# Cornwall Solar Project
# Renewable Energy Approval
# Modification Report

FINAL REPORT

October 16, 2020
revised February 17, 2021

Prepared for:

Liberty Power
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Prepared by 
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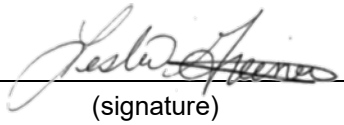
**Jacqueline Corr,** HBASc, MES
Environmental Assessment Planner

Reviewed by 
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Environmental Consultant

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Senior Project Manage

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## LIST OF APPENDICES

# 1.0 INTRODUCTION

Cornwall Solar Inc., a subsidiary of Liberty Power received a Renewable Energy Approval (REA #3195-92JKTY dated January 15, 2013) and an Amendment to the Renewable Energy Approval (EBR Registry #012-3158 dated December 17, 2014), from the Ministry of the Environment, Conservation and Parks (MECP) for the Cornwall Solar Project (the Project). A 10-megawatt (MW) solar photovoltaic (PV) facility was constructed on approximately 24.7 hectares (ha) of land on Park Lots 5. 6 and 7, Concession 5, Indian Lands Charlottenburgh, designated as Park 1 and 2 on Reference Plan 14R5859, within the Township of South Glengarry (lower tier municipality), in the United Counties of Stormont, Dundas and Glengarry (upper tier municipality). The facility has been operational since March 27, 2014.

# 2.0 SUMMARY AND RATIONALE FOR MINOR MODIFICATION

The proposed Project change entails replacing the existing ten intermediate transformers with ten new intermediate transformers in the same locations to address an existing maintenance issue. The proposed replacement transformers will be installed on concrete slab-on-grade, which will not be replaced. The facility's total maximum name plate capacity of 10 megawatt shall remain unchanged.

# 3.0 PROJECT DESIGN CHANGE (MINOR) – REPLACEMENT OF GROUND MOUNTED TRANSFORMERS

The proposed Project change entails replacing the existing ten intermediate transformers with ten new intermediate transformers in the same location to address an existing maintenance issue. The proposed replacement transformers will be installed on concrete slab-on-grade, which will not be replaced. The facility's total maximum name plate capacity of 10 megawatt shall remain unchanged.

The proposed layout and placement of transformers is provided in **Appendix A**.

Liberty Power has prepared an application to amend the REA to account for the replacement of the intermediate transformers which is designated as a Project Design Change.

# 4.0 RESULTS OF EFFECTS ASSESSMENT FOR THE PROJECT MODIFICATION

O. Reg. 359/09 requires that any adverse environmental effects that may result from construction, installation, operation and maintenance activities be described. The term “environment” in O. Reg. 359/09 has the same meaning as in the *Environmental Protection Act*, and includes the natural, physical, cultural, and socio-economic environment.

A screening to identify any new environmental effects that would require additional mitigation or monitoring measures beyond those outlined in the REA documents because of the proposed modifications to the Project has been completed.

The installation of the new intermediate transformers will be completed in the same manner as the original installation, Since this installation method has been previous reviewed as part of the REA application and the work will be completed within the previously assessed areas, no new environmental impacts are expected.

# 5.0 POTENTIAL IMPACTS TO REA TECHNICAL ASSESSMENT AND STUDIES

Liberty Power, on behalf of Cornwall Solar Inc., has previously completed all the required REA technical assessments (including the Natural Heritage Assessment, Noise Assessment as well as Stage 1 and Stage 2 Archeological Assessments) for the Project which includes the area where the proposed installations will be, and as such, the installation of the new intermediate transformers has been deemed to have no adverse effects on the result of the REA assessment.

Table 1 and 2 below outline the potential negative impacts on environmental components due to the minor Project change and any new mitigation and/or monitoring measures proposed (where applicable). Note: there is no potential for negative environmental impacts because of the minor Project change.

**Table 1: Potential Negative Impacts on Natural Environmental Components**

| Environmental Component | Potential Negative Environmental Impacts | Mitigation Measures | Monitoring Requirements |
|---|---|---|---|
| Air Quality | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Soil Quality | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Soil Quantity | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Groundwater | No additional negative impact. | No additional mitigation required. | No new monitoring required. |

## Table 1: Potential Negative Impacts on Natural Environmental Components

| Environmental Component | Potential Negative Environmental Impacts | Mitigation Measures | Monitoring Requirements |
|---|---|---|---|
| Surface Water Quality | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Surface Water Quantity | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Aquatic Habitat and Biota | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Woodlands | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Wetlands | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Wildlife Habitat | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Wildlife | No additional negative impact. | No additional mitigation required. | No new monitoring required. |

## Table 2: Potential Negative Impacts on Socio-Economic Environmental Components

| Environmental Component | Potential Negative Environmental Impacts | Mitigation Measures | Monitoring Requirements |
|---|---|---|---|
| Noise | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Public and Facility Safety | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Change in Visual Landscape | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Property Values | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Availability of Resources | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Recreational Land Use | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Infrastructure | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Traffic | No additional negative impact. | No additional mitigation required. | No new monitoring required. |
| Archaeological and Heritage Resources | No additional negative impact. | No additional mitigation required. | No new monitoring required. |

# 6.0 SUMMARY OF REVISIONS TO THE REA TECHNICAL ASSESSMENTS

Table 3 identifies the amendments to the REA technical assessments submitted with the original REA application and reviewed by the MECP that are required to address the proposed Project change. Any changes to the reports have been addressed by issuance of this Modification Report and its appendices.

**Table 3: Summary of Revisions to the REA Supporting Documents**

| Report | Original Text | Revised Text |
|---|---|---|
| Noise Assessment Report | Described existing conditions, potential impacts and mitigation measures. | Full replacement of the previous Noise Report. |

A copy of the Cornwall Solar Project Noise Assessment Study Report, dated January 15, 2021 is provided in **Appendix B**.

# 7.0 CONSULTATION AND NOTIFICATION

Consultation regarding the proposed modification was undertaken with the MECP via email on July 28th, 2020 and September 18th, 2020.

A copy of this Modification Report has been provided to the Ministry of Natural Resources and Forestry (MNRF) and the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) for their information. As there are no unassessed areas, and no new impacts, we do not anticipate the need for new confirmation letters from these ministries.

A copy of this Modification Report will be placed on the Project website – www.cornwallsolarproject.com

The Notice of Proposed Change to an Approved Renewable Energy Project will be mailed out to all Project stakeholders notifying them of the proposed minor Project Design Change and directing them to review the Modification Report available on the Project website. In addition, the notice shall be distributed to the public in accordance with Section 32.3(1) of O. Reg. 359/09. A copy of the notices is presented in **Appendix C**.

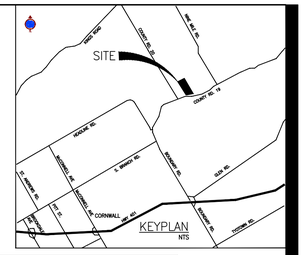
# 8.0 CLOSURE

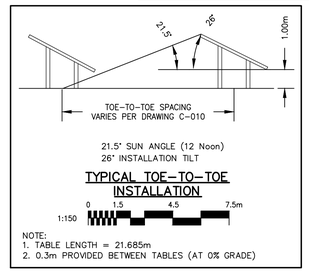
The proposed modifications have been adequately assessed in accordance with O. Reg. 359/09 and the MECP's Technical Guide. It has been determined that the modifications will not result in new negative environmental effects or require additional associated mitigation measures beyond those identified as part of the original REA Application submitted for the Project.

# APPENDIX A
## Site Layout

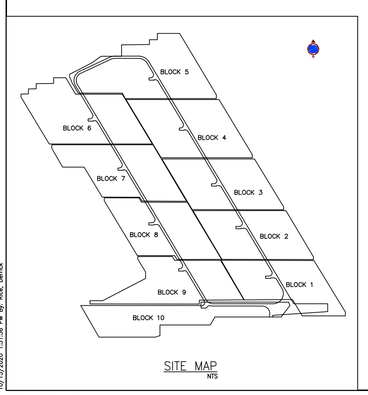
THE GOOD(S) AND/OR SERVICE(S) SHALL BE EITHER PRODUCED, SOURCED OR PROVIDED IN THE PROVINCE OF ONTARIO OR PERFORMED BY RESIDENTS OF ONTARIO TO MEET OR EXCEED THE MINIMUM REQUIRED DOMESTIC CONTENT LEVEL PRESCRIBED IN THE FEED-IN TARIFF (FIT) PROGRAM RULES (E.G. 60% FOR A SOLAR PROJECT > 10KW) AND IN ACCORDANCE WITH THE "DOMESTIC CONTENT GRIDS" IN EXHIBIT D OF THE PROJECT OWNER'S FIT CONTRACT AND AMENDMENTS THEREOF. THE SUPPLIER SHALL PROVIDE A FIT CERTIFICATE OF DOMESTIC CONTENT FOR THE GOODS AND SERVICES PROVIDED.

N




| SYSTEM SIZE | | | | |
|---|---|---|---|---|
| BLOCK | # OF MODULES | WATTAGE | DC MW | NUMBER OF TABLES |
| 1 | 4312 | 290 | 1.250 | 98 |
| 2 | 4312 | 290 | 1.250 | 98 |
| 3 | 4268 | 290 | 1.238 | 97 |
| 4 | 4268 | 295 | 1.259 | 97 |
| 5 | 4268 | 295 | 1.259 | 97 |
| 6 | 4268 | 295 | 1.259 | 97 |
| 7 | 4268 | 295 | 1.259 | 97 |
| 8 | 4312 | 290 | 1.250 | 98 |
| 9 | 4268 | 295 | 1.259 | 97 |
| 10 | 4268 | 295 | 1.259 | 97 |
| TOTAL | 42812 | | 12.544 | 973.00 |




SITE MAP
NTS


Stantec

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Notes

A. GENERAL:

1. BENCHMARK: ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM MTO VERTICAL CONTROL MONUMENT B19708525 HAVING AN ELEVATION OF 55.752.
2. TOPOGRAPHICAL SURVEY AND LEGAL PLAN PROVIDED BY STANTEC RECEIVED MAY 2012.
3. GEOTECHNICAL INVESTIGATION PROVIDED BY STANTEC, DATED JUNE 1, 2012.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE SITE LAYOUT PLAN (C-010), THE CLEARING, GRUBBING AND FENCING PLAN (C-050), THE SITE ACCESS PROFILES (C-201 TO C-203), AND THE SITE GRADING & EROSION CONTROL PLAN (C-401 TO C-404), PREPARED BY STANTEC CONSULTING LTD.
5. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
6. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
7. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO STANTEC, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
8. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO THE TOWNSHIP OF SOUTH GLENGARRY STANDARDS.
9. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
10. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
11. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010.
12. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED.
13. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
14. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
15. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.

