5dB for tonality) and associated transformer is represented with a sound power level of 86 dBA (rated at 81 dBA +5 dB for tonality). The sound power level for the 10 MVA transformer was estimated 97 dBA (rated at 92 + 5dB for tonality). The equipment specifications and data are provided in **Appendix B** along with the transformer calculations. As discussed, all sources (inverters, step-up transformers and substation transformer) include a tonal penalty as per MOE's requirements.

As mentioned the solar panels would be installed in arrays at a height of approximately 1 metre or more and will be installed at an angle. Therefore, the lower portions of these noise sources are expected to be shielded by the solar panels. However, the assessment does not consider the shielding provided by these panels for conservatism.

The sources discussed above for this Facility are summarized in the Noise Source Summary Table (**Table 3.1**) and illustrated in **Figure 2.1**. The table also provides the approximate UTM coordinates of each inverter unit (taken as the centre of the pad) and the transformer substation. All sources are assumed to have continuous, steady sound emissions when operating.

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ACOUSTIC ASSESSMENT REPORT**

Noise Source Summary

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**Table 3.1: Noise Source Summary Table**

Source ID	Coordinates (m)			Source Type <sup>1</sup>	Source Description	Sound Power Level (dBA)	Source Location (I/O) <sup>2</sup>	Sound Character <sup>3</sup> <sub>5</sub>	Noise Control Measures <sup>4</sup>
	X	Y	Z						
INV_1	499852	4983839	83	P	Inverter Unit 1	92	O	T	U
INV_2	499554	4983725	83	P	Inverter Unit 2	92	O	T	U
INV_3	499410	4983646	84	P	Inverter Unit 3	92	O	T	U
INV_4	499262	4983554	84	P	Inverter Unit 4	92	O	T	U
INV_5	499271	4983434	84	P	Inverter Unit 5	92	O	T	U
INV_6	499428	4983516	84	P	Inverter Unit 6	92	O	T	U
INV_7	499593	4983605	83	P	Inverter Unit 7	92	O	T	U
INV_8	499738	4983688	83	P	Inverter Unit 8	92	O	T	U
INV_9	499873	4983759	83	P	Inverter Unit 9	92	O	T	U
INV_10	500055	4983857	83	P	Inverter Unit 10	92	O	T	U
SUBS	500025	4983898	83	P	Transformer Substation	97	O	T	U
T_01	499856	4983839	82	P	Step Up Transformer 1	86	O	T	U
T_02	499558	4983727	82	P	Step Up Transformer 2	86	O	T	U
T_03	499414	4983647	83	P	Step Up Transformer 3	86	O	T	U
T_04	499266	4983556	83	P	Step Up Transformer 4	86	O	T	U
T_05	499268	4983432	83	P	Step Up Transformer 5	86	O	T	U
T_06	499424	4983514	83	P	Step Up Transformer 6	86	O	T	U
T_07	499588	4983604	82	P	Step Up Transformer 7	86	O	T	U
T_08	499735	4983686	82	P	Step Up Transformer 8	86	O	T	U
T_09	499869	4983757	82	P	Step Up Transformer 9	86	O	T	U
T_10	500051	4983856	82	P	Step Up Transformer 10	86	O	T	U

1. P = Point Source V = Vertical Source VA = Vertical Area Source

2. Source Location: O = outside of building; I = inside of building

3. Sound Character, per NPC-104:

T = Tonal

S = Steady

B = Buzzing

C = Cyclical

Q = Quasi-Steady Impulsive

I = Impulsive

4. Noise Control Measures:

S = Silencer/Muffler

A = Acoustic Lining, plenum

U = Uncontrolled

E = Acoustic Enclosure

L = Lagging

O = Other

B = Barrier

5. Includes 5 dB penalty for tonality for source marked with T



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ACOUSTIC ASSESSMENT REPORT**

Noise Source Summary

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### **3.2 SOUND CHARACTER ADJUSTMENTS**

The MOE's guideline NPC-104 outlines that the sources with distinct sound characteristics be penalized in the assessment. In accordance with this guideline and recent MOE communications, the resulting noise emissions associated with transformers and inverters were penalized with a 5 dB penalty to account for potential hum from transformer coils and all inverters. Transformers sometimes exhibit tonal characteristics; such characters are not expected in small transformers. However, a 5 dB penalty was conservatively applied to all transformers in the assessment (i.e. applied to 1 MVA transformer at each transformer-inverter stations as well as the 10 MVA transformer substation).



## 4.0 Points of Reception

**Figure 4.1** shows the location of the subject facility and the nearby PORs. The assessment considers a total of 719 PORs in all direction with approximately 80 PORs located within 1000 m of the Facility. Among the PORs, the nearest to the Facility property line is POR003 (approximately 185 metres), which is located to the south of the Facility. All receptors were modeled using a height of 4.5 meters and are summarized in **Appendix D**. For the purposes of this report, six (6) of the representative receptors, which through acoustical modeling were predicted to have the highest sound level as a result of the facility noise sources, are shown in the tables. These six (6) receptors are provided in **Table 4.1**. The results for the rest of the PORs are provided in **Appendix D**.

While not all zoning surrounding the proposed facility allows for residential dwellings, all existing buildings were considered as receptors for the purposes of this assessment. A review of the zoning plan did not highlight any lands adjacent to the facility which were vacant and would allow residential development, however for the purpose of completeness vacant lots were also considered in the assessment.

**Table 4.1: Nearby Points of Reception**

POR ID	Description	Coordinates		Receptor Height (m)	Approximate Distance to Nearest Facility Equipment (m)
		X	Y		
POR001	Existing dwelling	499358	4983840	4.5	200
POR002	Existing dwelling	499422	4983875		200
POR003	Existing dwelling	499155	4983704		185
POR004	Existing dwelling	499665	4983995		244
POR005	Existing dwelling	499633	4983990		266
POR006	Existing dwelling	499136	4983696		190







- ### Legend
- Subject Property
  - Project Location
  - 120 m Zone of Investigation
  - Noise Receptor
  - Source
  - Construction Laydown Area
  - Potential Constructable Area
  - Inverter Station
  - Fence
  - Access Road
  - Communication Tower
  - Proposed Distribution Line
  - Transformer Substation
  - Solar Panel
  - Point of Common Coupling

- ### Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
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  3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



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Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
**4.1**

Title  
**Critical Receptors Assessed for David Brown Solar Park**





## 5.0 Noise Assessment Criteria

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### 5.1 MOE GUIDELINE LIMITS

As the facility and some surrounding receptors are located adjacent to Highway 401, the sounds from the highway are expected to have considerable influence on the sound levels on PORs near Highway 401. The MOE noise criteria use the proximity of receptors to human-made sources of sound such as traffic or industry and their presence throughout the day to define the sound level limits for different areas. As the study area is adjacent to Highway 401, the area within 500 metres of the highway has been defined as a class 2 area as it would be dominated by the sounds of traffic and the sounds of nature during traffic lulls.

The areas outside of this 500 m buffer have been defined as a Class 3 (or rural) area. The identification of PORs in each class is shown in the figure in **Appendix C**. In a Class 3 area, the sounds of the ambient environment are expected to be dominated by natural sounds with little or no road traffic. The MOE publication NPC-205 "*Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)*" and NPC-232 "*Sound Level Limits for Stationary Sources in Class 3 (Rural)*" provide sound level limits for Class 2 and 3 areas respectively.

Publications NPC-205 and NPC-232 requires that the one-hour equivalent sound level (Leq(1 hour)) in A-weighted decibels (dBA) from the proposed stationary noise sources should not exceed the lowest background sound levels at a noise-sensitive receptor location. It defines the background sound as the sound level caused by sources other than those under assessment (e.g., road traffic, the sounds of nature, etc.). These publications also includes minimum exclusionary noise limits for stationary sources, which are the lowest levels stationary noise sources must achieve for compliance in Class 2 and 3 areas. The exclusionary minimum sound levels (Leq (1 hour)) for Class 2 area are:

- For a facility operating between 0700 and 1900 hrs (daytime) is 50 dBA; and,
- For a facility operating between 1900 and 0700 hrs (evening and night-time) is 45 dBA.

The exclusionary minimum sound levels (Leq (1 hour)) for Class 3 area are:

- For a facility operating between 0700 and 1900 hrs (daytime) is 45 dBA; and,
- For a facility operating between 1900 and 0700 hrs (evening and night-time) is 40 dBA.

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## 5.2 APPLICABLE LIMITS

Ambient monitoring was not conducted in the vicinity of the proposed Facility and therefore the MOE exclusionary limits were applied for this assessment. Since the Facility could operate during day and night time hours (e.g. early morning), and no difference is assumed between these operations, the applicable criterion is considered as MOE nighttime exclusionary limits of 45 and 40 dBA. This limit is also stated in the Ministry of the Environment publication on solar facilities for Renewable Energy Approval (PIBS 7234e).

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**Table 5.1: Applicable Sound Level Limits**

Time Period	MOE Exclusionary Limit	
	Class 2	Class 3
Evening/Nighttime (1900-0700)	45 dBA	40 dBA

**Note:**

Evening/Night time limits were utilized, as they are the most restrictive for Facility operation.



## **6.0 Impact Assessment**

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### **6.1 MODELLING METHODOLOGY**

A predictive analysis was performed using the commercially available software package CADNA/A, a computerized version of the algorithms contained in the ISO 9613-1 and 9613-2 standards. This model includes geometrical divergence (distance attenuation), barrier effects due to intervening structures, ground effects, atmospheric absorption, and topography. The model considers a downwind condition, in which for the purpose of analysis the wind direction is always from each source location to each POR location.

All sound sources (transformers and inverters) that emit into the environment were modeled as point sources. Topography was included in the model; however, the terrain is relatively flat and topography was not expected to influence the predicted results. No shielding or obstacles were included in the model; however, the inverters are to be located inside enclosures which in reality will offer some shielding.

The Facility and surrounding ground surfaces were modeled as a combination of reflective and absorptive surfaces due to the nature of the Facility site. The analysis utilized a ground absorption factor of 0.7 to represent the combination of gravel (diffuses sound into different directions) and grass (considered absorptive) observed from imagery of the site.

Typical Ontario meteorological values were used to initialize several parameters in the model. These included a temperature of 10 degrees Centigrade and a relative humidity of 70%.

### **6.2 MODELED SCENARIO**

As described in Section 2.3 (Operation Scenario), the modeled scenario for this assessment consists of all sources running at full capacity for a full hour. This modeled operating scenario assumes that the Facility, when operating outside of daytime (07:00 to 19:00 hours), could operate at full capacity. Therefore the nighttime operation is considered to be the predictable worst-case and the results of the modeling are presented in Section 6.3.

An example of the detailed model calculations is included in **Appendix D**.

### **6.3 CUMULATIVE EFFECTS**

There are two solar farms in this area; William Rutley Solar farm and Bruining 1 Solar farm. The closest distance between David Brown solar facility equipment and William Rutley Solar facility equipment is about 1700 metres (1.7 km). Similarly the closest distance between David Brown solar Bruining 1 Solar facility is about 2100 metres (2.1 km). As per MOE requirements receivers within 1000 metres require cumulative assessment and therefore William Rutley solar

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facility was considered for cumulative assessment. There are only two mutual receivers identified and included in this assessment. Bruining 1 Solar facility does not have any mutual receptors and therefore was not considered for cumulative effects. The adjacent facilities, mutual receptor zones are provided in **Figure 6.1**.

**6.4 RESULTS**

The resulting modeled contribution of each source at the nearest PORs during a predictable worst case operation is provided in **Table 6.1**. The sum of these individual sound levels at each POR gives the overall predicted sound level from Facility operation. The corresponding equivalent sound level contours are provided in **Appendix E**. The results of the overall modeling assessment are summarized in **Table 6.2**.

The six (6) nearest receptors to the facility all fall within 500 m of Highway 401 and therefore are classified as Class 2 receptors for this assessment. The nearest receptor outside of the 500 m buffer is POR 051 and the predicted sound level at this location due to the facility is 28 dBA, which is well below the Class 3 criterion of 40 dBA. The 40 dBA contour (shown in Figure E-1, **Appendix E**) occurs at a distance of approximately 265 m from the Facility noise sources and those PORs outside of the Class 2 boundary (i.e. those PORs that are classified as Class 3) are almost twice the distance (greater than 500 m) from the Facility sources. The Predicted sound levels at Class 3 PORs are well below the applicable limit of 40 dBA (i.e. at least 12 dB below the limit).

The contour plot shown in Figure E-1 also shows that the 45 dBA contour is predicted to lie mostly within the facility property boundary and within the boundary of Highway 401 for the remainder. Therefore, compliance with Class 2 limits at surrounding lands (existing and vacant receptors) are also reached with the maximum sound levels modelled in this assessment.

**Table 6.1: Point of Reception Noise Impact Table**

Source ID	POR001		POR002		POR003	
	Distance to POR001 (m)	Sound Level at POR001 (dBA)	Distance to POR008 (m)	Sound Level at POR008 (dBA)	Distance to POR002 (m)	Sound Level at POR002 (dBA)
INV_1	494	25	432	26	710	21
INV_2	228	32	200	33	400	27
INV_3	201	33	229	32	262	31
INV_4	302	30	359	28	185	34
INV_5	414	27	466	26	294	30
INV_6	331	29	359	28	332	29
INV_7	332	29	319	29	449	26
INV_8	410	27	368	28	584	23
INV_9	521	24	466	26	720	21
INV_10	698	21	634	22	913	19
T_01	670	29	436	21	714	16

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

Impact Assessment

July 5, 2013

**Table 6.1: Point of Reception Noise Impact Table**

Source ID	POR001		POR002		POR003	
	Distance to POR001 (m)	Sound Level at POR001 (dBA)	Distance to POR008 (m)	Sound Level at POR008 (dBA)	Distance to POR002 (m)	Sound Level at POR002 (dBA)
T_10	498	19	630	17	909	13
T_02	230	27	202	28	404	21
T_03	200	28	228	27	265	25
T_04	298	24	355	23	185	28
T_05	417	21	469	20	294	24
T_06	332	23	361	22	329	23
T_07	330	23	318	24	445	20
T_08	407	21	365	22	580	18
T_09	517	19	462	20	716	16
SUBS	693	16	604	30	892	26
INV_1	244	32	266	31	730	21
INV_2	292	30	277	30	419	27
INV_3	432	26	410	27	279	30
INV_4	597	23	572	23	190	34
INV_5	685	22	663	22	295	30
INV_6	535	24	517	25	343	28
INV_7	396	27	387	27	466	26
INV_8	316	29	320	29	603	23
INV_9	314	29	333	29	740	21
INV_10	414	27	443	26	933	18
T_01	247	26	270	25	734	15
T_10	411	21	439	21	929	13
T_02	289	24	274	25	424	21
T_03	429	21	407	21	282	25
T_04	593	18	568	18	191	28
T_05	689	16	667	16	295	24
T_06	538	19	520	19	341	23
T_07	399	21	389	22	462	20
T_08	317	24	321	23	599	17
T_09	313	24	331	23	735	15
SUBS	244	32	403	34	912	26

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

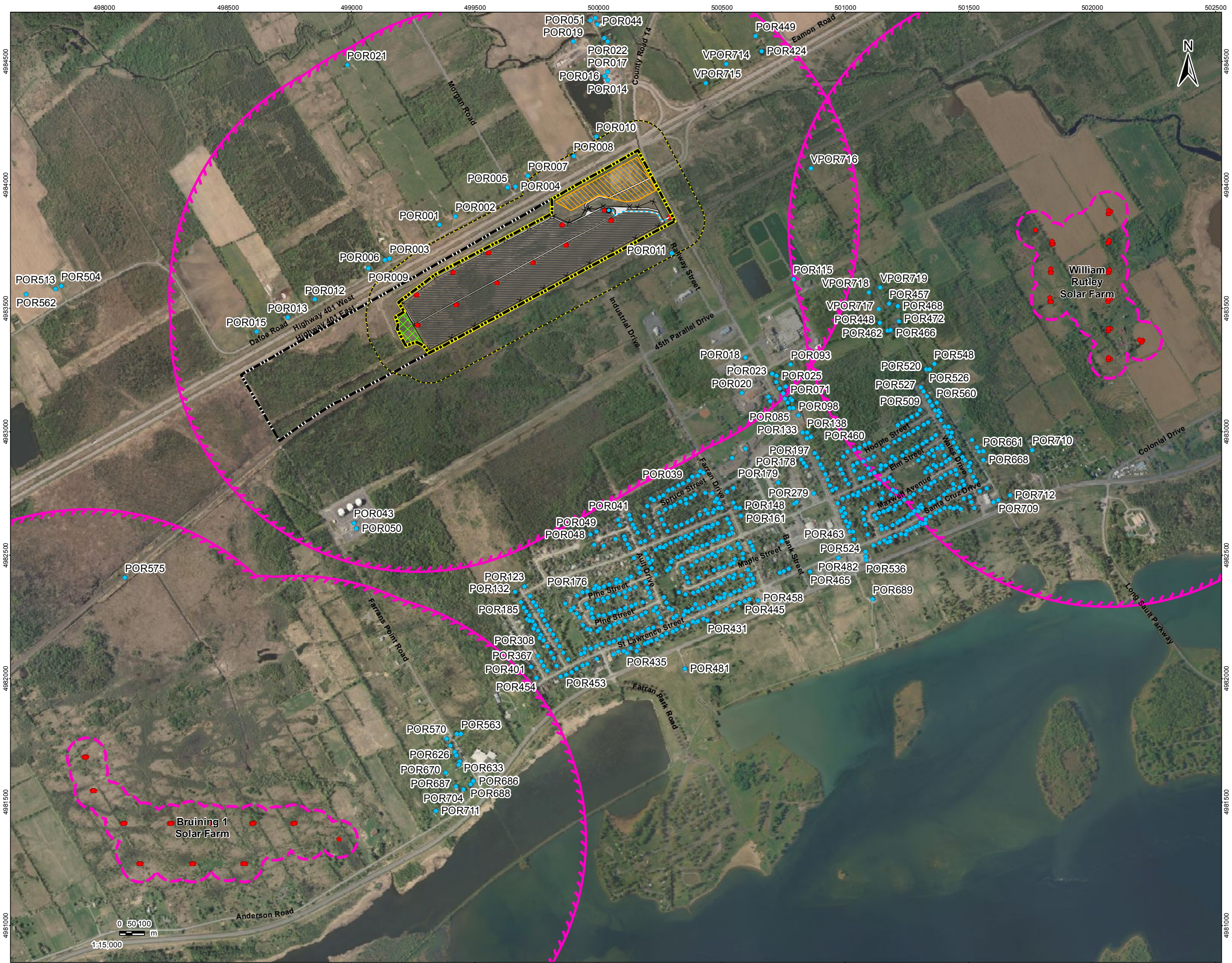
Impact Assessment

July 5, 2013

**Table 6.2: Acoustic Assessment Summary Table**

<b>POR ID</b>	<b>POR Description</b>	<b>Sound Level at Point of Reception (Leq, 4.5m)</b>	<b>Verified by Acoustic Audit (Y/N)</b>	<b>Performance Limit (Leq)</b>	<b>Compliance with Performance Limit (Y/N)</b>
POR001	Dwelling to the North	40.4	N	45	Y
POR002	Dwelling to the North	40.4	N		Y
POR003	Dwelling to the North	39.7	N		Y
POR004	Dwelling to the North	40.3	N		Y
POR005	Dwelling to the North	40	N		Y
POR006	Dwelling to the North	39.4	N		Y





- ### Legend
- Subject Property
  - Project Location
  - 120 m Zone of Investigation
  - Other Solar Farms
  - Noise Receptor
  - Source
  - Construction Laydown Area
  - Potential Constructable Area
  - Inverter Station
  - Fence
  - Access Road
  - Communication Tower
  - Proposed Distribution Line
  - Transformer Substation
  - Solar Panel
  - Point of Common Coupling
  - 1 km Source Buffer

- ### Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
  2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
  3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



**Stantec**

July 2013  
161011028

Client/Project  
Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
**6.1**

Title  
**David Brown Solar Park, Nearest Solar Facilities and Mutual Receptors**





## **7.0 Conclusions and Closure**

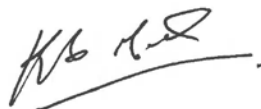
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Stantec Consulting Limited (Stantec) was retained by Saturn Power Inc. to prepare an Acoustic Assessment Report for their proposed Facility to be located within the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario. Stantec's conservative assessment predicted that noise emissions during the Facility's predictable worst case operation will meet the MOE criteria at all Points of Reception without the requirement for noise control.

This report has been prepared on behalf of Saturn Power Incorporated. The acoustic analysis highlighted in this report is based on information obtained from representatives of Saturn Power Incorporated. The assessment represents the conditions at the proposed facility at the time of the assessment, and the conclusions are the best judgment of the assessor based on current environmental standards and provided information. Stantec attests that to the best of our knowledge, the information presented in this report is accurate.

Respectfully Submitted,

**STANTEC CONSULTING LTD.**



**Kana Ganesh Ph.D., P.Eng.**

Acoustics, Noise and Vibration Engineer

Tel: (905) 415-6332

Fax: (905) 474-9889

[Kana.ganesh@stantec.com](mailto:Kana.ganesh@stantec.com)





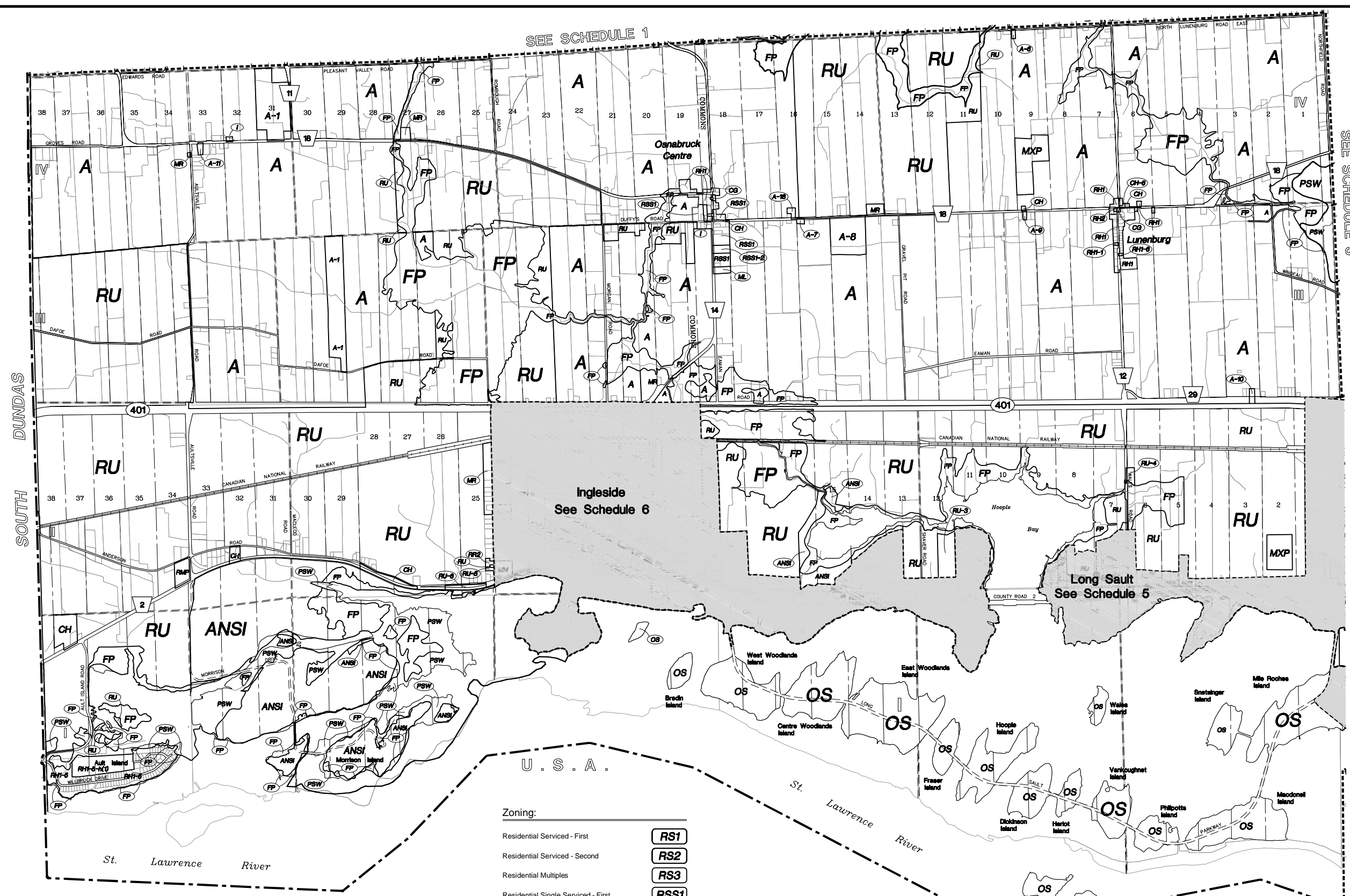
**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

## **Appendix A:**

### **Zoning Maps and Site Plan**





SEE SCHEDULE 1

SEE SCHEDULE 3

Ingeside  
See Schedule 6

Long Sault  
See Schedule 5

SOUTH DUNDAS

**Zoning:**

- Residential Serviced - First
- Residential Serviced - Second
- Residential Multiples
- Residential Single Serviced - First
- Residential Single Serviced - Second
- Hamlet Private Services - First
- Hamlet Private Services - Second
- Rural Residential Private Services - First
- Rural Residential Private Services - Second
- Residential Mobile Park
- General Commercial
- Highway Commercial
- Tourist Commercial
- Recreation Commercial

- RS1
- RS2
- RS3
- RSS1
- RSS2
- RH1
- RH2
- RR1
- RR2
- RMP
- CG
- CH
- CT
- CR

- Institutional
- Light Industrial
- General Industrial
- Heavy Industrial
- Rural Industrial
- Agricultural
- Rural
- Open Space
- Salvage Yard
- Waste Management

- I
- ML
- MM
- MH
- MR
- A
- RU
- OS
- SY
- WM

- Mineral Aggregate Extractive - Pit
- Mineral Aggregate Extractive - Quarry
- Mineral Aggregate Extractive - Reserve
- Flood Plain
- Provincially Significant Wetland
- Areas of Natural and Scientific Interest
- Development Reserve

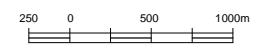
- MXP
- MXQ
- MXR
- FP
- PSW
- ANSI
- DR

**Legend:**

- Provincial Highway
- County Road
- Municipal Road
- Unopened/Seasonal Road Allowance
- Railway
- Municipal Boundary
- Lot Line
- Legal Fabric
- Drainage
- Sub-Schedule Boundary

**Zoning By-Law No. 2011-100**  
**Township of**  
**South Stormont**

**Schedule 2**  
Scale 1:15,000



J:\24430 South Stormont\_2011\_Maps\24430\_South Stormont.dwg



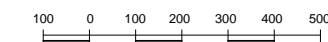


# Zoning By-Law No. 2011-100 Township of

# South Stormont

## Schedule 6 INGLESIDE

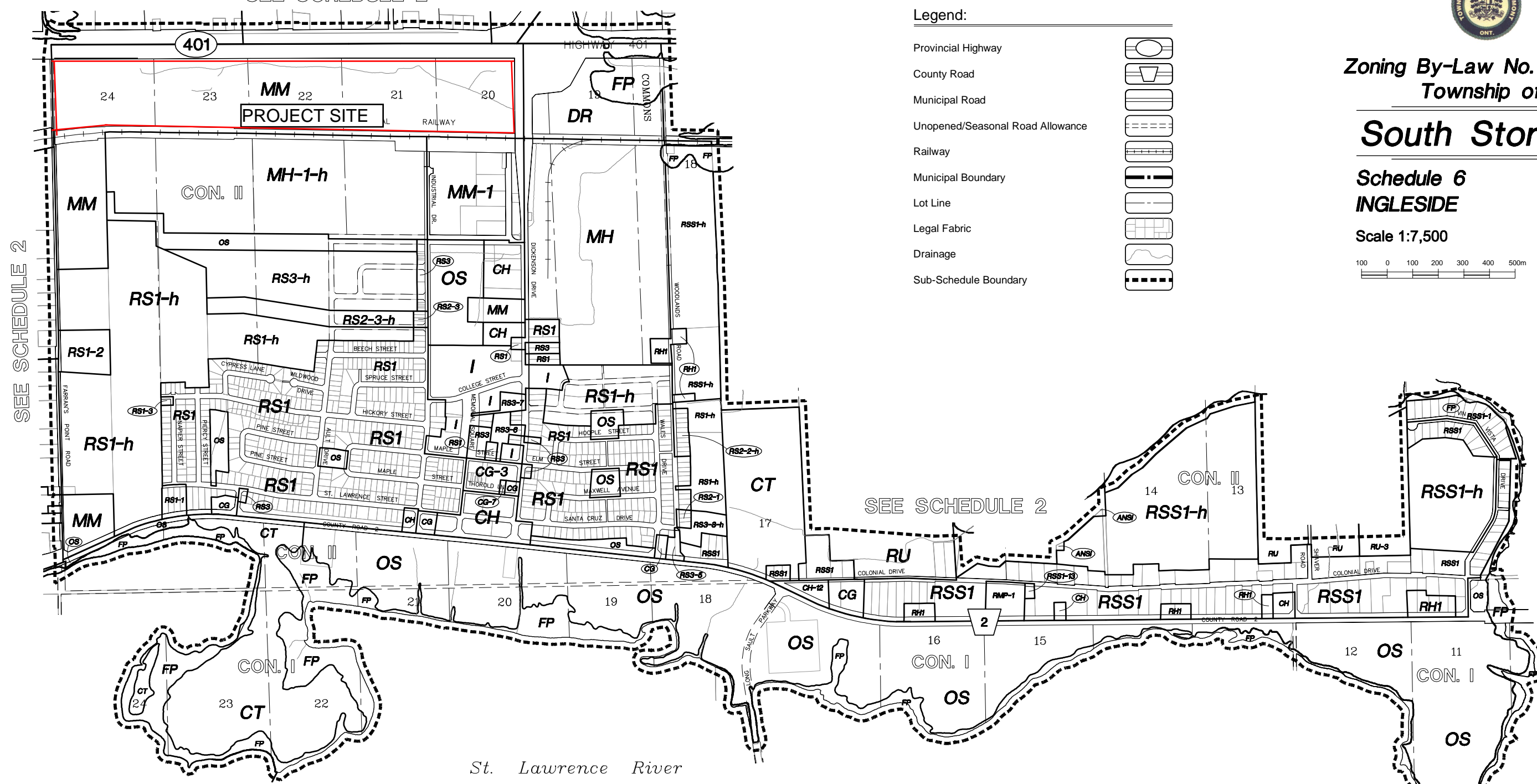
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SEE SCHEDULE 2

### Legend:

- Provincial Highway
- County Road
- Municipal Road
- Unopened/Seasonal Road Allowance
- Railway
- Municipal Boundary
- Lot Line
- Legal Fabric
- Drainage
- Sub-Schedule Boundary