Legend

- PROPERTY LINE
- SETBACK TO PV ARRAY
- BLOCK LIMITS (TYP.)
- ACCESS ROAD
- RACK OF 4 X 11 PV MODULES
- FENCE
- MV STATION
- CULVERT
- PROPOSED TREE SCREENING

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| F. O&M BUILDING | MHH | MAN | 14.09.23 |
| E. UPDATED TABLE LAYOUT IN BLOCK 9 | MHH | MAN | 13.08.15 |
| D. UPDATED TABLE LAYOUT IN BLOCK 9 | MHH | MAN | 13.05.01 |
| C. ISSUED FOR CONSTRUCTION | MHH | MAN | 13.03.08 |
| B. FINAL EQUIPMENT LOCATIONS | DK | MPV | 13.01.07 |
| **Issued** | **By** | **Appd.** | **YY.MM.DD** |
| File Name: 161011117_CS-SP.dwg | MHH Dwn. | MAN Chkd. | MHH Dsgn. | 12.09.27 YY.MM.DD |

Permit-Seal

Client/Project
LIBERTY POWER

CORNWALL SOLAR
Cornwall, ON Canada

Title
SITE PLAN LAYOUT
NOON SHADING AND 26° INSTALLATION TILT

| Project No. | Scale | Drawing No. | Sheet | Revision |
|---|---|---|---|---|
| 161011117 | 1:1250 (0 12.5 37.5 62.5m) | C-010 | | F |

\\Cd1220-001\work_group\01603\active\161011117\design\drawing\civil\sheet_files\161011117_CS-SP.dwg
10/15/2020 1:51:56 PM By: Rice, Derrick

ORIGINAL SHEET – ARCH D

# APPENDIX B
## Noise Assessment Study Report

Cornwall Solar Inc.

# Cornwall Solar Project

## Noise Assessment Study Report

January 15, 2021

Algonquin
POWER INVESTED.

Cornwall Solar Inc.
Oakville, ON

# Noise Assessment Study Report

## Cornwall Solar Project

H336742-2000-07-124-0009
Rev. 7
January 15, 2021

# Revision History

| Revision Number | Date | Change |
|---|---|---|
| 00 | 2012-11-16 | |
| 01 | 2012-11-23 | - Changed Cornwall Solar inverters design to enclosed inverters. Updated SPL calculations accordingly. |
| 02 | 2013-03-06 | - Added one ventilation exhaust fan as a noise source to each inverter cluster.<br>- Updated inverter make and model from Sunny Central 500HE-US to Xantrex GT500 MVX – updates made to its SWLs accordingly. |
| 03 | 2013-06-10 | - Changed Cornwall Solar facility substation transformer model to a different design.<br>- Removed substation transformer sound barrier as it is no longer needed. |
| 04 | 2020-02-25 | - Updated Cornwall Solar 1 MVA pad mounted transformers Lw calculations using newly provided transformer dimensions from WEG. |
| 05 | 2020-12-18 | - Updated as per MECP 2020-12-02 Comments |
| 06 | 2021-01-11 | - Revised South Glengarry and Glendale source coordinates to match respective REAs |
| 07 | 2021-01-15 | - Revised South Glengarry and Glendale source sound power levels to match respective REAs |

# Executive Summary

This report presents the results of the Noise Assessment Study required for Solar Facilities under Ontario Regulation 359/09 and 521/10, as part of the Renewable Energy Approval (REA) Process. Cornwall Solar Inc. is proposing to develop a 10-megawatt (MW) solar photovoltaic (PV) project titled Cornwall Solar Project (the "Project"). The Project will be located on an approximately 25 hectares (ha) of land within the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry, Ontario.

This Noise Assessment Study Report has been prepared based on the document entitled "Basic Comprehensive Certificates of Approval (Air) – User Guide" by the Ontario Ministry of the Environment, Conservation and Parks (MECP, 2004). The sound pressure levels at the points of reception (POR) have been estimated using ISO 9613-2, implemented in the CadnaA computer code. The performance limits used for verification of compliance correspond to the values for rural areas of 40 dBA. The results presented in this report are based on the best available information at this time. It is the intention that following commissioning of the facility, community noise emissions will be validated with measurements to confirm the conclusions of this noise impact assessment study.

The results obtained in this study show that the sound pressure levels at the Noise Receptors resulting from the project operation will not exceed MECP requirements of 40 dB for rural areas.

Project Report

# Cornwall Solar Inc.
# Cornwall Solar Project

## Noise Assessment Study Report

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# 1. Introduction

## 1.1 Project Description

Cornwall Solar Inc. is proposing to develop a 10-megawatt (10 MW) solar photovoltaic (PV) project titled Cornwall Solar Project (the "Project").

The proposed Project is a renewable energy generation facility which will use solar photovoltaic technology to generate electricity. Electricity generated by solar photovoltaic panels will be converted from Direct Current (DC) to Alternating Current (AC) by inverter clusters which will also step up the voltage to 34.5 kV. A main transformer, located in the substation, will step up the voltage from the clusters to 44 kV prior to being transmitted to the existing local distribution line.

The construction of the Project will begin once the Renewable Energy Approval (REA) has been obtained and the Notice to Proceed has been obtained from the OPA. The anticipated operational lifespan of the Project is 30 years.

## 1.2 Renewable Energy Approval Legislative Requirements

Ontario Regulation 359/09 and 521/10, made under the Environmental Protection Act identify the Renewable Energy Approval (REA) requirements for green energy projects in Ontario. As per Section 4 of these regulations, ground mounted solar facilities with a name plate capacity greater than 12 kilowatts (kW) are classified as a Class 3 solar facility and, therefore, require an REA.

Section 13 of the Ontario Regulation 359/09 requires proponents of Class 3 solar facilities to complete a Noise Assessment Study Report in accordance with Appendix A of the publication; "Basic Comprehensive Certificates of Approval (Air) – User Guide, 2004" by the Ministry of the Environment, Conservation and Parks (MECP, 2004).

The Noise Assessment Study Report is to include a general description of the facility, sources, Noise Receptors, assessment of compliance, as well as all the supporting information relevant to the Project.

# 2. Facility Description

The Project will use photovoltaic (PV) panels installed on fixed racking structures mounted on the ground. The PV panels generate DC electricity which will be converted to AC electricity by inverters. The Project layout is based on ten inverter clusters each one containing two inverters and one 208-V/34.5-kV/1MVA medium transformer, as well as a 34.5-kV/44-kV/10-MVA substation transformer. The 34.5-kV power, collected from the inverter clusters, will be stepped up to 44 kV by the substation transformer prior to being transmitted to the existing local distribution line.

Since the panels will be ground-mounted and the total nameplate capacity is over 12 kW, the Project is considered to be a Class 3 Solar Facility according to the classification presented in Ontario Regulation 521/10.

**Table 2.1 General Project Description**

| | |
|---|---|
| Project Description | Ground-mounted Solar PV, Class 3 |
| System Nameplate Capacity | 10 MW AC |
| Local Distribution Company | Hydro One Networks Inc. |

## 2.1 Project Location

The Project Location[1] will be located on approximately 25 ha of land, located about 8 km north of Cornwall. Figure A.1 in Appendix A shows the zoning designation plan while Figure A.3 presents the Project Area Location Plan. Figure A.2 displays adjacent solar projects.

## 2.2 Acoustical Environment

The Project will be surrounded by farmland with some forested areas to the northwest. The background noise levels are expected to be typical of rural areas, classified as a Class 3 based on Publication NPC-232 by the MECP. Some traffic noise is expected from Regional Road 19, passing south of the Project, mainly during day hours. Cornwall town is located about 8 km south of the proposed location.

## 2.3 Life of Project

The expected life of the Project is 30 years. The manufacturer's warranty on the PV modules is 25 years and the expected life of solar power plants of this type is typically 35 to 40 years. At that time (or earlier if the 20-yr power purchase agreement is not extended), the Project will be decommissioned or refurbished depending on market conditions and/or technological changes.

## 2.4 Operating Hours

Solar PV facilities produce electricity during the day hours, when the sun rays are collected by the panels. After sunset the facility will not receive solar radiation; therefore, no electricity will be produced. Under these conditions the inverters will not produce any noise and the transformers will be energized, but not in operation (no fans in operation).

## 2.5 Approach to the Study

The sound pressure levels at the POR were predicted using procedures from ISO 9613-2, which is a widely used and generally accepted standard for the evaluation of noise impact in environmental Assessments.

[1] "Project Location" in the context of this study is an area occupied by the Project infrastructure.

The sound power level for the inverters was provided by the manufacturer while the sound power level for the transformers was estimated using NEMA TR-1 standards.

The software package CadnaA, which implements ISO-9613-2, was used to predict the noise levels at the Points of Reception. This numerical modeling software is able to simulate sound sources as well as sound mitigation measures taking into account atmospheric and ground attenuation. Some of the CadnaA configurations used in the modeling are shown in Figure 2-1.

Elevation contours were not included in the model. This conservative approach was applied in order to avoid including any barrier effects of ground surface obstacles. For modeling purposes, the vegetation that blocks some of the POR from the sources has not been incorporated.

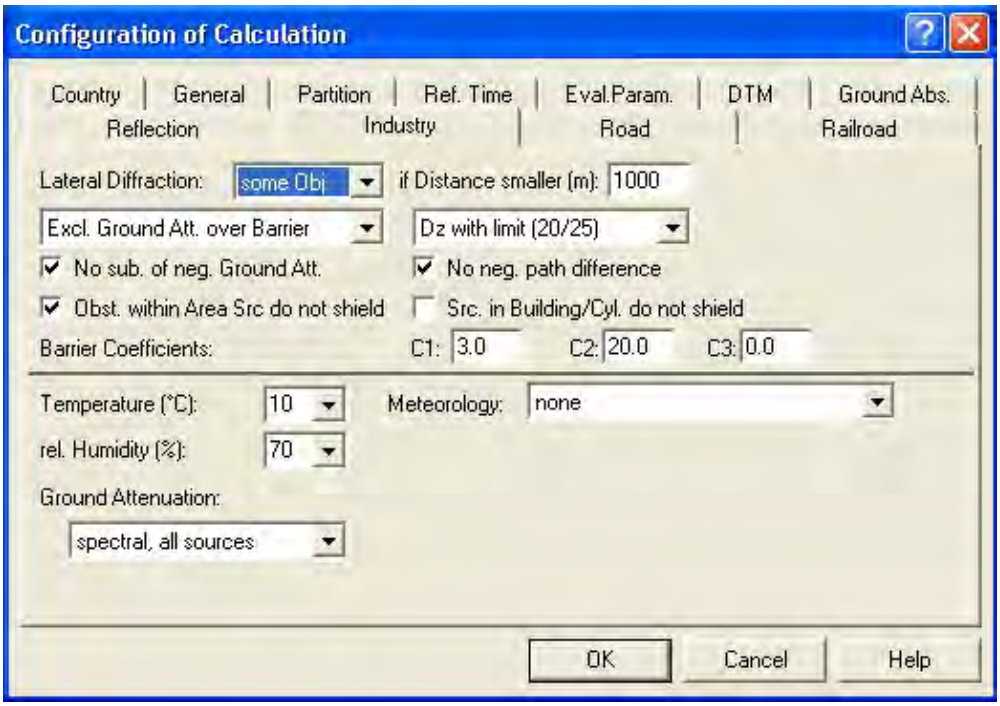


**Figure 2-1: CadnaA Configurations**

# 3. Noise Sources

The main sources of noise from the Project will be ten inverter clusters, each one containing two inverters, one ventilation exhaust fan, and one medium-voltage transformer, as well as a substation containing the main step-up transformer. The Project layout is provided in Figure A.3. The coordinates of each modelled noise source are presented in Table B.1 and of Appendix B. These coordinates are within 5m of coordinates listed in the REA.

All noise sources were modelled as non-directional point sources.

For the purpose of this study it is assumed that all equipment will be operating 24 hours at full capacity.

## 3.1 Substation Transformer

A 10-MVA step-up transformer that will step up the 34.5-kV power to 44 kV, required by the local distribution company, will be located in the substation. The transformer, manufactured by ABB, will be of ONAF (oil natural air forced) type with guaranteed characteristic sound pressure of 63.0 dBA, as shown with additional transformer specifications in Appendix B. The transformer sound pressure level dissipation surface area, needed for sound power calculation, was estimated based on dimensions taken from the transformer drawing provided by ABB and included in Appendix B. The provided characteristic sound pressure was converted into frequency spectra using empirical correlations for transformer noise (Crocker) and 41.9-$m^2$ surface area. This calculation is available in Figure B.2 of Appendix B. The transformer configurations are expected to be similar to those shown in Appendix B. Noise source height representing the transformer was assumed at 3.5 m above ground level (includes 0.5-m high concrete foundation).

Power transformers are considered by the MECP to be tonal noise sources. A 5-dB penalty was added to the sound power spectrum, as recommended by Publication NPC-104 “Sound Level Adjustments”, for tonality. Table B.3 in Appendix B shows the frequency spectrum used to model the substation transformer.

## 3.2 Inverter Clusters

Cornwall Solar Inc. is planning to use inverters manufactured by Schneider Electric. Ten inverter clusters will be installed as part of the Project. Each cluster comprises of two GT500 MVX inverters inside an enclosure, one ventilation exhaust fan, and one 208-V/34.5-kV/1-MVA medium voltage transformer supplied by WEG. Both the ventilation fan and 208-V/34.5-kV/1-MVA transformer will be located outside the enclosure. Schematic cluster arrangement can be found in Appendix B.

Nominal output capacity of GT500 MVX inverter is 500 kW. Cornwall Solar Inc. provided one third octave band sound power for the GT500 MVX inverter. Appendix B includes technical description of the inverter, sound power measurement report, and one third octave band to full octave band conversion calculation (Figure B.1). The two enclosed inverters were modeled as a single noise source with recommended minimum enclosure transmission loss. A 5-dBA penalty was added to the frequency spectrum, as stipulated in Publication NPC-104, “Sound Level Adjustments,” to allow for tonality. The frequency spectrum used to model combined noise emission from two inverters is shown in Table B.3 of Appendix B. Noise source height representing the inverter installation was assumed at 2.3 m above ground level.

To step up the 208 V from the inverters to 34.5-kV, 1-MVA medium voltage transformers will be located in close proximity to the inverters outside the enclosure. The transformer is an ONAN (oil natural air natural) type, a conservative estimate of sound power level was based on the data from NEMA TRI – 1993 (2000) and transformer dimensions as provided by WEG – shown in Appendix B. This standard provides maximum characteristic sound pressure values for transformers and manufacturers routinely meet this specification. The NEMA level was then converted into frequency spectra using empirical correlations for transformer noise (Crocker). This calculation is available in Figure B.3 of Appendix B. Noise source height representing the transformer was assumed at 2.0 m above ground level. Power transformers are considered by the MECP to be tonal noise sources. A 5-dB penalty was added to the sound power spectrum, as recommended by Publication NPC-104, "Sound Level Adjustments" for tonality. Table B.3 in Appendix B shows the frequency spectrum used to model the cluster medium-voltage transformer.

To provide an adequate ventilation inside the enclosure an exhaust fan will be mounted on one of the walls. CWB-101-4 exhaust fan manufactured by Greenheck was selected for the application. Sound power level of the fan was provided by Greenheck and can be found in Appendix B along with other technical data on the fan. Although fans in general are not considered tonal noise sources 5-dB was conservatively added to the provided sound power in the study. Noise source height representing the fan was assumed at 2.0 m above ground level.

Although for the modeling purposes it was assumed that the facility will operate 24 hours at full capacity, in reality at night the facility will be idle. Under these conditions the inverters do not produce noise. The transformers (at the substation and clusters) are energized and make some magnetostrictive noise at a reduced level, but no cooling fans are in operation.

## 3.3 Noise Summary Table

A summary of the sound sources described above, including sound power level, characteristics and proposed noise control measures, is presented in Table 3.1.

**Table 3.1 Noise Source Summary for Cornwall Solar Project**

| Source ID | Description | Total Sound Power Level (dBA) | Source Location | Sound Characteristics | Noise Control Measures |
|---|---|---|---|---|---|
| CW_Fan01 | CWB-101-4 exhaust fan at CW_Cluster01 | 78.2 | O | S | U |
| CW_Fan02 | CWB-101-4 exhaust fan at CW_Cluster02 | 78.2 | O | S | U |
| CW_Fan03 | CWB-101-4 exhaust fan at CW_Cluster03 | 78.2 | O | S | U |
| CW_Fan04 | CWB-101-4 exhaust fan at CW_Cluster04 | 78.2 | O | S | U |
| CW_Fan05 | CWB-101-4 exhaust fan at CW_Cluster05 | 78.2 | O | S | U |
| CW_Fan06 | CWB-101-4 exhaust fan at CW_Cluster06 | 78.2 | O | S | U |
| CW_Fan07 | CWB-101-4 exhaust fan at CW_Cluster07 | 78.2 | O | S | U |
| CW_Fan08 | CWB-101-4 exhaust fan at CW_Cluster08 | 78.2 | O | S | U |
| CW_Fan09 | CWB-101-4 exhaust fan at CW_Cluster09 | 78.2 | O | S | U |
| CW_Fan10 | CWB-101-4 exhaust fan at CW_Cluster10 | 78.2 | O | S | U |
| CW_Inv01 | Two Schneider Electric GT500 MVX inverters at CW_Cluster01 | 83.8 | O | S-T | E |
| CW_Inv02 | Two Schneider Electric GT500 MVX inverters at CW_Cluster02 | 83.8 | O | S-T | E |
| CW_Inv03 | Two Schneider Electric GT500 MVX inverters at CW_Cluster03 | 83.8 | O | S-T | E |
| CW_Inv04 | Two Schneider Electric GT500 MVX inverters at CW_Cluster04 | 83.8 | O | S-T | E |
| CW_Inv05 | Two Schneider Electric GT500 MVX inverters at CW_Cluster05 | 83.8 | O | S-T | E |

| Source ID | Description | Total Sound Power Level (dBA) | Source Location | Sound Characteristics | Noise Control Measures |
|---|---|---|---|---|---|
| CW_Inv06 | Two Schneider Electric GT500 MVX inverters at CW_Cluster06 | 83.8 | O | S-T | E |
| CW_Inv07 | Two Schneider Electric GT500 MVX inverters at CW_Cluster07 | 83.8 | O | S-T | E |
| CW_Inv08 | Two Schneider Electric GT500 MVX inverters at CW_Cluster08 | 83.8 | O | S-T | E |
| CW_Inv09 | Two Schneider Electric GT500 MVX inverters at CW_Cluster09 | 83.8 | O | S-T | E |
| CW_Inv10 | Two Schneider Electric GT500 MVX inverters at CW_Cluster10 | 83.8 | O | S-T | E |
| CW_Sub | 34.5-kV/44-kV/10-MVA substation transformer | 86.6 | O | S-T | U |
| CW_Trans01 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster01 | 78.3 | O | S-T | U |
| CW_Trans02 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster02 | 78.3 | O | S-T | U |
| CW_Trans03 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster03 | 78.3 | O | S-T | U |
| CW_Trans04 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster04 | 78.3 | O | S-T | U |
| CW_Trans05 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster05 | 78.3 | O | S-T | U |
| CW_Trans06 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster06 | 78.3 | O | S-T | U |
| CW_Trans07 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster07 | 78.3 | O | S-T | U |
| CW_Trans08 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster08 | 78.3 | O | S-T | U |
| CW_Trans09 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster09 | 78.3 | O | S-T | U |
| CW_Trans10 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster10 | 78.3 | O | S-T | U |

**Notes:**
1. A 5-dBA penalty and enclosure (E) attenuation are included in this table.
2. Location: Inside building (I), Outside building (O).
3. Sound Characteristics: Steady (S), Tonal (T), Impulsive (I), Quasi-Steady Impulsive (QSI).
4. Noise Control: Silencer (S), Acoustic lining (A), Barrier (B), Lagging (L), Enclosure (E), Other (O), Uncontrolled (U).