SEE SCHEDULE 2

SEE SCHEDULE 2

### Zoning:

Residential Serviced - First

**RS1**

Residential Serviced - Second

**RS2**

Residential Multiples

**RS3**

Residential Single Serviced - First

**RSS1**

Residential Single Serviced - Second

**RSS2**

Hamlet Private Services - First

**RH1**

Hamlet Private Services - Second

**RH2**

Rural Residential Private Services - First

**RR1**

Rural Residential Private Services - Second

**RR2**

Residential Mobile Park

**RMP**

General Commercial

**CG**

Highway Commercial

**CH**

Tourist Commercial

**CT**

Recreation Commercial

**CR**

Institutional

**I**

Light Industrial

**ML**

General Industrial

**MM**

Heavy Industrial

**MH**

Rural Industrial

**MR**

Agricultural

**A**

Rural

**RU**

Open Space

**OS**

Salvage Yard

**SY**

Waste Management

**WM**

Mineral Aggregate Extractive - Pit

**MXP**

Mineral Aggregate Extractive - Quarry

**MXQ**

Mineral Aggregate Extractive - Reserve

**MXR**

Flood Plain

**FP**

Provincially Significant Wetland

**PSW**

Areas of Natural and Scientific Interest

**ANSI**

Development Reserve

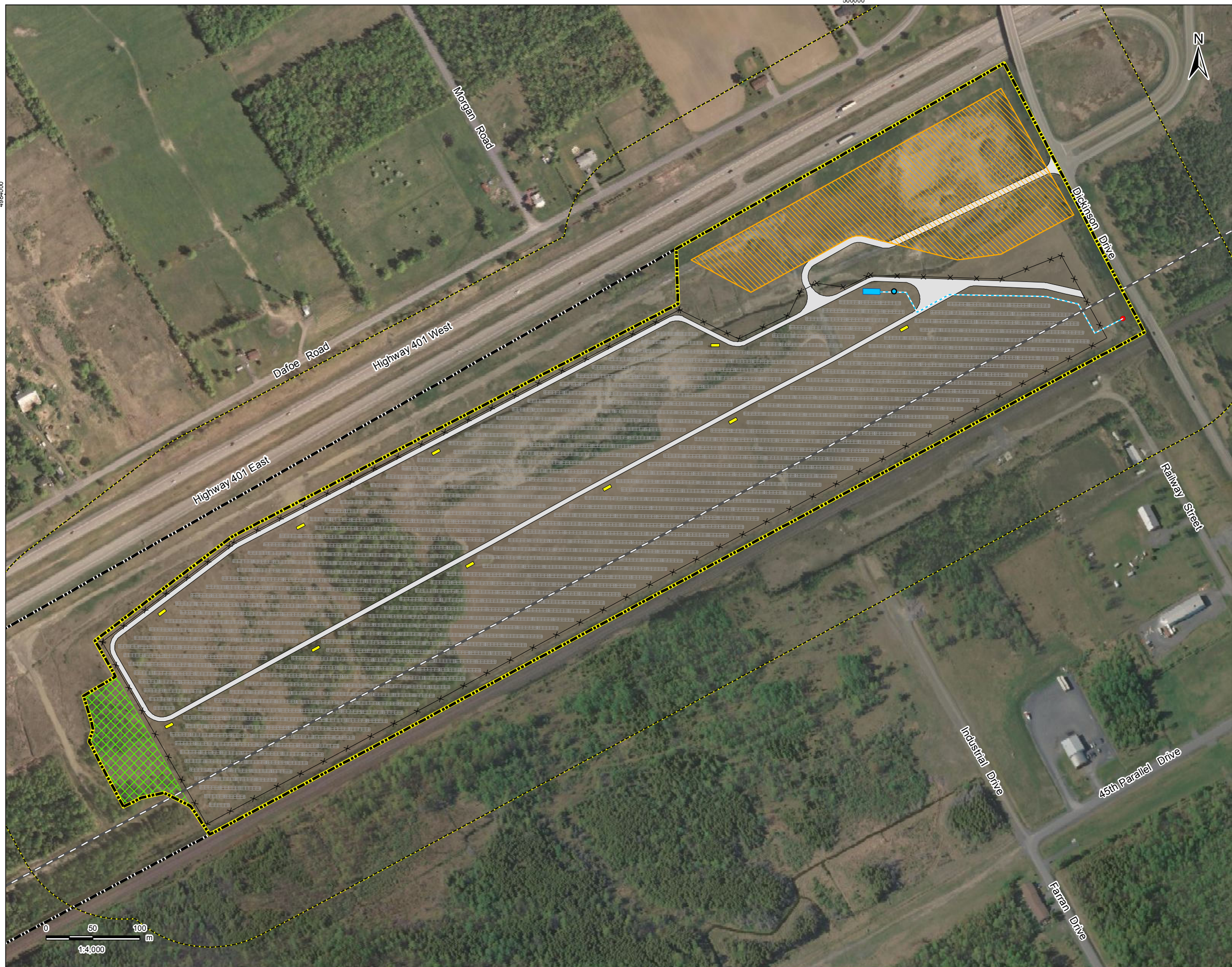
**DR**

St. Lawrence River















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**Legend**

-  Subject Property
-  Project Location
-  120 m Zone of Investigation
-  Transmission Line
-  Construction Laydown Area
-  Potential Constructable Area
-  Inverter Station
-  Fence
-  Access Road
-  Communication Tower
-  Proposed Distribution Line
-  Transformer Substation
-  Solar Panel
-  Point of Common Coupling

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



**Stantec**

January 2013  
161011028

Client/Project

Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.

A-1

Title

**Facility Site Plan**







**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

## **Appendix B:**

**Equipment Specifications and Sound Data**



## Solaron 500K

Acoustic Emissions / Noise

**Model tested:**

3159500-001  
SOLARON 500KW, 480V OUTPUT  
Serial Number:ENG1

**Test Date(s):**

11/21/2008

**Test Configuration:**

Full power operation

**Auxiliary Equipment used:**

None

**Line Voltage(s):**

~480V 3P+PE; WYE

**Environmental Conditions:**

Temperature 23 °C ± 10  
Humidity 50% ± 30%

**Line Frequency Tested:**

- 50 Hz
- 60 Hz

**Reference Standards:**

IEC/EN 61010-1

**Load Condition(s):**

No load

**Known Similar Models:**

3159500-xxxx

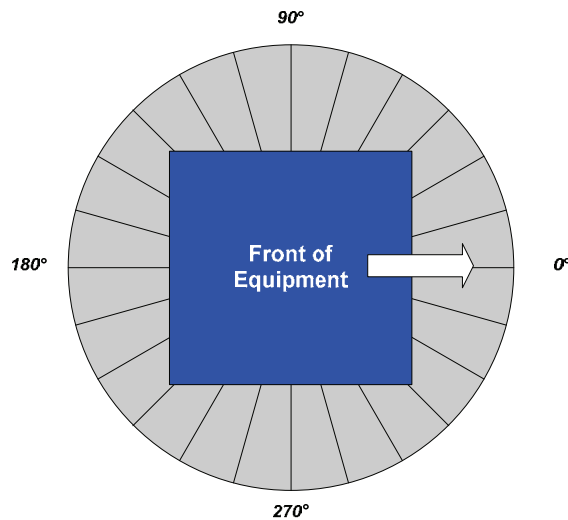
This letter and attached documentation certify that the Solaron 500 Inverter has been tested and was found to comply with the requirements of EN 50178 Section A.4.7 Acoustic Noise. This certificate remains valid, contingent on proper installation, operation, and adherence to conditions of use outlined in the User Manual.



**TEST SETUP:**

- 1) The product was placed on the floor and away from reflective walls.
- 2) After determining which angle from the product provides the maximum noise level, the following measurements were made from the front of the product and the angle of maximum noise level:

- Ambient Noise.
- 1 meter from the product
- 3 meters from the product


**RESULTS:**

The ambient noise measurement was 64.0 dB(A).

Measurement Angle	Distance	Operating Mode			
		#1	#2	#3	#4
0° (front)	1 meters	70.6 dB(A)	-	-	-
180° (back)	1 meters	70.0 dB(A)	-	-	-
0° (front)	3 meters	65.4 dB(A)	-	-	-
180° (back)	3 meters	65.1 dB(A)	-	-	-

**Operating Modes:**

1.	Full Power.
2.	-
3.	-
4.	-

**Test Equipment:**

Test Equipment:	Calibration Due
Simpson 897 Dosimeter, SN B003121	March/2009
Simpson 887-2 Sound level Calibrator, SN AE-1495	March/2009

Doug Powell

Tested by

November 21, 2008

Date



490 POST STREET • SUITE 1427  
SAN FRANCISCO • CA • 94102 • USA  
TEL / FAX: (+1) 415-693-0424 / 1398  
<http://www.va-consult.com>

**Inverter Sound Power Level Testing**  
**Advanced Energy Industries, Fort Collins, CO**

**Prepared by: Tyler Rynberg, PE**  
**Vibro-Acoustic Consultants**  
**[tyler@va-consult.com](mailto:tyler@va-consult.com)**

**Date: 14 April 2010**

## Table of Contents

1	Background	p. 1
2	Description of Inverter	p. 1
3	General Methodology	p. 1
4	Data Collection	p. 2
4.1	Measurement System Parameters	p. 2
4.2	Measurement Locations and Site Conditions	p. 2
4.3	Qualification of Acoustical Environment	p. 3
4.4	Data Presentation	p. 3
5	Discussion	p. 4
Figures 1~7 Measurement Data Plots		p. 5

## 1. Background

Advanced Energy Industries (AEI) wishes to document the sound power levels generated by the Solaron 500, a 500 kW inverter. AEI has requested that the testing of the fuel cell be performed per the ISO 3744-1994 Standard. We visited the AEI facility on Thursday, 1 April 2010, to perform the testing.

Since sound power is a property of the source being tested (rather than the cumulative result of multiple sources interacting with the environment), these data are applicable to many different installation conditions. In this document, we report the measured sound power levels and sound pressure levels and provide commentary on how we would insert this source into computer-based noise propagation models.

## 2. Description of Inverter

The device under test was designated as Solaron 500 model number 3159500-0000 A1 (with 3R enclosure), a 500 kW inverter, manufactured by AEI in March 2010. The inverter had a serial number of 750385 F/R A1. The inverter was 1.83m wide x 0.97m deep x 2m high.

The inverter was mounted on a rigid wood platform constructed using 2x4 studs and rigid foam. The platform raised the inverter 0.2m off the floor. The reference box established for the inverter had the following dimensions: L1 = 1.83m, L2 = 0.97m, L3 = 2.21m.

The inverter was supplied DC input voltage by power generation equipment located in an adjacent room.

## 3. General Methodology

We measured the sound pressure levels generated by the inverter per the ISO 3744-1994 Standard. During the measurements, we collected the overall un-weighted equivalent continuous sound level ( $L_{EQ}$ ), as well as the un-weighted 1/3-octave band spectra from both the inverter and ambient conditions. The measurement duration at each microphone position was 60 seconds.

To measure the inverter, we established a parallelepiped measurement surface 1 meter from the reference box. The resultant measurement surface had the following dimensions: L1 = 3.83m, L2 = 2.97m, L3 = 3.21m, and totaled 55.01 square meters. We used 9 microphone positions, per Figure C2 of the ISO 3744-1994 Standard. For all 9 positions, the fixed microphone position technique was used.



We tested four operating configurations of the inverter. As an exploratory test, we also measured a fifth configuration at only one microphone position. The tested configurations are shown in the following table:

Configuration	Input Voltage	Output Power	Blower Setting
1	790V	100% (500kW)	Maximum
2	850V	100% (500kW)	Maximum
3	730~745V <sup>1</sup>	100% (500kW)	Maximum
4	790V	50% (250kW)	Maximum
5	850V	50% (250kW)	Maximum

<sup>1</sup>During this measurement, the voltage regulator was not operating properly. The input voltage was observed to oscillate between 730V and 745V.

We understand from our discussions with AEI personnel that the operating conditions tested are representative of a real-world installation.

#### 4. Data Collection

##### 4.1 Measurement System Parameters

We measured the sound power levels using our standard testing suite:

<u>Instrument</u>	<u>Make / Model</u>	<u>Identification</u>
Microphone Calibrator	Bruel & Kjaer 4231	S/N 2292439
Noise Meter	Norsonic N-140	S/N 1403581
Microphone Preamplifier	Norsonic N-1209	S/N 12749
Microphone	Norsonic N-1225	S/N 96063

The noise meter was calibrated to 94 dB at 1 kHz before and after the measurements. The microphone windscreen was used. The Norsonic N-140 has an internal correction filter to correct for the effects of the windscreen.

##### 4.2 Measurement Locations and Site Conditions

We collected data in the Solaron testing lab adjacent to the main fabrication area at the AEI facility in Fort Collins, CO. The testing lab measured approximately 13.41m x 19.51m x 3.35m. The floor is an exposed concrete slab; three of the walls are constructed using vinyl-faced gypsum board on stud-framing; the remaining wall was open to the main fabrication area; the ceiling is a suspended grid containing vinyl-faced gypsum board panels. The testing area contains several workstations and other inverters. The inverter was placed near the center of the testing lab space, at least 5.5m from any of the lab walls. No workstations or other inverters were located within 4m of the inverter. However, the top of the inverter was only 1.14m below the suspended gypsum board ceiling. In an effort to reduce the effects of the ceiling on the measurements, several ceiling tiles above the

inverter were removed. This roof deck is approximately 2.8m above the suspended ceiling, providing a vertical clearance of 3.9m.

The temperature in the fabrication area was estimated to be 22°C. The relative humidity was typical of an indoor air-conditioned environment.

### 4.3 Qualification of Acoustical Environment

#### Ambient Noise Correction Factor $K_1$

In the majority of 1/3 octave bands, the ambient noise levels were greater than 6 dB below the test conditions. In the 50~80Hz, 630Hz, and 2~6.3kHz 1/3 octave bands, the ambient noise was frequently only 1~4 dB below the test conditions. Generally, the “middle” four measurement positions had a greater signal-to-noise ratio than the “top” five positions.

#### Acoustical Correction Factor $K_2$

The reflecting plane extended a minimum of 4.5m from the measurement surface in all directions, which meets the ISO-3744 Standard for the 50 Hz lower boundary of the presented data. The reflecting plane was concrete slab-on-grade and was estimated to have an absorption coefficient of 0.05 or less in the frequency bands of interest.

The Approximate Method was used to determine the environmental correction factor,  $K_2$ . Our calculations show that the highest value for  $K_2$  is 9.6 dB and occurs in the 500Hz octave band. The environment does not meet the ISO-3744 Standard requirement of  $K_2 < 2$  dB. The following table presents the calculated octave band  $K_2$  values:

Calculated $K_2$	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
	5.2 dB	4.6 dB	6.8 dB	9.6 dB	9.3 dB	8.6 dB	7.1 dB	6.2 dB

While the values for  $K_2$  exceed the ISO Standard in all octave bands, the Standard allows for compliance by using a maximum correction factor of 2 dB. Values for which the correction factor is limited to 2 dB therefore represent a “worst-case” or upper boundary for the actual performance of the device under test.

### 4.4 Data Presentation

Data are presented in Tables 1~7. For each configuration, we present the overall A-weighted ( $L_{WA}$ ) and the un-weighted 1/3 octave band sound power levels in decibels referenced to  $1 \times 10^{-12}$  W. We also present the overall A-weighted (dBA) and the un-weighted 1/3 octave band sound pressure levels in decibels referenced to 20  $\mu$ Pa for each configuration.

## 5. Discussion

### Non-Compliance Sound Pressure Levels

The noise generated in the 50~80Hz, 630Hz, and 2~6.3kHz 1/3 octave bands do not exceed the ambient conditions by the minimum 6 dB required by the ISO-3744 Standard. The published levels in these bands should be considered to be the upper boundary of the exact level – the true level is likely to be lower in level than the calculated values. The overall sound power level, L<sub>wA</sub>, does meet the requirements of the ISO-3744 Standard, in terms of ambient noise. However, the acoustical environment does not meet the ISO-3744 Standard in any of the 1/3 octave bands. Therefore, the published levels in all of the bands, including the overall L<sub>wA</sub>, should be considered as the upper boundary of the actual level.

### Configurations

There was no significant difference in sound power level between the configurations. The only statistically important variation was the amplitude of a 9kHz tone, which was highest with Configuration 2. This tone could be a sub-harmonic of the switching circuitry, which runs at 18kHz.

### Noise Modeling

In all of the configurations tested, the relatively broadband noise from the blower dominated the noise character. There is also significant tonality at the 160 Hz band from the blower. The directionality in the noise generation appears to be modest, with all four sides fitting within a 2 dB window. The relatively uniform directivity is due to the presence of air inlets or outlets on all four sides as well as at the bottom of the inverter. As there are no openings in the top of the inverter, the levels at the top typically measured 7 dB lower than the sides of the unit.

With the configurations tested, we would model the unit as a box with uniform directivity at an elevation of approximately 1m.

. . .

Please feel free to call if you have any questions; we may be reached in our San Francisco office by telephone at (+1) 415-693-0424 or via email at [tyler@va-consult.com](mailto:tyler@va-consult.com).

Sincerely,



Tyler Rynberg, PE

Vibro-Acoustic Consultants

**Table 1: AEI Solaron 500 Sound Power Measurements – Calculated Sound Power Levels in dB, re:  $1 \times 10^{-12}$  W**

Configuration	LWA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
1	83.5	77.5	81.0	77.0	80.0	84.0	87.5	79.0	75.5	77.0	76.0	77.5	73.0	74.0	74.0	71.0	70.0	68.0	65.0	64.5	64.5	63.0	58.5	67.5	66.5
2	84.0	77.5	80.5	77.0	80.0	84.0	87.5	78.5	75.5	76.5	76.0	78.0	73.5	74.0	74.0	71.0	70.0	68.0	66.0	66.0	65.5	65.0	62.5	72.0	72.0
3	83.5	77.0	80.5	76.5	80.0	83.5	87.5	78.5	75.5	76.5	77.5	78.0	73.5	74.5	74.0	71.5	72.0	69.5	66.5	65.5	64.5	63.0	58.0	63.0	61.5
4	83.0	77.0	77.0	76.5	80.0	83.5	87.5	78.5	73.5	76.5	76.0	77.5	73.5	74.0	74.0	71.0	70.0	67.5	65.0	64.5	64.5	63.0	58.0	61.5	61.5

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

**Table 2: AEI Solaron 500 Configuration 1 – Measured Sound Pressure Level at 1m in dB, re:  $20 \mu\text{Pa}$**

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.7	61.0	69.0	61.0	63.9	68.4	75.2	61.7	57.2	59.5	58.5	59.7	55.9	58.1	57.7	56.1	54.5	51.3	49.5	49.5	48.9	48.1	43.6	52.2	51.1
Left	66.1	59.0	61.1	61.9	65.0	67.4	66.0	59.1	61.0	60.4	61.5	61.9	57.3	56.7	56.4	53.2	52.5	50.3	47.9	46.6	45.8	42.8	39.3	49.3	48.5
Rear	67.8	61.0	65.5	60.1	62.4	65.9	68.3	64.4	59.9	59.4	59.3	59.9	57.3	58.9	60.1	56.3	55.4	52.2	50.7	49.5	49.6	48.7	44.0	54.3	54.7
Right	67.7	58.2	65.6	57.1	63.1	68.7	75.0	66.6	58.9	63.5	58.2	60.8	57.0	56.7	57.1	54.1	52.6	50.2	47.5	46.9	46.9	47.0	41.5	51.9	51.3
Front Top	64.3	60.6	59.4	59.2	61.2	66.7	67.9	56.7	56.2	56.9	57.7	59.5	54.3	55.3	54.5	51.9	51.2	49.3	46.7	45.8	45.5	43.0	39.1	48.2	43.7
Left Top	63.9	60.7	60.6	59.6	59.8	63.0	62.6	55.7	54.2	58.3	56.9	59.7	55.2	55.8	55.0	52.3	50.4	49.3	46.2	45.1	45.0	42.5	38.0	46.7	42.9
Rear Top	64.8	59.5	60.1	57.4	62.5	65.8	62.5	55.8	56.8	58.9	59.3	60.7	55.9	55.1	56.5	52.7	52.2	50.7	46.6	45.9	46.8	45.1	39.7	47.2	43.3
Right Top	64.9	59.8	60.3	56.9	63.4	67.5	67.5	59.4	54.3	56.8	56.3	60.1	55.0	55.4	56.1	52.7	52.7	51.0	47.9	47.2	47.0	46.1	40.9	45.5	43.8
Top	62.3	60.6	59.6	58.3	60.9	64.3	67.7	59.1	57.5	55.8	56.6	56.4	52.5	52.3	52.3	49.9	48.4	49.5	44.4	43.3	46.3	42.7	35.8	41.3	38.5

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

**Table 3: AEI Solaron 500 Configuration 2 – Measured Sound Pressure Level at 1m in dB, re: 20µPa**

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	68.3	60.9	67.3	61.5	64.2	68.2	74.7	61.9	57.4	59.1	58.8	61.4	56.7	58.7	57.8	55.8	54.8	51.6	50.7	50.6	49.8	49.4	47.5	57.4	57.6
Left	66.7	58.7	61.1	62.0	65.0	67.5	65.7	58.8	62.6	59.5	62.1	62.1	56.9	57.3	56.7	53.3	52.3	50.3	48.9	48.4	47.4	45.4	44.6	53.9	48.5
Rear	68.1	61.0	65.1	60.2	62.3	64.7	67.4	63.1	58.2	59.0	59.8	60.1	57.7	59.1	59.9	55.9	55.2	52.1	51.3	51.1	50.3	50.6	48.4	57.1	59.5
Right	68.1	58.3	65.5	57.0	63.0	68.5	74.6	66.5	59.6	63.3	58.2	61.0	56.9	56.6	56.8	54.0	52.6	50.3	49.1	49.2	48.3	48.9	46.6	56.9	57.1
Front Top	64.7	60.8	59.2	58.8	61.2	67.0	68.4	56.6	55.7	56.6	57.7	59.9	53.9	55.4	55.0	52.6	51.3	49.6	47.7	47.4	46.2	44.9	43.0	51.8	49.3
Left Top	64.6	59.9	60.7	59.3	58.8	62.2	65.7	57.4	56.0	57.2	57.4	60.6	56.5	54.7	54.7	52.4	50.4	49.5	47.1	47.5	47.0	45.8	43.3	53.0	50.3
Rear Top	65.1	60.2	59.9	57.2	61.8	65.4	62.0	56.9	56.6	59.2	59.2	60.1	56.1	56.1	55.5	52.9	52.4	50.5	48.0	47.6	47.8	46.8	42.9	50.2	49.8
Right Top	65.1	59.5	59.7	56.8	63.7	67.1	68.1	60.1	54.2	57.3	56.3	59.9	55.2	55.5	55.5	52.7	52.9	50.4	48.5	48.4	47.5	47.3	44.2	51.4	49.2
Top	62.5	60.1	58.8	58.2	61.3	63.9	67.6	59.0	56.3	56.2	56.6	57.0	52.5	51.9	52.5	50.3	48.8	49.3	45.1	44.3	46.4	43.5	38.8	48.2	44.7

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

**Table 4: AEI Solaron 500 Configuration 3 – Measured Sound Pressure Level at 1m in dB, re: 20µPa**

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	68.0	60.8	67.6	61.4	64.0	68.3	74.8	62.0	57.2	58.7	58.4	60.9	57.0	58.7	58.1	56.2	57.5	52.4	50.9	50.2	48.9	47.6	43.0	48.6	46.1
Left	67.0	58.5	61.2	61.6	64.7	67.1	66.3	59.0	62.3	60.7	63.9	63.5	56.6	56.5	56.7	53.7	54.8	52.5	49.3	47.6	45.8	42.8	38.7	45.2	43.7
Rear	67.9	61.2	65.8	60.2	62.3	64.4	67.4	63.1	58.7	58.6	60.0	60.4	58.0	60.2	59.9	56.4	56.2	55.3	51.3	50.6	49.5	49.0	43.8	49.4	49.0
Right	67.3	58.6	66.1	57.5	62.3	68.2	74.1	66.2	59.6	62.8	58.7	59.5	57.1	57.1	57.0	54.1	53.7	51.5	50.1	48.4	46.9	47.0	41.5	48.0	47.0
Front Top	65.1	60.2	58.7	59.0	61.5	67.3	68.5	56.6	55.8	57.7	59.4	59.9	55.0	55.5	55.1	53.9	53.6	50.9	48.2	46.5	45.3	43.1	38.2	42.9	39.7
Left Top	64.8	59.7	60.3	58.9	58.1	61.9	65.4	58.0	55.6	58.1	58.5	59.8	55.3	55.9	55.2	53.3	55.4	51.0	47.3	46.1	45.6	42.9	37.5	42.6	39.6
Rear Top	65.5	58.5	58.9	55.3	61.3	64.2	61.1	55.3	58.4	59.0	60.0	61.5	56.6	56.8	56.5	53.3	54.1	51.8	48.3	46.5	47.2	45.5	39.3	42.5	39.3
Right Top	65.6	59.0	60.4	56.6	63.1	66.4	67.6	58.9	52.9	58.4	58.9	61.2	55.2	56.1	56.2	54.3	54.3	52.1	48.8	47.5	47.0	46.1	40.9	43.2	40.1
Top	62.7	59.5	58.5	57.7	61.3	64.6	67.6	58.8	56.1	56.3	56.8	57.2	53.2	52.5	53.1	50.3	49.7	50.1	45.1	43.7	45.7	42.4	35.0	37.1	33.7

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.



**Table 5: AEI Solaron 500 Configuration 4 – Measured Sound Pressure Level at 1m in dB, re: 20µPa**

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.5	59.6	62.3	61.0	64.0	68.2	75.2	61.9	55.6	58.9	58.2	60.3	56.0	58.0	57.9	55.8	54.7	51.2	49.1	49.2	49.1	47.8	43.1	46.9	47.5
Left	65.6	57.9	59.9	61.9	64.9	67.1	66.3	58.2	56.8	59.4	61.2	61.3	56.9	56.7	56.1	53.2	52.5	50.2	47.5	46.4	45.8	42.4	38.7	45.5	43.8
Rear	67.0	60.3	61.2	60.0	62.0	64.4	67.6	63.8	59.3	58.2	59.1	59.8	56.8	58.8	59.7	55.9	55.0	51.6	50.1	49.4	49.4	48.5	43.5	47.2	48.8
Right	66.8	56.4	59.8	56.6	62.2	67.6	73.8	65.8	57.7	63.7	58.8	58.8	57.1	56.1	57.0	53.8	52.3	49.7	46.7	46.9	46.8	46.6	41.1	46.3	46.2
Front Top	64.1	60.8	58.7	58.7	61.1	65.5	68.1	56.0	54.7	57.0	57.8	59.5	54.8	56.1	54.7	51.8	50.2	49.1	46.1	45.7	45.3	42.7	37.8	41.4	39.5
Left Top	64.0	59.2	58.6	59.1	58.3	62.1	65.6	57.9	55.7	57.6	57.3	60.1	55.5	55.6	54.7	52.1	50.8	49.0	45.7	45.1	45.7	42.9	37.6	42.7	40.0
Rear Top	64.8	59.8	59.0	58.0	63.1	65.3	63.4	56.7	54.3	57.2	58.1	60.8	56.1	55.5	56.8	53.9	51.8	50.2	46.6	45.7	47.0	46.0	39.4	40.5	38.9
Right Top	65.0	59.8	57.9	57.6	64.4	67.4	68.1	60.3	53.4	57.2	55.4	59.9	57.1	55.6	55.9	54.2	52.9	50.2	47.6	47.0	46.8	46.1	40.5	41.7	40.9
Top	62.3	60.3	58.4	58.4	61.1	63.0	67.1	58.7	53.3	56.1	56.8	57.5	53.0	52.8	53.0	49.6	47.6	49.5	44.2	43.0	45.9	42.3	34.9	35.3	34.3

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

**Table 6: AEI Solaron 500 Configuration 5 – Measured Sound Pressure Level at 1m in dB, re: 20µPa**

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.4	60.5	63.3	61.3	63.9	68.1	74.6	61.9	56.2	58.9	58.5	61.2	56.1	58.2	57.4	55.8	54.8	51.5	49.2	48.8	48.6	47.5	42.6	45.6	45.3

\*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

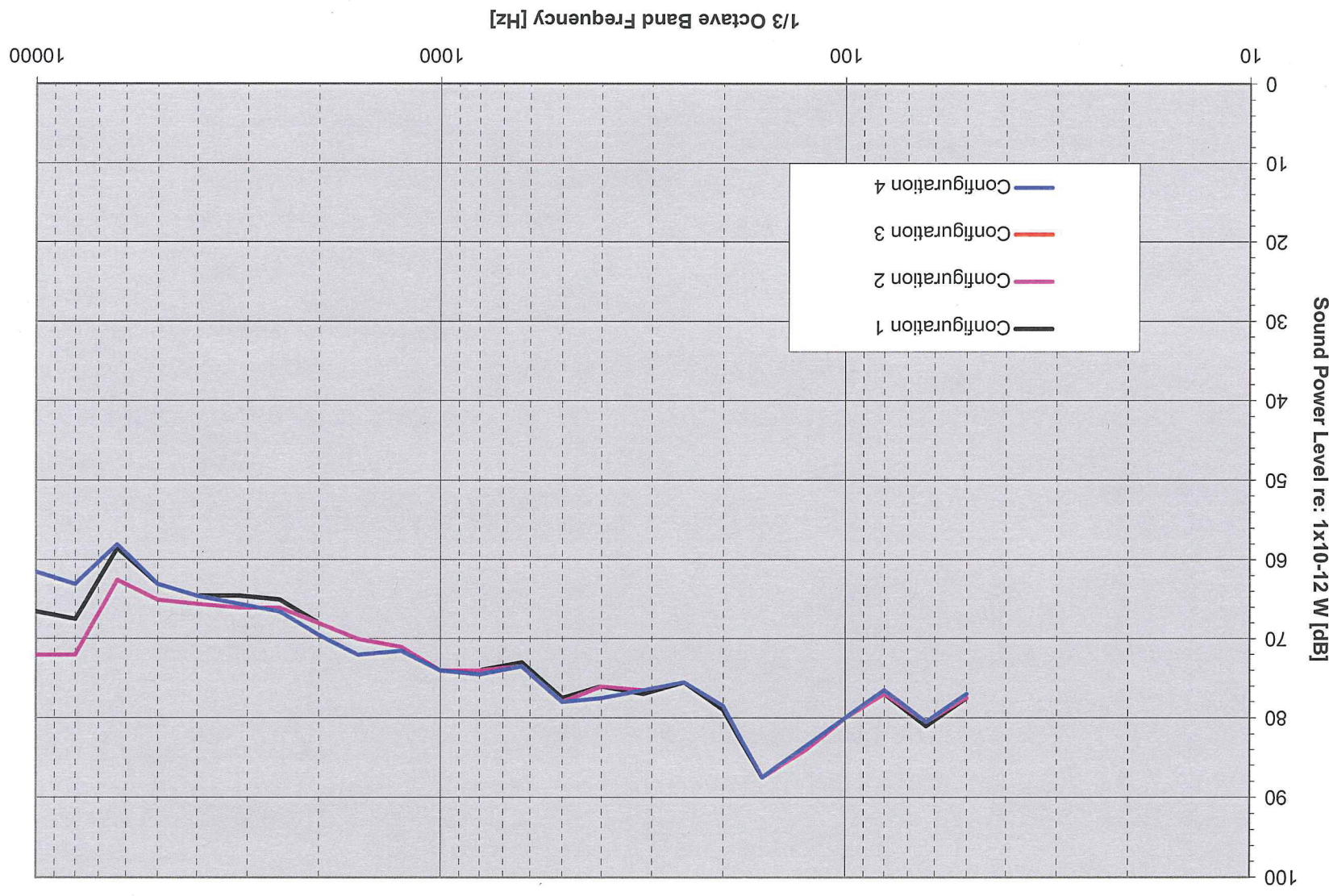


Table 7: AEI Solaron 500 – 1/3 Octave Band Sound Power Levels in dB, re: 1x10<sup>-12</sup> W

Inverter Specification AE Advanced Energy Solaron 500K - 2 per station  
 PWL Reference - Inverter Sound Level Testing Report - Vibro Acoustic Consultants - Config 2

Frequency (1/3, Hz)	Sound Power Level (PWL, dB)	Frequency (1/1, Hz)	For One Inverter Unit (PWL, dB)	For Two Inverter Units (PWL, dB)
50	77.5	63	83.4	86.4
63	80.5			
80	77			
100	80	125	89.6	92.6
125	84			
160	87.5			
200	78.5	250	81.8	84.8
250	75.5			
315	76.5			
400	76	500	81.0	84.0
500	78			
630	73.5			
800	74	1000	78.0	81.0
1000	74			
1250	71			
1600	70	2000	73.1	76.1
2000	68			
2500	66			
3150	66	4000	70.3	73.3
4000	65.5			
5000	65			
6300	62.5	8000	75.2	78.3
8000	72			
10000	72			

Ref: "Engineering Noise Control" - Bies and Hansen (p 600) / NEMA

**1 MVA Transformer for Inverter Stations - Cooper 1MVA**

		NR =							
		63							
	Surface area	41.7	Estimated based on plan and elevation						
Freq (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Correction of Octave Band	-1	5	7	2	2	-4	-9	-14	-21
Octave Band Data	78	84	86	81	81	75	70	65	58

**10 MVA Transformer for substation**

		NR =							
		71							
	Surface area	84.0	Estimated based on plan and elevation						
Freq (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Correction of Octave Band	-1	5	7	2	2	-4	-9	-14	-21
Octave Band Data	89	95	97	92	92	86	81	76	69



**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

## **Appendix C:**

**Points of Reception Details and Summary of  
Results**







**Legend**

- Subject Property
- Project Location
- 120 m Zone of Investigation
- Receptors outside 500 m setback from HWY 401 (Class 3 Receptors)
- Receptors within 500 m setback from HWY 401 (Class 2 Receptors)
- Source