## 3.4 Adjacent Solar Projects

To identify the adjacent solar projects Hatch's internal database of solar projects and MECP records available in http://www.ene.gov.on.ca/environment/en/subject/renewable_energy/projects/index.htm were searched (June 3, 2013).

There are two solar projects (Figure A.2 ) within 1 km of the Cornwall Solar Project Noise Receptors: Glendale Solar Project owned by Northland Power Inc; and South Glengarry St. Lawrence-1 Solar Farm owned by Penn Energy Renewable Limited. Noise sources from these two projects were taken into account in the study. Coordinates and sound properties of these noise sources were taken from the respective noise assessment study reports and are listed in Table B.3 of Appendix B.

# 4. Noise Receptors and Points of Reception

The Noise Receptors used in this study were identified from the OBM and Google Earth Pro aerial imagery (June 2007) within 1-km distance from the Project Site[2] boundary, and also from information provided by Cornwall Solar Inc. based on visual observations of the Project Site surroundings.

The Noise Receptors corresponding to the vacant lots were added based on parcel information provided by First Base Solutions (Teranet Data) and located according to the requirements outlined in Ontario Regulation 359/09, and its amendment (Ontario Regulation 521/10).

The total number of Noise Receptors within a 1-km distance from the Project Site of Cornwall Solar Project boundary is 86, including the vacant lots. Points of reception were placed at the Noise Receptors according to the following rules:

1) All existing Noise Receptors were modeled by POR located at the point on the façade where sound pressure level is a maximum at 4.5 m above ground height.

2) All existing Noise Receptors were also modeled by POR located at the point on the 30-m envelope placed around the façade where sound pressure level is a maximum at 1.5 m above ground height.

3) All vacant lot Noise Receptors were modeled by POR placed in the center of the assumed future building structures located at 4.5 m above ground height.

4) All vacant lot Noise Receptors were also modeled by POR located at the point on the 30-m circle placed around the center of the assumed future building structure where sound pressure level is a maximum at 1.5 m above ground height.

Ten of these POR, identified in Table 4.1 and Table 4.2, were chosen as representative for evaluating the noise contribution from each individual source. These ten POR were chosen in order to represent sound pressure level contributions on different areas around the Project Location. The complete set of results for all POR used to model 86 Noise Receptors is provided in Table 6.2. Coordinates of the Noise Receptor footprint centers are provided in Table C.1.

**Table 4.1 1.5-m Case – Point of Reception Noise Impact from Individual Cornwall Solar Noise Sources**

| Source ID | Noise Receptor ID | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R007 | | R034 | | R037 | | R038 | | R039 | |
| | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] |
| CW_Fan01 | 693 | 5 | 219 | 17 | 126 | 23 | 215 | 17 | 198 | 18 |
| CW_Fan02 | 742 | 4 | 260 | 16 | 250 | 16 | 332 | 13 | 292 | 14 |
| CW_Fan03 | 793 | 3 | 333 | 13 | 357 | 12 | 434 | 10 | 384 | 12 |
| CW_Fan04 | 876 | 2 | 450 | 10 | 498 | 9 | 572 | 7 | 515 | 8 |
| CW_Fan05 | 966 | 1 | 567 | 7 | 627 | 6 | 700 | 5 | 639 | 6 |
| CW_Fan06 | 1078 | 0 | 517 | 8 | 630 | 6 | 733 | 4 | 690 | 5 |

[2] "Project Site" in the context of this study is the complete area designated for the Project, but not necessary occupied with the project infrastructure. Project Location is always contained within Project Site.

| Source ID | Noise Receptor ID | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R007 | | R034 | | R037 | | R038 | | R039 | |
| | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] |
| CW_Fan07 | 1001 | 1 | 392 | 11 | 507 | 9 | 617 | 6 | 581 | 7 |
| CW_Fan08 | 933 | 2 | 257 | 16 | 378 | 12 | 499 | 9 | 476 | 9 |
| CW_Fan09 | 879 | 2 | 140 | 22 | 262 | 15 | 397 | 11 | 391 | 11 |
| CW_Fan10 | 849 | 3 | 67 | 29 | 183 | 19 | 332 | 13 | 345 | 13 |
| CW_Inv01 | 695 | 9 | 216 | 21 | 125 | 26 | 216 | 21 | 200 | 22 |
| CW_Inv02 | 744 | 9 | 258 | 19 | 250 | 20 | 333 | 17 | 294 | 18 |
| CW_Inv03 | 795 | 8 | 331 | 17 | 356 | 16 | 435 | 14 | 385 | 15 |
| CW_Inv04 | 878 | 7 | 449 | 14 | 497 | 13 | 572 | 11 | 516 | 12 |
| CW_Inv05 | 968 | 6 | 566 | 11 | 627 | 10 | 700 | 9 | 640 | 10 |
| CW_Inv06 | 1080 | 5 | 517 | 12 | 631 | 10 | 734 | 9 | 691 | 9 |
| CW_Inv07 | 1003 | 5 | 391 | 15 | 507 | 13 | 618 | 11 | 582 | 11 |
| CW_Inv08 | 936 | 6 | 257 | 19 | 379 | 16 | 501 | 13 | 478 | 13 |
| CW_Inv09 | 881 | 7 | 139 | 25 | 263 | 19 | 399 | 15 | 394 | 15 |
| CW_Inv10 | 852 | 7 | 65 | 33 | 185 | 22 | 334 | 17 | 348 | 16 |
| CW_Sub | 635 | 17 | 269 | 25 | 71 | 37 | 107 | 33 | 127 | 32 |
| CW_Trans01 | 691 | 7 | 220 | 18 | 123 | 23 | 212 | 19 | 195 | 19 |
| CW_Trans02 | 740 | 6 | 259 | 17 | 248 | 17 | 329 | 14 | 289 | 16 |
| CW_Trans03 | 790 | 5 | 332 | 14 | 354 | 14 | 431 | 12 | 381 | 13 |
| CW_Trans04 | 873 | 4 | 449 | 11 | 495 | 10 | 569 | 9 | 512 | 10 |
| CW_Trans05 | 963 | 3 | 565 | 9 | 624 | 8 | 697 | 7 | 636 | 8 |
| CW_Trans06 | 1075 | 2 | 515 | 10 | 627 | 8 | 730 | 6 | 687 | 7 |
| CW_Trans07 | 998 | 3 | 389 | 13 | 504 | 10 | 614 | 8 | 578 | 9 |
| CW_Trans08 | 931 | 3 | 255 | 17 | 375 | 13 | 496 | 10 | 473 | 11 |
| CW_Trans09 | 877 | 4 | 138 | 22 | 259 | 17 | 394 | 13 | 389 | 13 |
| CW_Trans10 | 848 | 4 | 67 | 29 | 181 | 20 | 329 | 14 | 343 | 14 |

**Table 4.2 4.5-m Case – Point of Reception Noise Impact from Individual Cornwall Solar Noise Sources**

| Source ID | Noise Receptor ID | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R007 | | R034 | | R037 | | R038 | | R039 | |
| | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] |
| CW_Fan01 | 696 | 7 | 248 | 17 | 139 | 23 | 220 | 18 | 223 | 18 |
| CW_Fan02 | 750 | 6 | 280 | 16 | 258 | 17 | 338 | 14 | 321 | 15 |
| CW_Fan03 | 804 | 5 | 347 | 14 | 363 | 14 | 440 | 12 | 414 | 12 |
| CW_Fan04 | 891 | 4 | 458 | 11 | 503 | 10 | 578 | 9 | 545 | 10 |
| CW_Fan05 | 984 | 3 | 571 | 9 | 632 | 8 | 706 | 7 | 669 | 7 |
| CW_Fan06 | 1093 | 2 | 513 | 10 | 627 | 8 | 739 | 6 | 720 | 7 |
| CW_Fan07 | 1013 | 3 | 389 | 13 | 502 | 10 | 622 | 8 | 610 | 8 |
| CW_Fan08 | 942 | 4 | 257 | 17 | 371 | 13 | 504 | 10 | 504 | 10 |
| CW_Fan09 | 884 | 4 | 147 | 22 | 251 | 17 | 402 | 13 | 416 | 12 |
| CW_Fan10 | 852 | 5 | 91 | 27 | 166 | 21 | 335 | 14 | 365 | 14 |
| CW_Inv01 | 699 | 12 | 245 | 21 | 137 | 27 | 221 | 22 | 225 | 22 |
| CW_Inv02 | 753 | 11 | 278 | 20 | 257 | 21 | 339 | 19 | 323 | 19 |
| CW_Inv03 | 807 | 10 | 345 | 18 | 362 | 18 | 441 | 16 | 415 | 17 |
| CW_Inv04 | 893 | 9 | 457 | 16 | 502 | 15 | 578 | 14 | 546 | 14 |
| CW_Inv05 | 986 | 8 | 570 | 14 | 631 | 13 | 706 | 12 | 670 | 12 |
| CW_Inv06 | 1095 | 7 | 512 | 15 | 627 | 13 | 740 | 11 | 721 | 11 |
| CW_Inv07 | 1015 | 8 | 388 | 17 | 503 | 15 | 623 | 13 | 611 | 13 |
| CW_Inv08 | 945 | 9 | 256 | 21 | 371 | 18 | 506 | 15 | 505 | 15 |
| CW_Inv09 | 887 | 9 | 146 | 26 | 252 | 21 | 404 | 17 | 418 | 17 |
| CW_Inv10 | 854 | 10 | 89 | 31 | 168 | 25 | 338 | 19 | 368 | 18 |
| CW_Sub | 634 | 19 | 299 | 26 | 101 | 36 | 112 | 35 | 141 | 33 |
| CW_Trans01 | 694 | 8 | 249 | 18 | 137 | 24 | 217 | 19 | 220 | 19 |
| CW_Trans02 | 748 | 8 | 280 | 17 | 256 | 18 | 335 | 16 | 318 | 16 |
| CW_Trans03 | 802 | 7 | 346 | 15 | 360 | 15 | 437 | 13 | 411 | 14 |
| CW_Trans04 | 889 | 6 | 456 | 13 | 500 | 12 | 575 | 10 | 542 | 11 |
| CW_Trans05 | 981 | 5 | 569 | 10 | 629 | 9 | 703 | 8 | 666 | 9 |
| CW_Trans06 | 1090 | 4 | 510 | 12 | 624 | 10 | 736 | 8 | 717 | 8 |
| CW_Trans07 | 1010 | 4 | 386 | 14 | 499 | 12 | 619 | 10 | 607 | 10 |
| CW_Trans08 | 940 | 5 | 255 | 18 | 368 | 15 | 501 | 12 | 501 | 12 |
| CW_Trans09 | 882 | 6 | 146 | 23 | 248 | 18 | 399 | 14 | 413 | 14 |
| CW_Trans10 | 850 | 6 | 92 | 27 | 163 | 22 | 333 | 16 | 363 | 15 |