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



**Stantec**

July 2013  
161011028

Client/Project  
Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
**C1**

Title  
**Assessed Points of Reception for David Brown Solar Park**





Table C1: Acoustic Assessment Summary Table

Name	ID	Level Lr		Height (m)	Coordinates		
		Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)
POR001	POR001	40.4	40.4	4.5	499357.8	4983839.7	85.4
POR002	POR002	40.4	40.4	4.5	499421.8	4983874.9	85.2
POR003	POR003	39.7	39.7	4.5	499154.8	4983703.9	86.1
POR004	POR004	40.3	40.3	4.5	499664.8	4983994.9	84.5
POR005	POR005	40	40	4.5	499632.8	4983989.9	84.5
POR006	POR006	39.4	39.4	4.5	499135.8	4983695.9	86.2
POR007	POR007	40.1	40.1	4.5	499715.8	4984038.9	84.5
POR008	POR008	40.4	40.4	4.5	499900.8	4984118.9	88.1
POR009	POR009	38.2	38.2	4.5	499069.8	4983661.9	86.4
POR010	POR010	38.7	38.7	4.5	499992.8	4984196.9	88.4
POR011	POR011	38.5	38.5	4.5	500297.8	4983724.9	88.3
POR012	POR012	33.9	33.9	4.5	498852.8	4983536.9	87.1
POR013	POR013	32	32	4.5	498742.8	4983464.9	87.5
POR014	POR014	31.1	31.1	4.5	500038.8	4984423.9	85.8
POR015	POR015	30.1	30.1	4.5	498615.8	4983405.9	87.9
POR016	POR016	30.9	30.9	4.5	500025.8	4984441.9	85.2
POR017	POR017	30.6	30.6	4.5	500038.8	4984458.9	84.6
POR018	POR018	30.6	30.6	4.5	500596.8	4983302.9	84.5
POR019	POR019	29.7	29.7	4.5	499898.8	4984580.9	84.5
POR020	POR020	29.7	29.7	4.5	500581.8	4983159.9	84.5
POR021	POR021	29.1	29.1	4.5	498983.8	4984486.9	84.5
POR022	POR022	29	29	4.5	500038.8	4984580.9	84.5
POR023	POR023	29.1	29.1	4.5	500704.8	4983235.9	84.5
POR024	POR024	28.9	28.9	4.5	500024.8	4984596.9	84.5
POR025	POR025	28.9	28.9	4.5	500722.8	4983227.9	84.5
POR026	POR026	28.8	28.8	4.5	500720.8	4983202.9	84.5
POR027	POR027	28.8	28.8	4.5	500688.8	4983142.9	84.5
POR028	POR028	28.4	28.4	4.5	500213.8	4982730.9	84.5
POR029	POR029	28.4	28.4	4.5	500324.8	4982783.9	84.5
POR030	POR030	28.4	28.4	4.5	500302.8	4982769.9	84.5
POR031	POR031	28.3	28.3	4.5	500263.8	4982744.9	84.5
POR032	POR032	28.4	28.4	4.5	500247.8	4982736.9	84.5
POR033	POR033	28.4	28.4	4.5	500283.8	4982763.9	84.5
POR034	POR034	28.3	28.3	4.5	500225.8	4982723.9	84.5
POR035	POR035	28.6	28.6	4.5	500696.8	4983125.9	84.5
POR036	POR036	28.4	28.4	4.5	500413.8	4982841.9	84.5
POR037	POR037	28.4	28.4	4.5	500381.8	4982819.9	84.5
POR038	POR038	28.4	28.4	4.5	500365.8	4982804.9	84.5
POR039	POR039	28.4	28.4	4.5	500342.8	4982792.9	84.5
POR040	POR040	28.3	28.3	4.5	500197.8	4982700.9	84.5
POR041	POR041	28.2	28.2	4.5	500124.8	4982664.9	84.5
POR042	POR042	28.2	28.2	4.5	500081.8	4982644.9	84.5
POR043	POR043	27.9	27.9	4.5	499010.8	4982632.9	86.8



Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR044	POR044	28.4	28.4	4.5	499995.8	4984651.9	84.5
POR045	POR045	28.5	28.5	4.5	500734.8	4983177.9	84.5
POR046	POR046	28.3	28.3	4.5	500425.8	4982835.9	84.5
POR047	POR047	28.3	28.3	4.5	500404.8	4982823.9	84.5
POR048	POR048	28	28	4.5	499968.8	4982584.9	84.5
POR049	POR049	28	28	4.5	499992.8	4982597.9	84.5
POR050	POR050	27.7	27.7	4.5	499020.8	4982608.9	86.7
POR051	POR051	28.2	28.2	4.5	499968.8	4984668.9	84.5
POR052	POR052	28.4	28.4	4.5	500758.8	4983185.9	84.5
POR053	POR053	28.2	28.2	4.5	499230.8	4984759.9	84.5
POR054	POR054	28	28	4.5	500087.8	4982622.9	84.5
POR055	POR055	28	28	4.5	500131.8	4982646.9	84.5
POR056	POR056	28.1	28.1	4.5	499987.8	4984676.9	84.5
POR057	POR057	28.3	28.3	4.5	500748.8	4983158.9	84.5
POR058	POR058	28	28	4.5	500185.8	4982661.9	84.5
POR059	POR059	28.1	28.1	4.5	500542.8	4982894.9	84.5
POR060	POR060	27.8	27.8	4.5	500271.8	4982686.9	84.5
POR061	POR061	27.9	27.9	4.5	499162.8	4984760.9	84.5
POR062	POR062	27.8	27.8	4.5	500245.8	4982672.9	84.5
POR063	POR063	27.8	27.8	4.5	500139.8	4982626.9	84.5
POR064	POR064	28.1	28.1	4.5	500756.8	4983135.9	84.5
POR065	POR065	28	28	4.5	500595.8	4982931.9	84.5
POR066	POR066	27.8	27.8	4.5	500353.8	4982727.9	84.5
POR067	POR067	27.7	27.7	4.5	500147.8	4982610.9	84.5
POR068	POR068	27.8	27.8	4.5	500332.8	4982718.9	84.5
POR069	POR069	27.8	27.8	4.5	500309.8	4982703.9	84.5
POR070	POR070	27.8	27.8	4.5	500292.8	4982695.9	84.5
POR071	POR071	28	28	4.5	500778.8	4983135.9	84.5
POR072	POR072	28	28	4.5	500766.8	4983119.9	84.5
POR073	POR073	27.8	27.8	4.5	500390.8	4982746.9	84.5
POR074	POR074	27.8	27.8	4.5	500375.8	4982733.9	84.5
POR075	POR075	27.6	27.6	4.5	500069.8	4982568.9	84.5
POR076	POR076	27.6	27.6	4.5	499983.8	4982543.9	84.5
POR077	POR077	27.9	27.9	4.5	500784.8	4983129.9	84.5
POR078	POR078	27.6	27.6	4.5	500432.8	4982753.9	84.5
POR079	POR079	27.5	27.5	4.5	500207.8	4982614.9	84.5
POR080	POR080	27.7	27.7	4.5	500356.8	4982710.9	84.5
POR081	POR081	27.5	27.5	4.5	500159.8	4982593.9	84.5
POR082	POR082	27.6	27.6	4.5	500255.8	4982646.9	84.5
POR083	POR083	27.5	27.5	4.5	500104.8	4982576.9	84.5
POR084	POR084	27.5	27.5	4.5	500021.8	4982539.9	84.5
POR085	POR085	27.8	27.8	4.5	500774.8	4983096.9	84.5
POR086	POR086	27.4	27.4	4.5	500108.8	4982565.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR087	POR087	27.7	27.7	4.5	500789.8	4983096.9	84.5
POR088	POR088	27.5	27.5	4.5	500461.8	4982752.9	84.5
POR089	POR089	27.3	27.3	4.5	500219.8	4982598.9	84.5
POR090	POR090	27.4	27.4	4.5	500266.8	4982626.9	84.5
POR091	POR091	27.3	27.3	4.5	499136.8	4984823.9	84.6
POR092	POR092	27.2	27.2	4.5	500119.8	4982546.9	84.5
POR093	POR093	28.5	28.5	4.5	500779.8	4983273.9	84.5
POR094	POR094	27.1	27.1	4.5	500188.8	4982559.9	84.5
POR095	POR095	27.1	27.1	4.5	500126.8	4982530.9	84.5
POR096	POR096	27.2	27.2	4.5	500221.8	4982577.9	84.5
POR097	POR097	27.1	27.1	4.5	500170.8	4982554.9	84.5
POR098	POR098	27.3	27.3	4.5	500811.8	4983067.9	84.5
POR099	POR099	27.2	27.2	4.5	500547.8	4982773.9	84.5
POR100	POR100	27.2	27.2	4.5	500521.8	4982758.9	84.5
POR101	POR101	27.1	27.1	4.5	500359.8	4982634.9	84.5
POR102	POR102	27.1	27.1	4.5	500432.8	4982684.9	84.5
POR103	POR103	27.2	27.2	4.5	500472.8	4982719.9	84.5
POR104	POR104	27.1	27.1	4.5	500337.8	4982626.9	84.5
POR105	POR105	27.2	27.2	4.5	500479.8	4982729.9	84.5
POR106	POR106	27.1	27.1	4.5	500280.8	4982599.9	84.5
POR107	POR107	27.1	27.1	4.5	500314.8	4982616.9	84.5
POR108	POR108	27.1	27.1	4.5	499107.8	4984827.9	85.0
POR109	POR109	27	27	4.5	500489.8	4982712.9	84.5
POR110	POR110	27.1	27.1	4.5	499199.8	4984875.9	85.1
POR111	POR111	27	27	4.5	500379.8	4982643.9	84.5
POR112	POR112	27.1	27.1	4.5	500411.8	4982665.9	84.5
POR113	POR113	27	27	4.5	500468.8	4982685.9	84.5
POR114	POR114	27	27	4.5	500443.8	4982670.9	84.5
POR115	POR115	27.1	27.1	4.5	500790.8	4983619.9	84.5
POR116	POR116	26.9	26.9	4.5	500499.8	4982692.9	84.5
POR117	POR117	26.9	26.9	4.5	500464.8	4982674.9	84.5
POR118	POR118	26.9	26.9	4.5	500485.8	4982692.9	84.5
POR119	POR119	26.7	26.7	4.5	500190.8	4982508.9	84.5
POR120	POR120	26.7	26.7	4.5	500249.8	4982533.9	84.5
POR121	POR121	26.7	26.7	4.5	500232.8	4982524.9	84.5
POR122	POR122	26.7	26.7	4.5	500144.8	4982489.9	84.5
POR123	POR123	26.6	26.6	4.5	499701.8	4982376.9	84.6
POR124	POR124	26.8	26.8	4.5	500547.8	4982714.9	84.5
POR125	POR125	26.7	26.7	4.5	500353.8	4982578.9	84.5
POR126	POR126	26.7	26.7	4.5	500334.8	4982569.9	84.5
POR127	POR127	26.7	26.7	4.5	500315.8	4982558.9	84.5
POR128	POR128	26.7	26.7	4.5	500292.8	4982550.9	84.5
POR129	POR129	26.7	26.7	4.5	500272.8	4982541.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR130	POR130	26.6	26.6	4.5	500264.8	4982532.9	84.5
POR131	POR131	26.7	26.7	4.5	499056.8	4984848.9	85.7
POR132	POR132	26.4	26.4	4.5	499662.8	4982353.9	84.7
POR133	POR133	26.9	26.9	4.5	500827.8	4982997.9	84.5
POR134	POR134	26.6	26.6	4.5	500432.8	4982614.9	84.5
POR135	POR135	26.6	26.6	4.5	500399.8	4982596.9	84.5
POR136	POR136	26.5	26.5	4.5	500199.8	4982488.9	84.5
POR137	POR137	26.6	26.6	4.5	500378.8	4982586.9	84.5
POR138	POR138	26.8	26.8	4.5	500845.8	4982997.9	84.5
POR139	POR139	26.6	26.6	4.5	500556.8	4982694.9	84.5
POR140	POR140	26.5	26.5	4.5	500456.8	4982617.9	84.5
POR141	POR141	26.5	26.5	4.5	500463.8	4982625.9	84.5
POR142	POR142	26.5	26.5	4.5	500445.8	4982614.9	84.5
POR143	POR143	26.4	26.4	4.5	500217.8	4982481.9	84.5
POR144	POR144	26.6	26.6	4.5	500422.8	4982605.9	84.5
POR145	POR145	26.5	26.5	4.5	500367.8	4982570.9	84.5
POR146	POR146	26.2	26.2	4.5	499724.8	4982335.9	84.5
POR147	POR147	26.6	26.6	4.5	500844.8	4982975.9	84.5
POR148	POR148	26.5	26.5	4.5	500572.8	4982692.9	84.5
POR149	POR149	26.4	26.4	4.5	500521.8	4982648.9	84.5
POR150	POR150	26.5	26.5	4.5	500482.8	4982631.9	84.5
POR151	POR151	26.3	26.3	4.5	500164.8	4982450.9	84.5
POR152	POR152	26.4	26.4	4.5	500206.8	4982470.9	84.5
POR153	POR153	26.6	26.6	4.5	500860.8	4982980.9	84.5
POR154	POR154	26.2	26.2	4.5	500168.8	4982431.9	84.5
POR155	POR155	26.1	26.1	4.5	499983.8	4982365.9	84.5
POR156	POR156	26.2	26.2	4.5	500072.8	4982401.9	84.5
POR157	POR157	26.1	26.1	4.5	499935.8	4982351.9	84.5
POR158	POR158	26.1	26.1	4.5	500022.8	4982376.9	84.5
POR159	POR159	26.2	26.2	4.5	499990.8	4982377.9	84.5
POR160	POR160	26.1	26.1	4.5	499686.8	4982312.9	84.6
POR161	POR161	26.3	26.3	4.5	500577.8	4982661.9	84.5
POR162	POR162	26.3	26.3	4.5	500530.8	4982631.9	84.5
POR163	POR163	26.1	26.1	4.5	500298.8	4982481.9	84.5
POR164	POR164	26.2	26.2	4.5	500319.8	4982494.9	84.5
POR165	POR165	26.1	26.1	4.5	500337.8	4982500.9	84.5
POR166	POR166	26.2	26.2	4.5	500361.8	4982515.9	84.5
POR167	POR167	26.2	26.2	4.5	500382.8	4982531.9	84.5
POR168	POR168	26.1	26.1	4.5	500132.8	4982413.9	84.5
POR169	POR169	26.1	26.1	4.5	500115.8	4982404.9	84.5
POR170	POR170	26.2	26.2	4.5	500216.8	4982448.9	84.5
POR171	POR171	26.1	26.1	4.5	500086.8	4982395.9	84.5
POR172	POR172	26.1	26.1	4.5	500071.8	4982387.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR173	POR173	26.1	26.1	4.5	500043.8	4982381.9	84.5
POR174	POR174	26	26	4.5	499912.8	4982338.9	84.5
POR175	POR175	26.1	26.1	4.5	500002.8	4982368.9	84.5
POR176	POR176	26.1	26.1	4.5	499955.8	4982356.9	84.5
POR177	POR177	26	26	4.5	499736.8	4982312.9	84.5
POR178	POR178	26.3	26.3	4.5	500821.8	4982889.9	84.5
POR179	POR179	26.3	26.3	4.5	500728.8	4982794.9	84.5
POR180	POR180	26.1	26.1	4.5	500440.8	4982546.9	84.5
POR181	POR181	26.1	26.1	4.5	500422.8	4982539.9	84.5
POR182	POR182	26.1	26.1	4.5	500377.8	4982519.9	84.5
POR183	POR183	26.1	26.1	4.5	500399.8	4982530.9	84.5
POR184	POR184	26.1	26.1	4.5	500293.8	4982473.9	84.5
POR185	POR185	25.9	25.9	4.5	499698.8	4982290.9	84.5
POR186	POR186	25.9	25.9	4.5	499748.8	4982296.9	84.5
POR187	POR187	26.2	26.2	4.5	500832.8	4982876.9	84.5
POR188	POR188	26	26	4.5	500507.8	4982576.9	84.5
POR189	POR189	26	26	4.5	500483.8	4982565.9	84.5
POR190	POR190	25.9	25.9	4.5	500232.8	4982422.9	84.5
POR191	POR191	25.9	25.9	4.5	500289.8	4982450.9	84.5
POR192	POR192	26.1	26.1	4.5	500463.8	4982559.9	84.5
POR193	POR193	26.1	26.1	4.5	500489.8	4982577.9	84.5
POR194	POR194	26.1	26.1	4.5	500539.8	4982611.9	84.5
POR195	POR195	25.7	25.7	4.5	499709.8	4982274.9	84.5
POR196	POR196	25.8	25.8	4.5	499866.8	4982305.9	84.5
POR197	POR197	26.1	26.1	4.5	500876.8	4982913.9	84.5
POR198	POR198	26	26	4.5	500541.8	4982590.9	84.5
POR199	POR199	26	26	4.5	500530.8	4982586.9	84.5
POR200	POR200	25.8	25.8	4.5	500149.8	4982371.9	84.5
POR201	POR201	25.7	25.7	4.5	500106.8	4982353.9	84.5
POR202	POR202	25.8	25.8	4.5	500128.8	4982362.9	84.5
POR203	POR203	25.8	25.8	4.5	500191.8	4982392.9	84.5
POR204	POR204	25.7	25.7	4.5	499997.8	4982319.9	84.5
POR205	POR205	25.9	25.9	4.5	500278.8	4982439.9	84.5
POR206	POR206	25.7	25.7	4.5	500038.8	4982330.9	84.5
POR207	POR207	25.7	25.7	4.5	500060.8	4982338.9	84.5
POR208	POR208	25.7	25.7	4.5	500018.8	4982325.9	84.5
POR209	POR209	25.7	25.7	4.5	499758.8	4982278.9	84.5
POR210	POR210	25.7	25.7	4.5	499773.8	4982275.9	84.5
POR211	POR211	26	26	4.5	500842.8	4982860.9	84.5
POR212	POR212	25.8	25.8	4.5	500397.8	4982476.9	84.5
POR213	POR213	25.8	25.8	4.5	500340.8	4982449.9	84.5
POR214	POR214	25.6	25.6	4.5	500023.8	4982314.9	84.5
POR215	POR215	25.6	25.6	4.5	499771.8	4982258.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR216	POR216	25.6	25.6	4.5	499889.8	4982278.9	84.5
POR217	POR217	25.7	25.7	4.5	500084.8	4982345.9	84.5
POR218	POR218	25.7	25.7	4.5	499950.8	4982303.9	84.5
POR219	POR219	25.6	25.6	4.5	499900.8	4982288.9	84.5
POR220	POR220	25.6	25.6	4.5	499720.8	4982257.9	84.5
POR221	POR221	25.9	25.9	4.5	500888.8	4982896.9	84.5
POR222	POR222	25.6	25.6	4.5	500344.8	4982432.9	84.5
POR223	POR223	25.7	25.7	4.5	500461.8	4982505.9	84.5
POR224	POR224	25.7	25.7	4.5	500444.8	4982497.9	84.5
POR225	POR225	25.7	25.7	4.5	500421.8	4982485.9	84.5
POR226	POR226	25.7	25.7	4.5	500377.8	4982461.9	84.5
POR227	POR227	25.6	25.6	4.5	500198.8	4982369.9	84.5
POR228	POR228	25.6	25.6	4.5	500110.8	4982331.9	84.5
POR229	POR229	25.5	25.5	4.5	499959.8	4982288.9	84.5
POR230	POR230	25.5	25.5	4.5	499711.8	4982242.9	84.5
POR231	POR231	25.6	25.6	4.5	500525.8	4982534.9	84.5
POR232	POR232	25.7	25.7	4.5	500501.8	4982522.9	84.5
POR233	POR233	25.7	25.7	4.5	500485.8	4982515.9	84.5
POR234	POR234	25.6	25.6	4.5	500473.8	4982497.9	84.5
POR235	POR235	25.5	25.5	4.5	499974.8	4982284.9	84.5
POR236	POR236	25.5	25.5	4.5	499911.8	4982266.9	84.5
POR237	POR237	25.4	25.4	4.5	499782.8	4982237.9	84.5
POR238	POR238	25.4	25.4	4.5	499733.8	4982233.9	84.5
POR239	POR239	25.4	25.4	4.5	499720.8	4982235.9	84.5
POR240	POR240	25.7	25.7	4.5	500898.8	4982868.9	84.5
POR241	POR241	25.6	25.6	4.5	500565.8	4982547.9	84.5
POR242	POR242	25.6	25.6	4.5	500536.8	4982528.9	84.5
POR243	POR243	25.5	25.5	4.5	500206.8	4982349.9	84.5
POR244	POR244	25.3	25.3	4.5	499923.8	4982249.9	84.5
POR245	POR245	25.4	25.4	4.5	499972.8	4982266.9	84.5
POR246	POR246	25.3	25.3	4.5	499744.8	4982217.9	84.5
POR247	POR247	25.6	25.6	4.5	500908.8	4982853.9	84.5
POR248	POR248	25.4	25.4	4.5	500572.8	4982531.9	84.5
POR249	POR249	25.3	25.3	4.5	500212.8	4982328.9	84.5
POR250	POR250	25.3	25.3	4.5	500151.8	4982303.9	84.5
POR251	POR251	25.2	25.2	4.5	500001.8	4982257.9	84.5
POR252	POR252	25.4	25.4	4.5	500357.8	4982410.9	84.5
POR253	POR253	25.2	25.2	4.5	499738.8	4982205.9	84.5
POR254	POR254	25.2	25.2	4.5	499793.8	4982219.9	84.5
POR255	POR255	25.5	25.5	4.5	500794.8	4982710.9	84.5
POR256	POR256	25.4	25.4	4.5	500803.8	4982717.9	84.5
POR257	POR257	25.4	25.4	4.5	500614.8	4982552.9	84.5
POR258	POR258	25.3	25.3	4.5	500363.8	4982391.9	84.5



Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR259	POR259	25.3	25.3	4.5	500405.8	4982411.9	84.5
POR260	POR260	25.3	25.3	4.5	500436.8	4982432.9	84.5
POR261	POR261	25.3	25.3	4.5	500179.8	4982311.9	84.5
POR262	POR262	25.1	25.1	4.5	499804.8	4982198.9	84.5
POR263	POR263	25.2	25.2	4.5	500134.8	4982295.9	84.5
POR264	POR264	25.2	25.2	4.5	500109.8	4982287.9	84.5
POR265	POR265	25.2	25.2	4.5	500088.8	4982279.9	84.5
POR266	POR266	25.2	25.2	4.5	500065.8	4982272.9	84.5
POR267	POR267	25.2	25.2	4.5	500047.8	4982266.9	84.5
POR268	POR268	25.2	25.2	4.5	499977.8	4982247.9	84.5
POR269	POR269	25.2	25.2	4.5	500022.8	4982258.9	84.5
POR270	POR270	25.1	25.1	4.5	499755.8	4982196.9	84.5
POR271	POR271	25.4	25.4	4.5	500918.8	4982829.9	84.5
POR272	POR272	25.2	25.2	4.5	500623.8	4982537.9	84.5
POR273	POR273	25.2	25.2	4.5	500552.8	4982485.9	84.5
POR274	POR274	25.1	25.1	4.5	500325.8	4982351.9	84.5
POR275	POR275	25.2	25.2	4.5	500468.8	4982440.9	84.5
POR276	POR276	25.2	25.2	4.5	500489.8	4982450.9	84.5
POR277	POR277	25.2	25.2	4.5	500266.8	4982332.9	84.5
POR278	POR278	25.1	25.1	4.5	499937.8	4982219.9	84.5
POR279	POR279	25.3	25.3	4.5	500873.8	4982752.9	84.5
POR280	POR280	25.1	25.1	4.5	500534.8	4982464.9	84.5
POR281	POR281	25.1	25.1	4.5	500548.8	4982470.9	84.5
POR282	POR282	25.2	25.2	4.5	500584.8	4982507.9	84.5
POR283	POR283	25.2	25.2	4.5	500509.8	4982453.9	84.5
POR284	POR284	24.9	24.9	4.5	499816.8	4982181.9	84.5
POR285	POR285	24.9	24.9	4.5	499766.8	4982179.9	84.5
POR286	POR286	25.2	25.2	4.5	501009.8	4982920.9	84.5
POR287	POR287	25.3	25.3	4.5	500992.8	4982900.9	84.5
POR288	POR288	25.2	25.2	4.5	500927.8	4982806.9	84.5
POR289	POR289	25.3	25.3	4.5	500969.8	4982873.9	84.5
POR290	POR290	25.1	25.1	4.5	500627.8	4982521.9	84.5
POR291	POR291	25.1	25.1	4.5	500585.8	4982487.9	84.5
POR292	POR292	24.9	24.9	4.5	500151.8	4982250.9	84.5
POR293	POR293	24.9	24.9	4.5	500174.8	4982260.9	84.5
POR294	POR294	24.9	24.9	4.5	500191.8	4982269.9	84.5
POR295	POR295	24.9	24.9	4.5	500223.8	4982277.9	84.5
POR296	POR296	25	25	4.5	500233.8	4982289.9	84.5
POR297	POR297	24.8	24.8	4.5	500045.8	4982214.9	84.5
POR298	POR298	24.9	24.9	4.5	500065.8	4982221.9	84.5
POR299	POR299	24.9	24.9	4.5	500107.8	4982235.9	84.5
POR300	POR300	24.9	24.9	4.5	500132.8	4982244.9	84.5
POR301	POR301	25	25	4.5	500275.8	4982309.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR302	POR302	25	25	4.5	500353.8	4982343.9	84.5
POR303	POR303	24.8	24.8	4.5	500007.8	4982204.9	84.5
POR304	POR304	24.9	24.9	4.5	500084.8	4982229.9	84.5
POR305	POR305	24.8	24.8	4.5	499779.8	4982156.9	84.5
POR306	POR306	24.9	24.9	4.5	499967.8	4982199.9	84.5
POR307	POR307	24.9	24.9	4.5	499954.8	4982201.9	84.5
POR308	POR308	24.9	24.9	4.5	499762.8	4982166.9	84.5
POR309	POR309	24.9	24.9	4.5	500482.8	4982393.9	84.5
POR310	POR310	24.9	24.9	4.5	500463.8	4982383.9	84.5
POR311	POR311	24.9	24.9	4.5	500442.8	4982373.9	84.5
POR312	POR312	24.9	24.9	4.5	500422.8	4982365.9	84.5
POR313	POR313	24.9	24.9	4.5	500403.8	4982354.9	84.5
POR314	POR314	24.9	24.9	4.5	500383.8	4982348.9	84.5
POR315	POR315	24.8	24.8	4.5	500036.8	4982203.9	84.5
POR316	POR316	24.8	24.8	4.5	499996.8	4982194.9	84.5
POR317	POR317	24.7	24.7	4.5	499830.8	4982156.9	84.5
POR318	POR318	25.1	25.1	4.5	501036.8	4982928.9	84.5
POR319	POR319	25	25	4.5	500939.8	4982782.9	84.5
POR320	POR320	25.1	25.1	4.5	500981.8	4982849.9	84.5
POR321	POR321	24.8	24.8	4.5	500551.8	4982422.9	84.5
POR322	POR322	24.8	24.8	4.5	500529.8	4982414.9	84.5
POR323	POR323	24.8	24.8	4.5	500507.8	4982401.9	84.5
POR324	POR324	24.8	24.8	4.5	500495.8	4982386.9	84.5
POR325	POR325	24.7	24.7	4.5	500298.8	4982281.9	84.5
POR326	POR326	24.8	24.8	4.5	500285.8	4982287.9	84.5
POR327	POR327	24.8	24.8	4.5	500241.8	4982268.9	84.5
POR328	POR328	24.9	24.9	4.5	500947.8	4982763.9	84.5
POR329	POR329	24.9	24.9	4.5	500989.8	4982831.9	84.5
POR330	POR330	24.8	24.8	4.5	500743.8	4982557.9	84.5
POR331	POR331	24.7	24.7	4.5	500606.8	4982443.9	84.5
POR332	POR332	24.7	24.7	4.5	500546.8	4982409.9	84.5
POR333	POR333	24.7	24.7	4.5	498964.8	4985094.9	89.5
POR334	POR334	24.6	24.6	4.5	500251.8	4982248.9	84.5
POR335	POR335	24.5	24.5	4.5	499843.8	4982131.9	84.5
POR336	POR336	24.6	24.6	4.5	499792.8	4982131.9	84.5
POR337	POR337	24.8	24.8	4.5	501031.8	4982864.9	84.5
POR338	POR338	24.8	24.8	4.5	500963.8	4982771.9	84.5
POR339	POR339	24.7	24.7	4.5	500579.8	4982421.9	84.5
POR340	POR340	24.6	24.6	4.5	500392.8	4982303.9	84.5
POR341	POR341	24.4	24.4	4.5	499808.8	4982107.9	84.5
POR342	POR342	24.7	24.7	4.5	501036.8	4982843.9	84.5
POR343	POR343	24.8	24.8	4.5	501048.8	4982874.9	84.5
POR344	POR344	24.8	24.8	4.5	500999.8	4982807.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR345	POR345	24.5	24.5	4.5	500479.8	4982329.9	84.5
POR346	POR346	24.5	24.5	4.5	500617.8	4982422.9	84.5
POR347	POR347	24.4	24.4	4.5	500222.8	4982208.9	84.5
POR348	POR348	24.4	24.4	4.5	500202.8	4982201.9	84.5
POR349	POR349	24.4	24.4	4.5	500178.8	4982191.9	84.5
POR350	POR350	24.4	24.4	4.5	500157.8	4982184.9	84.5
POR351	POR351	24.4	24.4	4.5	500134.8	4982177.9	84.4
POR352	POR352	24.5	24.5	4.5	500305.8	4982248.9	84.5
POR353	POR353	24.5	24.5	4.5	500317.8	4982255.9	84.5
POR354	POR354	24.4	24.4	4.5	500345.8	4982260.9	84.5
POR355	POR355	24.5	24.5	4.5	500364.8	4982273.9	84.5
POR356	POR356	24.5	24.5	4.5	500381.8	4982283.9	84.5
POR357	POR357	24.4	24.4	4.5	500108.8	4982167.9	84.2
POR358	POR358	24.5	24.5	4.5	500254.8	4982227.9	84.5
POR359	POR359	24.4	24.4	4.5	500062.8	4982153.9	84.5
POR360	POR360	24.4	24.4	4.5	500044.8	4982147.9	84.5
POR361	POR361	24.5	24.5	4.5	500351.8	4982275.9	84.5
POR362	POR362	24.4	24.4	4.5	500083.8	4982160.9	84.4
POR363	POR363	24.3	24.3	4.5	499992.8	4982133.9	84.5
POR364	POR364	24.4	24.4	4.5	500015.8	4982143.9	84.5
POR365	POR365	24.3	24.3	4.5	499945.8	4982123.9	84.4
POR366	POR366	24.3	24.3	4.5	499858.8	4982105.9	84.5
POR367	POR367	24.3	24.3	4.5	499755.8	4982093.9	84.5
POR368	POR368	24.7	24.7	4.5	501072.8	4982882.9	84.5
POR369	POR369	24.6	24.6	4.5	501013.8	4982789.9	84.5
POR370	POR370	24.4	24.4	4.5	500508.8	4982331.9	84.5
POR371	POR371	24.4	24.4	4.5	500467.8	4982311.9	84.5
POR372	POR372	24.4	24.4	4.5	500493.8	4982326.9	84.5
POR373	POR373	24.5	24.5	4.5	500605.8	4982403.9	84.5
POR374	POR374	24.4	24.4	4.5	500407.8	4982286.9	84.5
POR375	POR375	24.4	24.4	4.5	500425.8	4982292.9	84.5
POR376	POR376	24.4	24.4	4.5	500449.8	4982304.9	84.5
POR377	POR377	24.5	24.5	4.5	500512.8	4982345.9	84.5
POR378	POR378	24.2	24.2	4.5	499943.8	4982107.9	83.9
POR379	POR379	24.3	24.3	4.5	499969.8	4982122.9	84.3
POR380	POR380	24.2	24.2	4.5	499819.8	4982085.9	84.5
POR381	POR381	24.5	24.5	4.5	500988.8	4982729.9	84.5
POR382	POR382	24.5	24.5	4.5	500969.8	4982713.9	84.5
POR383	POR383	24.3	24.3	4.5	500571.8	4982359.9	84.5
POR384	POR384	24.3	24.3	4.5	500596.8	4982371.9	84.5
POR385	POR385	24.4	24.4	4.5	500534.8	4982341.9	84.5
POR386	POR386	24.4	24.4	4.5	500551.8	4982352.9	84.5
POR387	POR387	24.4	24.4	4.5	500626.8	4982406.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR388	POR388	24.1	24.1	4.5	499877.8	4982079.9	84.5
POR389	POR389	24.2	24.2	4.5	499930.8	4982101.9	83.8
POR390	POR390	24.1	24.1	4.5	499768.8	4982070.9	84.5
POR391	POR391	24.4	24.4	4.5	501093.8	4982853.9	84.5
POR392	POR392	24.4	24.4	4.5	501057.8	4982811.9	84.5
POR393	POR393	24.4	24.4	4.5	501011.8	4982738.9	84.5
POR394	POR394	24.3	24.3	4.5	500627.8	4982386.9	84.5
POR395	POR395	24.1	24.1	4.5	500257.8	4982175.9	84.5
POR396	POR396	24.1	24.1	4.5	500276.8	4982183.9	84.5
POR397	POR397	24.1	24.1	4.5	500317.8	4982200.9	84.5
POR398	POR398	24.1	24.1	4.5	500340.8	4982212.9	84.5
POR399	POR399	24.3	24.3	4.5	500612.8	4982380.9	84.5
POR400	POR400	24	24	4.5	499778.8	4982054.9	84.5
POR401	POR401	24	24	4.5	499726.8	4982050.9	84.5
POR402	POR402	24.3	24.3	4.5	500982.8	4982681.9	84.5
POR403	POR403	24.3	24.3	4.5	500993.8	4982692.9	84.5
POR404	POR404	24.3	24.3	4.5	501031.8	4982746.9	84.5
POR405	POR405	24.4	24.4	4.5	501072.8	4982816.9	84.5
POR406	POR406	24.1	24.1	4.5	500479.8	4982267.9	84.5
POR407	POR407	24.1	24.1	4.5	500393.8	4982229.9	84.5
POR408	POR408	24.1	24.1	4.5	500403.8	4982233.9	84.5
POR409	POR409	24.1	24.1	4.5	500425.8	4982243.9	84.5
POR410	POR410	24	24	4.5	500236.8	4982160.9	84.1
POR411	POR411	24	24	4.5	500161.8	4982131.9	82.9
POR412	POR412	24.1	24.1	4.5	500302.8	4982191.9	84.5
POR413	POR413	24.1	24.1	4.5	500362.8	4982219.9	84.5
POR414	POR414	24.1	24.1	4.5	500382.8	4982230.9	84.5
POR415	POR415	24	24	4.5	500188.8	4982143.9	83.2
POR416	POR416	24.1	24.1	4.5	500201.8	4982149.9	83.4
POR417	POR417	24.1	24.1	4.5	500215.8	4982155.9	83.6
POR418	POR418	24	24	4.5	500061.8	4982100.9	83.4
POR419	POR419	24	24	4.5	500080.8	4982110.9	83.4
POR420	POR420	24	24	4.5	500103.8	4982112.9	83.1
POR421	POR421	24	24	4.5	500130.8	4982124.9	82.9
POR422	POR422	24	24	4.5	499993.8	4982081.9	82.9
POR423	POR423	24	24	4.5	499831.8	4982053.9	84.5
POR424	POR424	24.6	24.6	4.5	500661.8	4984542.9	84.5
POR425	POR425	24.3	24.3	4.5	501100.8	4982830.9	84.5
POR426	POR426	24.2	24.2	4.5	501049.8	4982744.9	84.5
POR427	POR427	24.2	24.2	4.5	501052.8	4982756.9	84.5
POR428	POR428	24.1	24.1	4.5	500751.8	4982437.9	84.5
POR429	POR429	24.1	24.1	4.5	500734.8	4982431.9	84.5
POR430	POR430	24	24	4.5	500571.8	4982307.9	84.5



Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR431	POR431	24	24	4.5	500442.8	4982238.9	84.5
POR432	POR432	24	24	4.5	500517.8	4982281.9	84.5
POR433	POR433	24	24	4.5	500544.8	4982296.9	84.5
POR434	POR434	23.9	23.9	4.5	500155.8	4982112.9	82.4
POR435	POR435	23.9	23.9	4.5	500115.8	4982104.9	82.7
POR436	POR436	23.9	23.9	4.5	499935.8	4982055.9	82.6
POR437	POR437	23.9	23.9	4.5	499955.8	4982062.9	82.7
POR438	POR438	23.8	23.8	4.5	499793.8	4982033.9	84.5
POR439	POR439	24.1	24.1	4.5	501076.8	4982766.9	84.5
POR440	POR440	24.2	24.2	4.5	501118.8	4982836.9	84.5
POR441	POR441	24.1	24.1	4.5	500999.8	4982671.9	84.5
POR442	POR442	24.1	24.1	4.5	500990.8	4982659.9	84.5
POR443	POR443	24	24	4.5	500770.8	4982445.9	84.5
POR444	POR444	24	24	4.5	500612.8	4982323.9	84.5
POR445	POR445	24	24	4.5	500593.8	4982315.9	84.5
POR446	POR446	23.7	23.7	4.5	499892.8	4982028.9	83.1
POR447	POR447	23.8	23.8	4.5	499911.8	4982041.9	82.9
POR448	POR448	23.9	23.9	4.5	501140.8	4983443.9	84.5
POR449	POR449	24.4	24.4	4.5	500637.8	4984603.9	84.5
POR450	POR450	24	24	4.5	501002.8	4982637.9	84.5
POR451	POR451	24.1	24.1	4.5	501093.8	4982772.9	84.5
POR452	POR452	23.6	23.6	4.5	499847.8	4982009.9	83.8
POR453	POR453	23.7	23.7	4.5	499870.8	4982018.9	83.4
POR454	POR454	23.7	23.7	4.5	499749.8	4982003.9	84.5
POR455	POR455	24.8	24.8	4.5	501057.8	4982937.9	84.5
POR456	POR456	23.9	23.9	4.5	501017.8	4982631.9	84.5
POR457	POR457	23.6	23.6	4.5	501178.8	4983520.9	84.5
POR458	POR458	23.8	23.8	4.5	500647.8	4982316.9	84.5
POR459	POR459	24.6	24.6	4.5	501097.8	4982956.9	84.5
POR460	POR460	24.7	24.7	4.5	501079.8	4982948.9	84.5
POR461	POR461	23.8	23.8	4.5	501011.8	4982617.9	84.5
POR462	POR462	23.6	23.6	4.5	501171.8	4983411.9	84.5
POR463	POR463	23.7	23.7	4.5	501018.8	4982597.9	84.5
POR464	POR464	23.8	23.8	4.5	501115.8	4982786.9	84.5
POR465	POR465	23.6	23.6	4.5	500858.8	4982434.9	84.5
POR466	POR466	23.5	23.5	4.5	501183.8	4983413.9	84.5
POR467	POR467	23.7	23.7	4.5	501138.8	4982791.9	84.5
POR468	POR468	23.3	23.3	4.5	501212.8	4983509.9	84.5
POR469	POR469	24.4	24.4	4.5	501094.8	4982890.9	84.5
POR470	POR470	23.6	23.6	4.5	501073.8	4982673.9	84.5
POR471	POR471	23.6	23.6	4.5	501081.8	4982692.9	84.5
POR472	POR472	23.2	23.2	4.5	501217.8	4983448.9	84.5
POR473	POR473	24.3	24.3	4.5	501115.8	4982901.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR474	POR474	23.4	23.4	4.5	501031.8	4982597.9	84.5
POR475	POR475	23.4	23.4	4.5	501076.8	4982646.9	84.5
POR476	POR476	23.5	23.5	4.5	501108.8	4982713.9	84.5
POR477	POR477	24.2	24.2	4.5	501155.8	4982928.9	84.5
POR478	POR478	23.4	23.4	4.5	501150.8	4982754.9	84.5
POR479	POR479	23.2	23.2	4.5	501034.8	4982565.9	84.5
POR480	POR480	23.3	23.3	4.5	501081.8	4982626.9	84.5
POR481	POR481	23	23	4.5	500350.8	4982041.9	80.8
POR482	POR482	23.1	23.1	4.5	500972.8	4982489.9	83.4
POR483	POR483	22.7	22.7	4.5	501212.8	4983027.9	84.5
POR484	POR484	23.1	23.1	4.5	501147.8	4982729.9	84.5
POR485	POR485	23.6	23.6	4.5	501157.8	4982805.9	84.5
POR486	POR486	22.6	22.6	4.5	501173.8	4982940.9	84.5
POR487	POR487	23	23	4.5	501184.8	4982746.9	84.5
POR488	POR488	23	23	4.5	501118.8	4982662.9	84.5
POR489	POR489	22.5	22.5	4.5	501231.8	4983038.9	84.5
POR490	POR490	22.5	22.5	4.5	501199.8	4982960.9	84.5
POR491	POR491	23.7	23.7	4.5	501143.8	4982850.9	84.5
POR492	POR492	23.8	23.8	4.5	501144.8	4982864.9	84.5
POR493	POR493	22.9	22.9	4.5	501126.8	4982651.9	84.5
POR494	POR494	22.9	22.9	4.5	501137.8	4982673.9	84.5
POR495	POR495	23.6	23.6	4.5	501164.8	4982864.9	84.5
POR496	POR496	23.6	23.6	4.5	501190.8	4982901.9	84.5
POR497	POR497	22.9	22.9	4.5	501155.8	4982679.9	84.5
POR498	POR498	22.8	22.8	4.5	501091.8	4982586.9	84.5
POR499	POR499	23.6	23.6	4.5	501184.8	4982879.9	84.5
POR500	POR500	22.2	22.2	4.5	501249.8	4983048.9	84.5
POR501	POR501	22.1	22.1	4.5	501218.8	4982970.9	84.5
POR502	POR502	22.1	22.1	4.5	501269.8	4983062.9	84.5
POR503	POR503	22	22	4.5	501257.8	4982993.9	84.5
POR504	POR504	21.4	21.4	4.5	497824.8	4983592.9	88.5
POR505	POR505	22.1	22.1	4.5	501238.8	4982984.9	84.5
POR506	POR506	22.6	22.6	4.5	500651.8	4984838.9	84.5
POR507	POR507	22.5	22.5	4.5	501181.8	4982692.9	84.5
POR508	POR508	22.6	22.6	4.5	501173.8	4982685.9	84.5
POR509	POR509	21.9	21.9	4.5	501303.8	4983088.9	84.5
POR510	POR510	21.9	21.9	4.5	501275.8	4983004.9	84.5
POR511	POR511	22	22	4.5	501291.8	4983072.9	84.5
POR512	POR512	23.1	23.1	4.5	501193.8	4982765.9	84.5
POR513	POR513	21.3	21.3	4.5	497802.8	4983579.9	88.6
POR514	POR514	23.3	23.3	4.5	501202.8	4982891.9	84.5
POR515	POR515	22.4	22.4	4.5	501222.8	4982713.9	84.5
POR516	POR516	22.5	22.5	4.5	501203.8	4982701.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR517	POR517	22.4	22.4	4.5	501199.8	4982687.9	84.5
POR518	POR518	22.4	22.4	4.5	501144.8	4982619.9	84.5
POR519	POR519	21.8	21.8	4.5	501293.8	4983016.9	84.5
POR520	POR520	21.9	21.9	4.5	501328.8	4983254.9	84.5
POR521	POR521	21.8	21.8	4.5	501247.8	4982921.9	84.5
POR522	POR522	21.8	21.8	4.5	501231.8	4982904.9	84.5
POR523	POR523	23.1	23.1	4.5	501179.8	4982814.9	84.5
POR524	POR524	22.3	22.3	4.5	501082.8	4982516.9	83.1
POR525	POR525	22.3	22.3	4.5	501147.8	4982607.9	84.5
POR526	POR526	21.8	21.8	4.5	501340.8	4983254.9	84.5
POR527	POR527	21.8	21.8	4.5	501306.8	4983180.9	84.5
POR528	POR528	23	23	4.5	501193.8	4982804.9	84.5
POR529	POR529	22.2	22.2	4.5	501192.8	4982623.9	84.5
POR530	POR530	22.2	22.2	4.5	501113.8	4982541.9	83.7
POR531	POR531	22.2	22.2	4.5	501167.8	4982611.9	84.5
POR532	POR532	21.7	21.7	4.5	501273.8	4982928.9	84.5
POR533	POR533	21.7	21.7	4.5	501316.8	4983165.9	84.5
POR534	POR534	22.1	22.1	4.5	501211.8	4982633.9	84.5
POR535	POR535	22.1	22.1	4.5	501220.8	4982641.9	84.5
POR536	POR536	22	22	4.5	501084.8	4982482.9	82.0
POR537	POR537	22.1	22.1	4.5	501157.8	4982562.9	84.5
POR538	POR538	22.1	22.1	4.5	501138.8	4982550.9	84.0
POR539	POR539	22.1	22.1	4.5	501083.8	4982496.9	82.4
POR540	POR540	21.6	21.6	4.5	501330.8	4983143.9	84.5
POR541	POR541	22	22	4.5	501172.8	4982554.9	84.5
POR542	POR542	22	22	4.5	501181.8	4982570.9	84.5
POR543	POR543	22.7	22.7	4.5	501206.8	4982758.9	84.5
POR544	POR544	21.6	21.6	4.5	500449.8	4985184.9	84.5
POR545	POR545	21.3	21.3	4.5	501352.8	4983107.9	84.5
POR546	POR546	21.2	21.2	4.5	501334.8	4983039.9	84.5
POR547	POR547	21.3	21.3	4.5	501318.8	4983029.9	84.5
POR548	POR548	21.4	21.4	4.5	501360.8	4983275.9	84.5
POR549	POR549	21.2	21.2	4.5	501291.8	4982939.9	84.5
POR550	POR550	21.2	21.2	4.5	501363.8	4983087.9	84.5
POR551	POR551	21.2	21.2	4.5	501313.8	4982951.9	84.5
POR552	POR552	21.8	21.8	4.5	501234.8	4982646.9	84.5
POR553	POR553	21.1	21.1	4.5	501377.8	4983087.9	84.5
POR554	POR554	21.1	21.1	4.5	501328.8	4982962.9	84.5
POR555	POR555	21.2	21.2	4.5	501341.8	4983125.9	84.5
POR556	POR556	21	21	4.5	501295.8	4982885.9	84.5
POR557	POR557	21.5	21.5	4.5	501182.8	4982557.9	84.5
POR558	POR558	21	21	4.5	501313.8	4982898.9	84.5
POR559	POR559	20.8	20.8	4.5	501350.8	4982973.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR560	POR560	20.9	20.9	4.5	501369.8	4983119.9	84.5
POR561	POR561	22.2	22.2	4.5	501239.8	4982726.9	84.5
POR562	POR562	20	20	4.5	497683.8	4983558.9	89.0
POR563	POR563	20	20	4.5	499444.8	4981777.9	84.5
POR564	POR564	20	20	4.5	499427.8	4981778.9	84.5
POR565	POR565	22.1	22.1	4.5	501261.8	4982737.9	84.5
POR566	POR566	21.4	21.4	4.5	501253.8	4982656.9	84.5
POR567	POR567	21.4	21.4	4.5	501261.8	4982667.9	84.5
POR568	POR568	20.7	20.7	4.5	501383.8	4983077.9	84.5
POR569	POR569	20.7	20.7	4.5	501376.8	4983065.9	84.5
POR570	POR570	19.9	19.9	4.5	499386.8	4981758.9	84.5
POR571	POR571	21.2	21.2	4.5	501225.8	4982587.9	84.5
POR572	POR572	21.3	21.3	4.5	501202.8	4982578.9	84.5
POR573	POR573	20.5	20.5	4.5	501366.8	4982988.9	84.5
POR574	POR574	20.5	20.5	4.5	501387.8	4983048.9	84.5
POR575	POR575	19.8	19.8	4.5	498083.8	4982410.9	86.3
POR576	POR576	21.1	21.1	4.5	501271.8	4982612.9	84.5
POR577	POR577	21.1	21.1	4.5	501261.8	4982606.9	84.5
POR578	POR578	21.1	21.1	4.5	501249.8	4982599.9	84.5
POR579	POR579	21.1	21.1	4.5	501244.8	4982586.9	84.5
POR580	POR580	20.4	20.4	4.5	501352.8	4982925.9	84.5
POR581	POR581	20.5	20.5	4.5	501338.8	4982912.9	84.5
POR582	POR582	21	21	4.5	501295.8	4982621.9	84.5
POR583	POR583	21	21	4.5	501285.8	4982616.9	84.5
POR584	POR584	20.4	20.4	4.5	501402.8	4983021.9	84.5
POR585	POR585	19.6	19.6	4.5	499400.8	4981730.9	84.5
POR586	POR586	20.3	20.3	4.5	501359.8	4982903.9	84.5
POR587	POR587	20.2	20.2	4.5	501413.8	4983000.9	84.5
POR588	POR588	20.3	20.3	4.5	501419.8	4983021.9	84.5
POR589	POR589	20.2	20.2	4.5	501390.8	4982944.9	84.5
POR590	POR590	20.3	20.3	4.5	501372.8	4982934.9	84.5
POR591	POR591	20.3	20.3	4.5	501335.8	4982853.9	84.5
POR592	POR592	20.3	20.3	4.5	501324.8	4982837.9	84.5
POR593	POR593	21.7	21.7	4.5	501277.8	4982747.9	84.5
POR594	POR594	20.2	20.2	4.5	501346.8	4982843.9	84.5
POR595	POR595	20.2	20.2	4.5	501358.8	4982866.9	84.5
POR596	POR596	21.7	21.7	4.5	501303.8	4982762.9	84.5
POR597	POR597	21.3	21.3	4.5	501273.8	4982669.9	84.5
POR598	POR598	21.4	21.4	4.5	501279.8	4982680.9	84.5
POR599	POR599	19.6	19.6	4.5	501426.8	4982981.9	84.5
POR600	POR600	19.6	19.6	4.5	501430.8	4982997.9	84.5
POR601	POR601	19.7	19.7	4.5	501394.8	4982933.9	84.5
POR602	POR602	21	21	4.5	501304.8	4982633.9	84.5



Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR603	POR603	18.9	18.9	4.5	497605.8	4983340.9	89.5
POR604	POR604	19.6	19.6	4.5	501368.8	4982861.9	84.5
POR605	POR605	19.6	19.6	4.5	501402.8	4982904.9	84.5
POR606	POR606	21	21	4.5	501313.8	4982628.9	84.5
POR607	POR607	19.5	19.5	4.5	501346.8	4982792.9	84.5
POR608	POR608	19.5	19.5	4.5	501389.8	4982867.9	84.5
POR609	POR609	21.3	21.3	4.5	501324.8	4982777.9	84.5
POR610	POR610	19.4	19.4	4.5	501422.8	4982891.9	84.5
POR611	POR611	19.5	19.5	4.5	501438.8	4982958.9	84.5
POR612	POR612	19.5	19.5	4.5	501407.8	4982882.9	84.5
POR613	POR613	19.4	19.4	4.5	501361.8	4982799.9	84.5
POR614	POR614	19.5	19.5	4.5	501338.8	4982769.9	84.5
POR615	POR615	21.1	21.1	4.5	501297.8	4982694.9	84.5
POR616	POR616	21.1	21.1	4.5	501305.8	4982704.9	84.5
POR617	POR617	19.3	19.3	4.5	501451.8	4982937.9	84.5
POR618	POR618	19.3	19.3	4.5	501404.8	4982826.9	84.5
POR619	POR619	19.4	19.4	4.5	501386.8	4982813.9	84.5
POR620	POR620	21	21	4.5	501295.8	4982681.9	84.5
POR621	POR621	21	21	4.5	501310.8	4982694.9	84.5
POR622	POR622	19.2	19.2	4.5	501460.8	4982920.9	84.5
POR623	POR623	19.2	19.2	4.5	501426.8	4982837.9	84.5
POR624	POR624	20.9	20.9	4.5	501342.8	4982710.9	84.5
POR625	POR625	19.1	19.1	4.5	501378.8	4982731.9	84.5
POR626	POR626	18.3	18.3	4.5	499419.8	4981704.9	84.5
POR627	POR627	20.8	20.8	4.5	501358.8	4982719.9	84.5
POR628	POR628	20.7	20.7	4.5	501342.8	4982658.9	84.5
POR629	POR629	20.7	20.7	4.5	501324.8	4982632.9	84.5
POR630	POR630	18.2	18.2	4.5	499425.8	4981690.9	84.5
POR631	POR631	20.7	20.7	4.5	501325.8	4982646.9	84.5
POR632	POR632	18.1	18.1	4.5	499438.8	4981667.9	84.5
POR633	POR633	18	18	4.5	499434.8	4981651.9	84.5
POR634	POR634	17.9	17.9	4.5	497579.8	4983333.9	89.5
POR635	POR635	17.9	17.9	4.5	497579.8	4983382.9	89.5
POR636	POR636	19.2	19.2	4.5	501115.8	4984871.9	84.5
POR637	POR637	17.6	17.6	4.5	497531.8	4983367.9	89.5
POR638	POR638	17.6	17.6	4.5	497535.8	4983404.9	89.5
POR639	POR639	18.4	18.4	4.5	501513.8	4982968.9	84.5
POR640	POR640	18.4	18.4	4.5	501475.8	4982898.9	84.5
POR641	POR641	18.5	18.5	4.5	501446.8	4982846.9	84.5
POR642	POR642	18.3	18.3	4.5	501484.8	4982884.9	84.5
POR643	POR643	18.4	18.4	4.5	501437.8	4982789.9	84.5
POR644	POR644	18.4	18.4	4.5	501416.8	4982759.9	84.5
POR645	POR645	18.4	18.4	4.5	501451.8	4982827.9	84.5

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR646	POR646	18.4	18.4	4.5	501400.8	4982748.9	84.5
POR647	POR647	17.4	17.4	4.5	497507.8	4983345.9	89.5
POR648	POR648	18.2	18.2	4.5	501532.8	4982938.9	84.5
POR649	POR649	18.3	18.3	4.5	501438.8	4982770.9	84.5
POR650	POR650	20.2	20.2	4.5	501365.8	4982673.9	84.5
POR651	POR651	20.1	20.1	4.5	501383.8	4982682.9	84.5
POR652	POR652	18.1	18.1	4.5	501540.8	4982921.9	84.5
POR653	POR653	18.2	18.2	4.5	501505.8	4982875.9	84.5
POR654	POR654	18.2	18.2	4.5	501499.8	4982861.9	84.5
POR655	POR655	18.2	18.2	4.5	501462.8	4982777.9	84.5
POR656	POR656	18.2	18.2	4.5	501474.8	4982800.9	84.5
POR657	POR657	17.2	17.2	4.5	497550.8	4982984.9	89.5
POR658	POR658	20.1	20.1	4.5	501401.8	4982693.9	84.5
POR659	POR659	18.7	18.7	4.5	501173.8	4984856.9	84.0
POR660	POR660	18.5	18.5	4.5	500677.8	4985345.9	84.5
POR661	POR661	18	18	4.5	501558.8	4982922.9	84.5
POR662	POR662	18.1	18.1	4.5	501505.8	4982843.9	84.5
POR663	POR663	18.1	18.1	4.5	501481.8	4982785.9	84.5
POR664	POR664	18.1	18.1	4.5	501425.8	4982694.9	84.5
POR665	POR665	17.1	17.1	4.5	497458.8	4983350.9	89.5
POR666	POR666	18.6	18.6	4.5	501197.8	4984847.9	83.8
POR667	POR667	18.3	18.3	4.5	500690.8	4985369.9	84.5
POR668	POR668	17.9	17.9	4.5	501559.8	4982888.9	84.5
POR669	POR669	18	18	4.5	501518.8	4982819.9	84.5
POR670	POR670	17	17	4.5	499383.8	4981621.9	84.5
POR671	POR671	17.9	17.9	4.5	501452.8	4982697.9	84.5
POR672	POR672	18	18	4.5	501439.8	4982691.9	84.5
POR673	POR673	17	17	4.5	497448.8	4983300.9	89.5
POR674	POR674	17	17	4.5	497454.8	4983331.9	89.5
POR675	POR675	18.5	18.5	4.5	501172.8	4984893.9	83.9
POR676	POR676	17.9	17.9	4.5	501479.8	4982729.9	84.5
POR677	POR677	16.9	16.9	4.5	497436.8	4983344.9	89.5
POR678	POR678	17.7	17.7	4.5	501528.8	4982801.9	84.5
POR679	POR679	17.8	17.8	4.5	501467.8	4982688.9	84.5
POR680	POR680	16.7	16.7	4.5	497439.8	4983308.9	89.5
POR681	POR681	18.1	18.1	4.5	501169.8	4984919.9	83.8
POR682	POR682	17.6	17.6	4.5	500725.8	4985354.9	84.5
POR683	POR683	17.5	17.5	4.5	500681.8	4985382.9	84.5
POR684	POR684	17	17	4.5	501503.8	4982738.9	84.5
POR685	POR685	17.3	17.3	4.5	500704.8	4985409.9	84.5
POR686	POR686	15.6	15.6	4.5	499494.8	4981586.9	84.2
POR687	POR687	15.5	15.5	4.5	499424.8	4981564.9	83.7
POR688	POR688	15.5	15.5	4.5	499483.8	4981572.9	83.6

Name	ID	Level Lr		Height (m)	Coordinates		
		Day	Night		X (m)	Y (m)	Z (m)
		(dBA)	(dBA)				
POR689	POR689	16.6	16.6	4.5	501111.8	4982322.9	79.5
POR690	POR690	16.5	16.5	4.5	501265.8	4985076.9	82.0
POR691	POR691	16.5	16.5	4.5	501272.8	4985067.9	82.0
POR692	POR692	16.5	16.5	4.5	501278.8	4985056.9	82.0
POR693	POR693	16.5	16.5	4.5	501288.8	4985039.9	81.9
POR694	POR694	16.3	16.3	4.5	501270.8	4985108.9	81.8
POR695	POR695	16	16	4.5	501510.8	4982717.9	84.5
POR696	POR696	14.3	14.3	4.5	497427.8	4983323.9	89.5
POR697	POR697	14.2	14.2	4.5	497407.8	4983287.9	89.5
POR698	POR698	14.2	14.2	4.5	497414.8	4983300.9	89.5
POR699	POR699	15.7	15.7	4.5	501545.8	4982759.9	84.5
POR700	POR700	14.1	14.1	4.5	497399.8	4983278.9	89.5
POR701	POR701	15.6	15.6	4.5	501572.8	4982772.9	84.5
POR702	POR702	15.6	15.6	4.5	501522.8	4982693.9	84.5
POR703	POR703	13.9	13.9	4.5	497367.8	4983313.9	89.5
POR704	POR704	13.8	13.8	4.5	499454.8	4981552.9	83.0
POR705	POR705	13.7	13.7	4.5	497350.8	4983135.9	89.5
POR706	POR706	13.7	13.7	4.5	497367.8	4983108.9	89.5
POR707	POR707	13.6	13.6	4.5	497348.8	4983111.9	89.5
POR708	POR708	13.7	13.7	4.5	501599.8	4982717.9	84.5
POR709	POR709	13.6	13.6	4.5	501620.8	4982725.9	84.5
POR710	POR710	13.6	13.6	4.5	501757.8	4982927.9	82.5
POR711	POR711	10.5	10.5	4.5	499343.8	4981466.9	82.2
POR712	POR712	6.9	6.9	4.5	501667.8	4982744.9	84.5
POR713	POR713	3.8	3.8	4.5	497280.8	4983209.9	89.5
VPOR714	VPOR714	26.2	26.2	4.5	500518.0	4984489.5	84.5
VPOR715	VPOR715	27.6	27.6	4.5	500435.5	4984414.0	84.5
VPOR716	VPOR716	25.3	25.3	4.5	500860.9	4984067.5	84.5
VPOR717	VPOR717	24	24	4.5	501135.9	4983499.0	84.5
VPOR718	VPOR718	24.1	24.1	4.5	501096.7	4983566.5	84.5
VPOR719	VPOR719	23.6	23.6	4.5	501141.9	4983587.0	84.5

Table C2: Cumulative Effects

PORID	Description	UTM Coordinates		Nearest Project Source		Sound level [dBA]			Performance Limit [dBA]	Compliance with Performance Limit [Y/N]
		Easting [m]	Northing [m]	Dist. [m]	ID	David Brown	William Rutley	Overall		
POR115	Exisitng	500790.8	4983619.9	773	INV_10	27	29	31	40	Y
VPOR716	Vacant	500860.9	4984067.5	833	INV_10	25	29	31	40	Y

Refer Figure 6-1 for details



**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

## **Appendix D:**

### **CADNA/A Sample Calculations**



Receiver: POR001  
 ID: POR001  
 X: 499358  
 Y: 4983840  
 Z: 85  
 Ground: 81

ISO	Bezeichnung	ID	X	Y	Z	Ground	LxT	LxN	L/A	Dist.	hm	Freq	Adiv	KOb	Agr	Abar	z	Aatm	Afol	Ahous	Cmet	CmetN	Dc	RL	LtotT	LtotN
	Inverter Ur INV_1		499852	4983839	83	80	92	92	1	494	4	0	65	0	0	0	0	2	0	0	0	0	0	0	25	25
	Inverter Ur INV_2		499554	4983725	83	81	92	92	1	228	4	0	58	0	0	0	0	1	0	0	0	0	0	0	32	32
	Inverter Ur INV_3		499410	4983646	84	81	92	92	1	201	4	0	57	0	0	0	0	1	0	0	0	0	0	0	33	33
	Inverter Ur INV_4		499262	4983554	84	82	92	92	1	302	4	0	61	0	0	0	0	2	0	0	0	0	0	0	30	30
	Inverter Ur INV_5		499271	4983434	84	82	92	92	1	414	3	0	63	0	0	0	0	2	0	0	0	0	0	0	27	27
	Inverter Ur INV_6		499428	4983516	84	81	92	92	1	331	3	0	61	0	0	0	0	2	0	0	0	0	0	0	29	29
	Inverter Ur INV_7		499593	4983605	83	81	92	92	1	332	3	0	61	0	0	0	0	2	0	0	0	0	0	0	29	29
	Inverter Ur INV_8		499738	4983688	83	80	92	92	1	410	3	0	63	0	0	0	0	2	0	0	0	0	0	0	27	27
	Inverter Ur INV_9		499873	4983759	83	80	92	92	1	521	4	0	65	0	0	0	0	2	0	0	0	0	0	0	24	24
	Inverter Ur INV_10		500055	4983857	83	80	92	92	1	698	4	0	68	0	0	0	0	3	0	0	0	0	0	0	21	21
	Substation SUBS		500025	4983898	83	80	97	97	1	670	4	0	68	0	-1	0	0	2	0	0	0	0	0	0	29	29
	Step Up Tr.T_01		499856	4983839	82	80	86	86	1	498	3	0	65	0	1	0	0	1	0	0	0	0	0	0	19	19
	Step Up Tr.T_02		499558	4983727	82	81	86	86	1	230	3	0	58	0	1	0	0	1	0	0	0	0	0	0	27	27
	Step Up Tr.T_03		499414	4983647	83	81	86	86	1	200	3	0	57	0	1	0	0	1	0	0	0	0	0	0	28	28
	Step Up Tr.T_04		499266	4983556	83	82	86	86	1	298	3	0	60	0	1	0	0	1	0	0	0	0	0	0	24	24
	Step Up Tr.T_05		499268	4983432	83	82	86	86	1	417	3	0	63	0	1	0	0	1	0	0	0	0	0	0	21	21
	Step Up Tr.T_06		499424	4983514	83	81	86	86	1	332	3	0	61	0	1	0	0	1	0	0	0	0	0	0	23	23
	Step Up Tr.T_07		499588	4983604	82	81	86	86	1	330	3	0	61	0	1	0	0	1	0	0	0	0	0	0	23	23
	Step Up Tr.T_08		499735	4983686	82	80	86	86	1	407	3	0	63	0	1	0	0	1	0	0	0	0	0	0	21	21
	Step Up Tr.T_09		499869	4983757	82	80	86	86	1	517	3	0	65	0	1	0	0	1	0	0	0	0	0	0	19	19
	Step Up Tr.T_10		500051	4983856	82	80	86	86	1	693	3	0	68	0	1	0	0	2	0	0	0	0	0	0	16	16

Limit. Value I 0 0  
 Level D/N: 40 40



























**Stantec**

**DAVID BROWN SOLAR PARK  
ACOUSTIC ASSESSMENT REPORT**

# **Appendix E:**

## **Sound Propagation Contours**









**Legend**

- Subject Property
  - Project Location
  - 120 m Zone of Investigation
  - Receptors outside 500 m setback from HWY 401 (Class 3 Receptors)
  - Receptors within 500 m setback from HWY 401 (Class 2 Receptors)
  - Source
  - 40 dB
  - 45 dB
- Sound Level (dB)
- 35
  - 40
  - 45
  - 50
  - 55
  - 60
  - 65
  - 70
  - 75+

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.



**Stantec**

July 2013  
161011028

Client/Project  
Saturn Power Inc.  
David Brown Solar Park  
Highway 401, Stormont Township, Ontario

Figure No.  
**E1**

Title  
**Predicted Noise Propagation Contours**