# 5. Mitigation Measures

Mitigation for operation of the Cornwall Solar Project has been modelled and shown to be feasible in the form of enclosures at all inverters. The enclosure transmission loss must be at least as specified in the table below. Note that the exhaust fans and medium voltage transformer will be outside the enclosures.

| Frequency [Hz] | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|
| Transmission loss [dB] | 0.0 | 9.0 | 7.0 | 7.0 | 11.0 | 18.0 | 19.0 | 14.0 | 13.0 |

The transmission loss above is based on the performance of Construction Specialties acoustical louver A8370. Technical information of the louver as well as its sound data can be found in Appendix B.

Currently, enclosures are planned to be installed at three inverter clusters of South Glengarry St. Lawrence-1 Solar Farm (Table B.2 and Table B.5), these enclosures were included in the noise model. No mitigation measure is planned at the Glendale Solar Project.

# 6. Impact Assessment

The purpose of the acoustic Assessment report is to demonstrate that the facility is in compliance with the noise performance limits. The Project will be located in a Class 3 Area, based on the classification defined in Publication NPC-232 by the MECP. Class 3 area means a rural area with an acoustical environment that is dominated by natural sounds, with little or no traffic noise, such as an agricultural area.

Table 6.1 shows the performance limits set by the MECP for Class 3 Areas, according to Publication NPC-232.

**Table 6.1 Performance Limits (One-Hour $L_{eq}$) by Time of Day for Class 3 Areas.**

| Time of Day | One Hour $L_{eq}$ (dBA) Class 3 Area |
|---|---|
| 07:00 to 19:00 | 45 |
| 19:00 to 23:00 | 40 |
| 23:00 to 07:00 | 40 |

The solar facility will be operating during the daylight hours, that is, between 07:00 and 19:00 during most days of the year. However, in the summer months the sun may shine until past 19:00, or before 07:00. As such, during the summer the facility will be operating at the time when the applicable performance limit changes from 45 dBA to 40 dBA. Also, the transformers remain energized at night. In order to account for this the study assumes that the facility will be operating 24 hours and compares the impact from the facility with the 40-dBA limit. In reality, the cooling fans will not be in operation at night.

For this study, the overall ground attenuation coefficient was estimated to be 0.7. Appendix F includes a list of all the parameters used in the CadnaA model to predict the sound pressure levels at the POR. The modelling does not consider the effect of the solar panels on the predicted sound pressure levels at the points of reception. The solar panels may act as barriers to further reduce noise at the POR.

## 6.1 Compliance With Performance Limits

Table 6.2 presents the predicted sound pressure levels for the Noise Receptors located within 1 km from the Project Site. Sound pressure contours at 4.5 m and 1.5 m are available in Figure C.1 and Figure C.2. Appendix F includes a detailed calculation log of the representative POR with the highest sound pressure level.

Following MECP recommendations provided on October 26, 2012 (e-mail from Enoch Tse to Steve Hichinson, Algonquin Power), the cumulative contributions from neighbouring projects do not apply to receptors R042 and R088 since they are proponents of the South Glengarry Solar Project. This e-mail is included in Appendix C.

The results of this study show that all POR are compliant with MECP guidelines based on the 40-dBA performance limit.

**Table 6.2 Calculated Sound Pressure Levels at POR within 1 km of Cornwall Solar Project**

(Shaded rows correspond to representative POR)
Existing = Existing dwelling, Vacant = Vacant Lot.
The performance limit is 40.0 dBA.

| Noise Receptor ID | Description | Point of Reception at 1.5 m | | | | | | | | Point of Reception at 4.5 m | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | |
| | | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist[m] | ID | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist [m] | ID |
| R001 | Existing | 524552 | 4994435 | 31.5 | 9.9 | 30.2 | 33.9 | 167 | CW_Sub | 524566 | 4994424 | 32.7 | 12.5 | 30.9 | 35.0 | 176 | CW_Sub |
| R002 | Existing | 524572 | 4994441 | 30.7 | 9.7 | 30.5 | 33.6 | 187 | CW_Sub | 524599 | 4994429 | 31.5 | 12.3 | 31.2 | 34.4 | 210 | CW_Sub |
| R003 | Existing | 524771 | 4994513 | 25.2 | 8.6 | 33.0 | 33.7 | 399 | CW_Sub | 524774 | 4994483 | 27.2 | 11.4 | 33.0 | 34.1 | 392 | CW_Sub |
| R004 | Existing | 524834 | 4994549 | 23.9 | 8.3 | 34.0 | 34.5 | 471 | CW_Sub | 524841 | 4994520 | 25.9 | 11.0 | 34.0 | 34.6 | 467 | CW_Sub |
| R005 | Existing | 524879 | 4994576 | 23.1 | 8.0 | 34.9 | 35.2 | 523 | CW_Sub | 524887 | 4994547 | 25.1 | 10.8 | 34.6 | 35.1 | 520 | CW_Sub |
| R006 | Existing | 524910 | 4994580 | 22.6 | 7.9 | 35.0 | 35.2 | 552 | CW_Sub | 524919 | 4994551 | 24.7 | 10.6 | 34.7 | 35.1 | 552 | CW_Sub |
| R007 | Existing | 524979 | 4994629 | 21.4 | 7.1 | 36.1 | 36.3 | 635 | CW_Sub | 524989 | 4994601 | 23.6 | 9.8 | 35.6 | 35.9 | 634 | CW_Sub |
| R008 | Existing | 525041 | 4994570 | 20.7 | 6.8 | 33.4 | 33.7 | 673 | CW_Sub | 525043 | 4994541 | 23.0 | 9.6 | 33.4 | 33.8 | 667 | CW_Sub |
| R009 | Existing | 525073 | 4994573 | 20.3 | 6.7 | 33.1 | 33.3 | 704 | CW_Sub | 525091 | 4994549 | 22.4 | 8.8 | 33.1 | 33.4 | 716 | CW_Sub |
| R010 | Existing | 525103 | 4994624 | 19.8 | 5.9 | 33.8 | 34.0 | 749 | CW_Sub | 525125 | 4994629 | 21.9 | 8.5 | 34.3 | 34.5 | 772 | CW_Sub |
| R011 | Existing | 525168 | 4994679 | 19.0 | 3.0 | 33.6 | 33.8 | 829 | CW_Sub | 525193 | 4994663 | 21.1 | 5.6 | 33.6 | 33.8 | 847 | CW_Sub |
| R012 | Existing | 525180 | 4994802 | 18.5 | 2.8 | 35.3 | 35.4 | 892 | CW_Sub | 525208 | 4994791 | 20.6 | 5.4 | 35.0 | 35.2 | 912 | CW_Sub |
| R013 | Existing | 524937 | 4995364 | 17.6 | 4.1 | 33.9 | 34.0 | 1017 | CW_Trans05 | 524953 | 4995390 | 19.8 | 6.7 | 33.7 | 33.9 | 1043 | CW_Trans05 |
| R014 | Existing | 523351 | 4994686 | 21.6 | 17.2 | 18.5 | 24.3 | 566 | CW_Inv06 | 523321 | 4994686 | 23.5 | 20.0 | 19.6 | 26.1 | 596 | CW_Inv06 |
| R015 | Vacant | 523521 | 4994768 | 24.4 | 15.6 | 20.4 | 26.2 | 388 | CW_Inv06 | 523491 | 4994769 | 25.9 | 18.4 | 21.3 | 27.7 | 418 | CW_Inv06 |
| R016 | Existing | 523572 | 4994481 | 24.8 | 16.2 | 20.1 | 26.5 | 448 | CW_Inv07 | 523543 | 4994473 | 26.3 | 19.0 | 21.0 | 28.0 | 478 | CW_Inv07 |
| R017 | Existing | 523576 | 4994423 | 24.5 | 16.3 | 19.8 | 26.2 | 473 | CW_Inv07 | 523549 | 4994409 | 26.1 | 19.1 | 20.8 | 27.8 | 503 | CW_Inv07 |
| R018 | Existing | 523645 | 4994587 | 26.8 | 15.3 | 21.2 | 28.1 | 328 | CW_Inv06 | 523615 | 4994581 | 28.0 | 18.1 | 22.1 | 29.4 | 355 | CW_Inv06 |
| R019 | Existing | 523646 | 4994382 | 25.4 | 15.8 | 20.3 | 26.9 | 436 | CW_Inv08 | 523618 | 4994370 | 26.9 | 18.6 | 21.2 | 28.4 | 466 | CW_Inv08 |

| Noise Receptor ID | Description | Point of Reception at 1.5 m | | | | | | | | Point of Reception at 4.5 m | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | |
| | | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist[m] | ID | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist [m] | ID |
| R020 | Existing | 523646 | 4994217 | 23.9 | 16.1 | 19.5 | 25.7 | 524 | CW_Inv08 | 523624 | 4994197 | 25.5 | 18.8 | 20.4 | 27.4 | 553 | CW_Inv09 |
| R021 | Vacant | 523666 | 4993457 | 16.7 | 15.2 | 14.9 | 20.4 | 1043 | CW_Inv10 | 523660 | 4993427 | 18.9 | 17.7 | 16.2 | 22.5 | 1071 | CW_Inv10 |
| R022 | Vacant | 523694 | 4994137 | 23.7 | 15.8 | 19.4 | 25.5 | 526 | CW_Inv09 | 523673 | 4994116 | 25.3 | 18.5 | 20.4 | 27.2 | 556 | CW_Inv09 |
| R023 | Vacant | 523693 | 4995312 | 21.5 | 12.4 | 21.9 | 24.9 | 561 | CW_Inv05 | 523666 | 4995326 | 23.3 | 15.2 | 22.7 | 26.4 | 589 | CW_Inv05 |
| R024 | Existing | 523718 | 4994506 | 27.8 | 15.0 | 21.6 | 28.9 | 309 | CW_Inv07 | 523692 | 4994490 | 29.0 | 17.8 | 22.5 | 30.1 | 339 | CW_Inv07 |
| R025 | Existing | 523721 | 4994286 | 25.7 | 15.4 | 20.5 | 27.1 | 423 | CW_Inv08 | 523715 | 4994256 | 27.3 | 18.0 | 21.5 | 28.7 | 446 | CW_Inv09 |
| R026 | Existing | 523826 | 4994316 | 27.9 | 14.6 | 21.6 | 29.0 | 320 | CW_Inv09 | 523804 | 4994294 | 29.1 | 17.3 | 22.5 | 30.2 | 349 | CW_Inv09 |
| R027 | Existing | 523786 | 4994181 | 25.4 | 15.0 | 20.4 | 26.9 | 425 | CW_Inv10 | 523778 | 4994155 | 27.0 | 17.6 | 21.4 | 28.4 | 445 | CW_Inv10 |
| R028 | Existing | 523891 | 4994218 | 27.5 | 14.2 | 21.5 | 28.7 | 315 | CW_Inv10 | 523869 | 4994197 | 28.7 | 16.9 | 22.4 | 29.9 | 344 | CW_Inv10 |
| R029 | Existing | 523900 | 4994317 | 29.4 | 14.0 | 22.3 | 30.3 | 254 | CW_Inv09 | 523879 | 4994296 | 30.4 | 16.8 | 23.2 | 31.3 | 283 | CW_Inv09 |
| R030 | Existing | 523917 | 4994140 | 26.6 | 14.0 | 21.2 | 27.9 | 340 | CW_Inv10 | 523898 | 4994117 | 27.9 | 16.8 | 22.1 | 29.2 | 370 | CW_Inv10 |
| R031 | Existing | 523959 | 4994060 | 25.6 | 13.8 | 20.9 | 27.1 | 374 | CW_Inv10 | 523942 | 4994036 | 27.1 | 16.5 | 21.8 | 28.5 | 404 | CW_Inv10 |
| R032 | Existing | 523983 | 4994255 | 29.9 | 13.5 | 22.6 | 30.7 | 217 | CW_Inv10 | 523961 | 4994234 | 30.7 | 16.3 | 23.4 | 31.6 | 247 | CW_Inv10 |
| R033 | Vacant | 524001 | 4994316 | 31.8 | 13.3 | 23.3 | 32.4 | 175 | CW_Inv10 | 523978 | 4994296 | 32.3 | 16.1 | 24.0 | 33.0 | 203 | CW_Inv10 |
| R034 | Existing | 524135 | 4994315 | 37.3 | 12.4 | 24.6 | 37.6 | 65 | CW_Inv10 | 524106 | 4994307 | 36.6 | 15.3 | 25.3 | 36.9 | 89 | CW_Inv10 |
| R035 | Vacant | 524152 | 4993765 | 21.8 | 12.3 | 19.5 | 24.1 | 606 | CW_Trans10 | 524144 | 4993736 | 23.6 | 15.0 | 20.5 | 25.7 | 636 | CW_Trans10 |
| R036 | Vacant | 524228 | 4993554 | 19.1 | 11.6 | 17.9 | 22.0 | 819 | CW_Trans10 | 524222 | 4993525 | 21.2 | 14.3 | 19.1 | 23.8 | 848 | CW_Trans10 |
| R037 | Existing | 524346 | 4994325 | 38.6 | 11.1 | 26.7 | 38.9 | 71 | CW_Sub | 524322 | 4994307 | 37.8 | 13.9 | 27.2 | 38.2 | 101 | CW_Sub |
| R038 | Existing | 524499 | 4994343 | 34.6 | 10.2 | 28.2 | 35.5 | 107 | CW_Sub | 524502 | 4994338 | 35.9 | 12.9 | 29.0 | 36.7 | 112 | CW_Sub |
| R039 | Existing | 524508 | 4994435 | 33.6 | 10.1 | 29.9 | 35.1 | 127 | CW_Sub | 524532 | 4994416 | 34.3 | 12.7 | 30.6 | 35.9 | 141 | CW_Sub |
| R040 | Existing | 524795 | 4994418 | 24.8 | 8.6 | 30.8 | 31.8 | 400 | CW_Sub | 524766 | 4994394 | 27.3 | 11.5 | 31.1 | 32.7 | 370 | CW_Sub |
| R041 | Existing | 524856 | 4994446 | 23.7 | 8.3 | 31.4 | 32.1 | 465 | CW_Sub | 524853 | 4994416 | 25.8 | 11.0 | 31.6 | 32.6 | 458 | CW_Sub |
| R042 | Existing | 524937 | 4994621 | 22.0 | 7.7 | 36.3 | 36.5 | 593 | CW_Sub | 524948 | 4994593 | 24.2 | 10.4 | 35.8 | 36.1 | 593 | CW_Sub |

| Noise Receptor ID | Description | Point of Reception at 1.5 m | | | | | | | | Point of Reception at 4.5 m | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | |
| | | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist[m] | ID | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist [m] | ID |
| R043 | Existing | 524952 | 4994491 | 22.1 | 7.7 | 32.2 | 32.6 | 567 | CW_Sub | 524962 | 4994463 | 24.1 | 10.0 | 32.3 | 32.9 | 572 | CW_Sub |
| R045 | Existing | 524982 | 4994520 | 21.6 | 7.2 | 32.7 | 33.1 | 603 | CW_Sub | 524991 | 4994491 | 23.7 | 9.9 | 32.8 | 33.3 | 605 | CW_Sub |
| R046 | Existing | 525071 | 4994597 | 20.3 | 6.6 | 33.7 | 33.9 | 710 | CW_Sub | 525078 | 4994577 | 22.5 | 8.8 | 33.9 | 34.2 | 711 | CW_Sub |
| R047 | Existing | 525095 | 4994483 | 20.1 | 6.1 | 30.8 | 31.2 | 707 | CW_Sub | 525125 | 4994489 | 22.0 | 8.7 | 31.5 | 32.0 | 737 | CW_Sub |
| R048 | Existing | 525145 | 4994442 | 19.5 | 5.9 | 29.5 | 29.9 | 751 | CW_Sub | 525170 | 4994424 | 21.5 | 7.8 | 29.9 | 30.5 | 775 | CW_Sub |
| R049 | Vacant | 525193 | 4994363 | 18.8 | 4.2 | 27.7 | 28.3 | 797 | CW_Sub | 525211 | 4994339 | 21.0 | 6.8 | 28.3 | 29.0 | 815 | CW_Sub |
| R050 | Existing | 525210 | 4994495 | 18.7 | 3.0 | 29.6 | 30.0 | 822 | CW_Sub | 525237 | 4994481 | 20.8 | 5.6 | 30.0 | 30.5 | 847 | CW_Sub |
| R051 | Vacant | 525281 | 4994224 | 17.6 | 2.7 | 25.1 | 25.9 | 896 | CW_Sub | 525298 | 4994200 | 19.8 | 3.9 | 25.8 | 26.8 | 918 | CW_Sub |
| R052 | Vacant | 525279 | 4994743 | 17.6 | 0.8 | 31.8 | 32.0 | 956 | CW_Sub | 525306 | 4994731 | 19.8 | 0.6 | 32.0 | 32.3 | 977 | CW_Sub |
| R053 | Existing | 525299 | 4994357 | 17.7 | 1.1 | 26.6 | 27.2 | 902 | CW_Sub | 525317 | 4994333 | 19.9 | 3.8 | 27.2 | 28.0 | 921 | CW_Sub |
| R054 | Existing | 523027 | 4993973 | 16.0 | 22.9 | 13.9 | 24.1 | 1174 | CW_Inv08 | 523057 | 4993971 | 18.8 | 24.8 | 15.6 | 26.1 | 1149 | CW_Inv08 |
| R055 | Existing | 523112 | 4993991 | 16.8 | 21.7 | 14.5 | 23.5 | 1092 | CW_Inv08 | 523142 | 4993991 | 19.5 | 23.7 | 16.2 | 25.6 | 1066 | CW_Inv08 |
| R056 | Existing | 523131 | 4993999 | 17.0 | 21.5 | 14.7 | 23.4 | 1071 | CW_Inv08 | 523161 | 4993995 | 19.7 | 23.5 | 16.3 | 25.5 | 1048 | CW_Inv08 |
| R057 | Existing | 523147 | 4994309 | 18.4 | 20.6 | 15.9 | 23.5 | 896 | CW_Inv06 | 523168 | 4994284 | 21.0 | 22.9 | 17.4 | 25.7 | 892 | CW_Inv06 |
| R059 | Existing | 523164 | 4994127 | 17.9 | 20.9 | 15.4 | 23.4 | 980 | CW_Inv07 | 523194 | 4994126 | 20.6 | 23.0 | 17.0 | 25.6 | 954 | CW_Inv08 |
| R060 | Existing | 523185 | 4994324 | 18.9 | 20.2 | 16.2 | 23.5 | 856 | CW_Inv06 | 523213 | 4994334 | 21.6 | 22.2 | 17.8 | 25.7 | 827 | CW_Inv06 |
| R061 | Existing | 523326 | 4994636 | 21.3 | 17.6 | 18.2 | 24.1 | 601 | CW_Inv06 | 523296 | 4994638 | 23.1 | 20.4 | 19.3 | 26.0 | 630 | CW_Inv06 |
| R062 | Existing | 523269 | 4994083 | 18.6 | 19.8 | 15.9 | 23.2 | 909 | CW_Inv08 | 523298 | 4994077 | 21.3 | 21.9 | 17.5 | 25.4 | 887 | CW_Inv08 |
| R063 | Existing | 523309 | 4994003 | 18.6 | 19.4 | 15.9 | 22.9 | 921 | CW_Inv08 | 523324 | 4993982 | 21.0 | 21.7 | 17.3 | 25.1 | 921 | CW_Inv09 |
| R064 | Existing | 523437 | 4994036 | 20.0 | 18.1 | 16.9 | 23.3 | 796 | CW_Inv09 | 523395 | 4994006 | 21.7 | 21.0 | 17.9 | 25.2 | 847 | CW_Inv09 |
| R065 | Existing | 523434 | 4994129 | 20.6 | 18.0 | 17.3 | 23.7 | 746 | CW_Inv08 | 523417 | 4994121 | 22.7 | 20.7 | 18.5 | 25.7 | 764 | CW_Inv08 |
| R066 | Existing | 523467 | 4993951 | 19.6 | 17.8 | 16.7 | 23.0 | 816 | CW_Inv10 | 523451 | 4993926 | 21.6 | 20.4 | 17.9 | 25.0 | 843 | CW_Inv10 |
| R067 | Existing | 523465 | 4994173 | 21.3 | 17.7 | 17.8 | 24.0 | 696 | CW_Inv08 | 523450 | 4994147 | 23.2 | 20.4 | 18.9 | 26.0 | 723 | CW_Inv08 |

| Noise Receptor ID | Description | Point of Reception at 1.5 m | | | | | | | | Point of Reception at 4.5 m | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Pressure Contribution [dBA] | | | | Nearest Project Source | |
| | | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist[m] | ID | X | Y | Cornwall | Glendale | South Glengarry | Total | Dist [m] | ID |
| R068 | Existing | 523484 | 4994063 | 20.6 | 17.6 | 17.4 | 23.6 | 742 | CW_Inv09 | 523468 | 4994038 | 22.6 | 20.3 | 18.5 | 25.6 | 768 | CW_Inv09 |
| R069 | Existing | 523528 | 4994084 | 21.3 | 17.2 | 17.8 | 23.9 | 693 | CW_Inv09 | 523512 | 4994058 | 23.2 | 19.9 | 18.9 | 25.8 | 720 | CW_Inv09 |
| R070 | Existing | 523537 | 4994218 | 22.5 | 17.0 | 18.6 | 24.7 | 611 | CW_Inv08 | 523515 | 4994198 | 24.2 | 19.7 | 19.6 | 26.5 | 640 | CW_Inv08 |
| R071 | Existing | 523538 | 4994088 | 21.4 | 17.1 | 17.9 | 24.0 | 683 | CW_Inv09 | 523538 | 4994063 | 23.5 | 19.6 | 19.1 | 26.0 | 697 | CW_Inv09 |
| R072 | Vacant | 523611 | 4994102 | 22.3 | 16.5 | 18.5 | 24.6 | 614 | CW_Inv09 | 523593 | 4994078 | 24.1 | 19.2 | 19.6 | 26.4 | 643 | CW_Inv09 |
| R073 | Existing | 524712 | 4994475 | 26.5 | 9.0 | 31.9 | 33.0 | 331 | CW_Sub | 524712 | 4994445 | 28.5 | 11.7 | 32.0 | 33.7 | 323 | CW_Sub |
| R074 | Existing | 523634 | 4994276 | 24.3 | 16.1 | 19.7 | 26.0 | 498 | CW_Inv08 | 523632 | 4994246 | 26.1 | 18.7 | 20.8 | 27.8 | 517 | CW_Inv08 |
| R075 | Vacant | 523194 | 4996002 | 12.8 | 11.1 | 14.8 | 17.9 | 1412 | CW_Inv05 | 523176 | 4996026 | 15.2 | 13.7 | 16.1 | 19.9 | 1442 | CW_Inv05 |
| R076 | Existing | 524709 | 4994392 | 26.7 | 9.1 | 30.1 | 31.8 | 312 | CW_Sub | 524716 | 4994363 | 28.3 | 11.7 | 30.4 | 32.6 | 319 | CW_Sub |
| R077 | Vacant | 523457 | 4996155 | 12.7 | 9.6 | 15.7 | 18.2 | 1409 | CW_Fan05 | 523437 | 4996178 | 15.2 | 12.2 | 16.9 | 20.0 | 1438 | CW_Fan05 |
| R078 | Existing | 524557 | 4994352 | 31.4 | 9.9 | 28.7 | 33.3 | 162 | CW_Sub | 524577 | 4994338 | 32.2 | 12.5 | 29.5 | 34.1 | 184 | CW_Sub |
| R079 | Existing | 525031 | 4994545 | 20.9 | 6.9 | 32.9 | 33.2 | 657 | CW_Sub | 525043 | 4994518 | 23.0 | 9.6 | 32.9 | 33.4 | 662 | CW_Sub |
| R080 | Existing | 522945 | 4995810 | 12.7 | 12.9 | 13.9 | 18.0 | 1411 | CW_Inv06 | 522927 | 4995834 | 15.2 | 15.4 | 15.2 | 20.0 | 1441 | CW_Inv06 |
| R081 | Existing | 524171 | 4993725 | 21.3 | 12.2 | 19.2 | 23.7 | 646 | CW_Trans10 | 524166 | 4993695 | 23.1 | 14.8 | 20.2 | 25.3 | 676 | CW_Trans10 |
| R082 | Existing | 523643 | 4994581 | 26.7 | 15.4 | 21.1 | 28.0 | 332 | CW_Inv06 | 523620 | 4994562 | 28.0 | 18.2 | 22.0 | 29.4 | 362 | CW_Inv06 |
| R083 | Existing | 523644 | 4996197 | 12.9 | 8.8 | 16.6 | 18.6 | 1382 | CW_Fan05 | 523625 | 4996221 | 15.3 | 11.5 | 17.8 | 20.3 | 1410 | CW_Fan05 |
| R084 | Vacant | 522828 | 4995731 | 12.5 | 13.7 | 13.3 | 18.0 | 1440 | CW_Inv06 | 522807 | 4995753 | 15.0 | 16.2 | 14.7 | 20.1 | 1470 | CW_Inv06 |
| R085 | Existing | 523375 | 4994675 | 22.0 | 17.1 | 18.7 | 24.5 | 545 | CW_Inv06 | 523345 | 4994675 | 23.8 | 19.8 | 19.8 | 26.3 | 574 | CW_Inv06 |
| R086 | Existing | 525251 | 4994504 | 18.3 | 2.8 | 29.2 | 29.6 | 864 | CW_Sub | 525270 | 4994481 | 20.4 | 3.9 | 29.6 | 30.1 | 880 | CW_Sub |
| R087 | Vacant | 523738 | 4996391 | 11.7 | 7.4 | 15.9 | 17.7 | 1547 | CW_Fan05 | 523723 | 4996417 | 14.2 | 10.1 | 17.1 | 19.4 | 1575 | CW_Fan05 |
| R088 | Existing | 525055 | 4994862 | 19.6 | * | * | * | 819 | CW_Sub | 525084 | 4994856 | 21.7 | * | * | * | 840 | CW_Sub |

Note: R088, located nearest to the South Glengarry solar site was not included with the 2011 South Glengarry AAR, and therefore adjacent facility contributions excluded.

*Since R042 and R088 are owned by the proponent of South Glengarry Solar Project, noise levels at these receptors have not been calculated

# 7. Conclusions and Recommendations

For the Cornwall Solar Project, the sound pressure levels at the Noise Receptors have been estimated using the CadnaA model, based on ISO 9613-2. Mitigation for operation of the Project has been modelled and shown to be feasible.

Based on the results obtained in this study, it is concluded that the sound pressure levels at the Noise Receptors, resulting from the Cornwall Solar Project operation, will be compliant with MECP requirements for Class 3 areas of 40 dBA at all times.

Signatures

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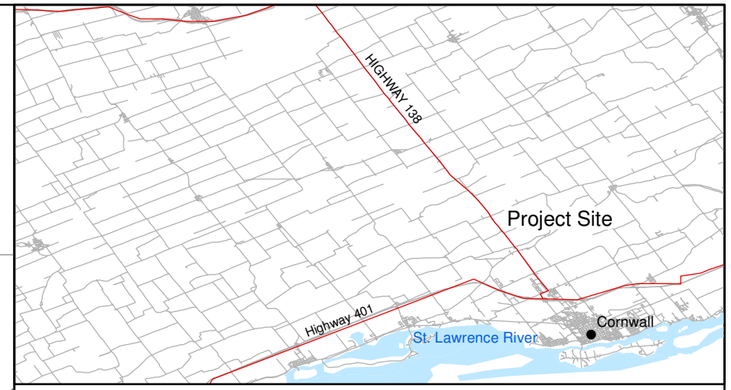
# Appendix A
## Land Use Zoning Designation Plan and Area Location Plan

522000
523000
524000
525000
4996000
4995000
4994000

AG
RU
GLEN FALLOCH RD
COUNTY RD 20
9 MILE RD
COUNTY RD 19
CASHION RD
COUNTY RD 44 HEADLINE RD
KINLOCH RD
ST RD

R087 R083 R077 R075 R080 R084 R013 R023 R015 R014 R035 R061 R018 R082 R016 R024 R017 R019 R060 R057 R074 R070 R020 R025 R026 R029 R033 R034 R037 R032 R028 R027 R059 R065 R067 R062 R022 R030 R069 R071 R031 R054 R055 R056 R063 R064 R068 R066 R035 R081 R036 R021 R088 R012 R052 R011 R010 R007 R046 R009 R006 R008 R079 R004 R003 R045 R043 R050 R086 R047 R048 R049 R053 R051 R001 R002 R073 R041 R040 R076 R038 R078

CW_Cluster5
CW_Cluster6
CW_Cluster4
CW_Cluster7
CW_Cluster3
CW_Cluster8
CW_Cluster2
CW_Cluster9
CW_Cluster1
CW_Cluster10
CW_Sub




**Legend**

- Cluster # — Inverter Cluster
- SUB — Substation Transformer
- # — Noise Receptor - Existing
- # — Noise Receptor - Vacant
- Road
- Cornwall Solar Project Site
- 1000 m from Project Site
- Waterbody
- Zone Boundary
- Parcel

AG Agricultural
RU Rural

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.

0 100 200 400 600 Metres

NORTH

1:13,000

Figure A.1

Cornwall Solar Inc.

**Cornwall Solar Project**
**Land Use**

HATCH

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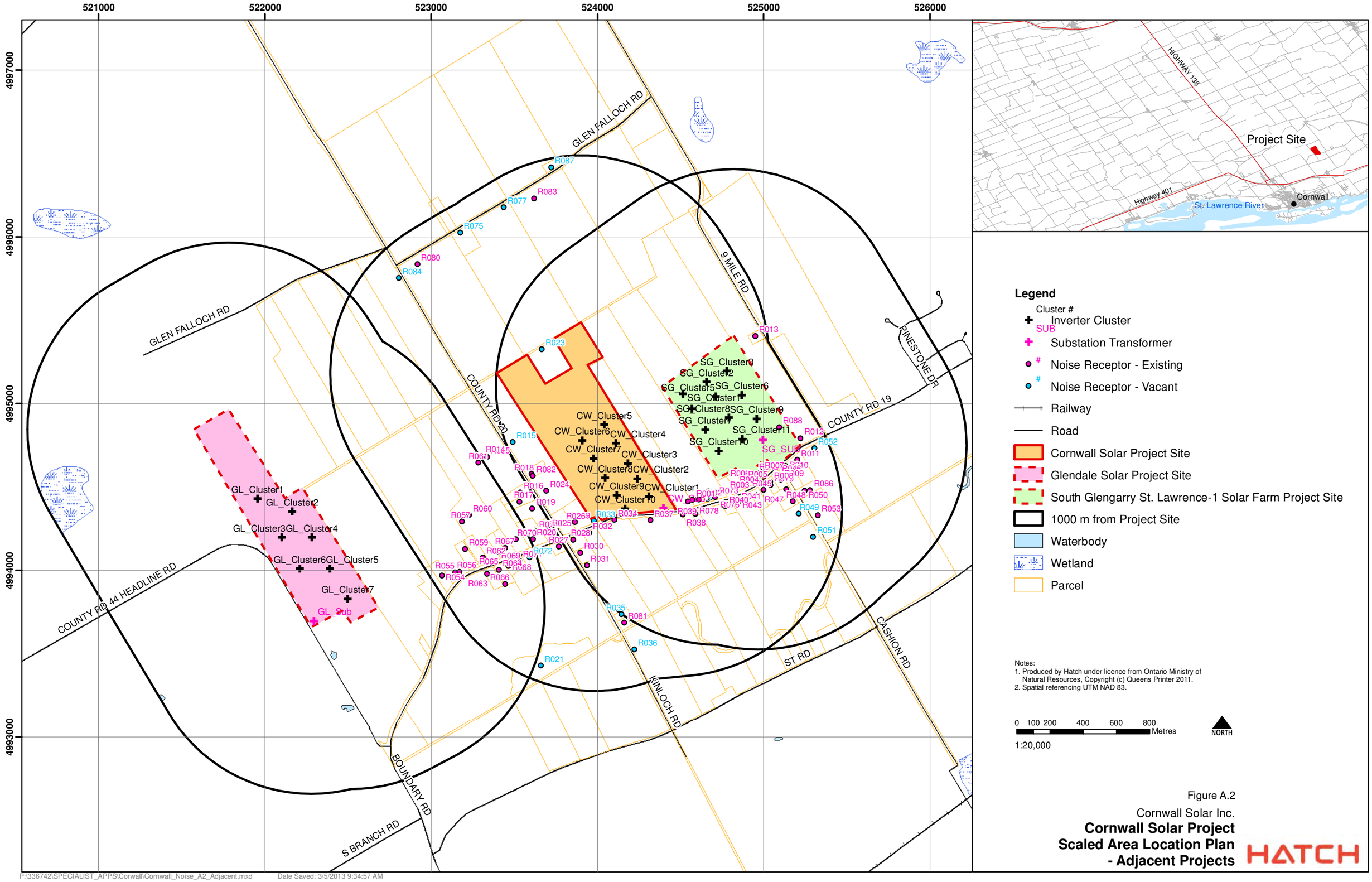


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Figure A.2

Cornwall Solar Inc.

**Cornwall Solar Project**
**Scaled Area Location Plan**
**- Adjacent Projects**

HATCH

523000 524000 525000

4996000 4995000 4994000

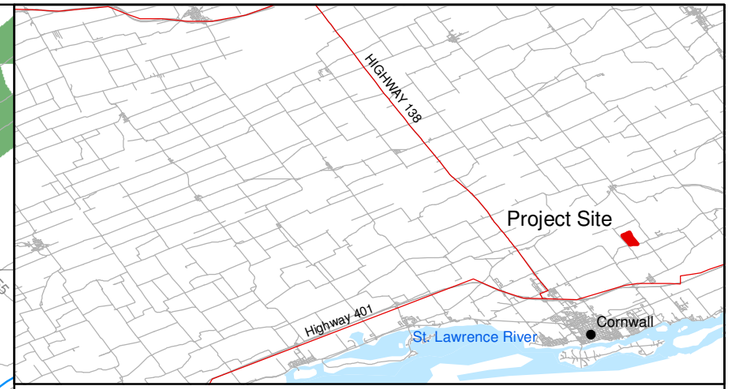
GLEN FALLOCH RD
GLEN FALLOCH RD
9 MILE RD
COUNTY RD 20
KINLOCH RD
CASHION RD
ST RD

R087 R083 R077 R075 R080 R084 R023 R013 R088 R012 R052 R011 R010 R007 R046 R009 R006 R008 R004 R079 R003 R045 R050 R086 R043 R073 R047 R048 R041 R040 R076 R049 R053 R051 R078 R038 R037 R034 R033 R029 R026 R032 R028 R025 R020 R070 R074 R027 R030 R031 R072 R071 R069 R067 R065 R062 R059 R063 R064 R068 R066 R054 R055 R056 R057 R060 R024 R016 R017 R019 R018 R082 R061 R014 R015 R035 R081 R036 R021

SG_Cluster1 SG_Cluster2 SG_Cluster3 SG_Cluster4 SG_Cluster5 SG_Cluster6 SG_Cluster7 SG_Cluster8 SG_Cluster9 SG_Cluster10 SG_Cluster11 SG_SUB

CW_Cluster1 CW_Cluster2 CW_Cluster3 CW_Cluster4 CW_Cluster5 CW_Cluster6 CW_Cluster7 CW_Cluster8 CW_Cluster9 CW_Cluster10 CW_SUB

GL_Cluster2 GL_Cluster4 GL_Cluster3 GL_Cluster6 GL_Cluster5 GL_Cluster7 GL_SUB




**Legend**

- Cluster #
- Inverter Cluster
- SUB — Substation Transformer
- # — Noise Receptor - Existing
- # — Noise Receptor - Vacant
- Road
- Railway
- Topographic Contour (5 m interval)
- Watercourse
- Inverter Enclosure (Not to Scale)
- Project Site
- 1000 m from Project Site
- South Glengarry St. Lawrence-1 Solar Farm Project Site
- Glendale Solar Project Site
- Parcel
- Waterbody
- Wetland
- Wooded Area

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.

0 100 200 400 600 Metres

NORTH

1:13,000

Figure A.3

Cornwall Solar Inc.

**Cornwall Solar Project**
**Scaled Area Location Plan**

HATCH

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# Appendix B
## Noise Sources

**Table B.1 Point Sources from Cornwall Solar Project Used in CadnaA, Includes 5.0-dBA Tonality Penalty and Enclosure Attenuation at the Inverters**

| Source ID | Description | Sound Power ID | Enclosure attenuation ID | Total sound power level (dBA) | Correction (dBA) | Height (m) | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | X | Y |
| CW_Fan01 | CWB-101-4 exhaust fan at CW_Cluster01 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524311 | 4994446 |
| CW_Fan02 | CWB-101-4 exhaust fan at CW_Cluster02 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524241 | 4994552 |
| CW_Fan03 | CWB-101-4 exhaust fan at CW_Cluster03 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524186 | 4994644 |
| CW_Fan04 | CWB-101-4 exhaust fan at CW_Cluster04 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524113 | 4994765 |
| CW_Fan05 | CWB-101-4 exhaust fan at CW_Cluster05 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524044 | 4994875 |
| CW_Fan06 | CWB-101-4 exhaust fan at CW_Cluster06 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 523912 | 4994782 |
| CW_Fan07 | CWB-101-4 exhaust fan at CW_Cluster07 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 523979 | 4994675 |
| CW_Fan08 | CWB-101-4 exhaust fan at CW_Cluster08 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524048 | 4994557 |
| CW_Fan09 | CWB-101-4 exhaust fan at CW_Cluster09 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524118 | 4994454 |
| CW_Fan10 | CWB-101-4 exhaust fan at CW_Cluster10 | Fan_CWB_101_4 | | 78.2 | 5 | 2 | 524169 | 4994373 |
| CW_Inv01 | Two Schneider Electric GT500 MVX inverters at CW_Cluster01 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524308 | 4994444 |
| CW_Inv02 | Two Schneider Electric GT500 MVX inverters at CW_Cluster02 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524239 | 4994551 |
| CW_Inv03 | Two Schneider Electric GT500 MVX inverters at CW_Cluster03 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524184 | 4994642 |
| CW_Inv04 | Two Schneider Electric GT500 MVX inverters at CW_Cluster04 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524111 | 4994763 |
| CW_Inv05 | Two Schneider Electric GT500 MVX inverters at CW_Cluster05 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524042 | 4994873 |
| CW_Inv06 | Two Schneider Electric GT500 MVX inverters at CW_Cluster06 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 523909 | 4994780 |
| CW_Inv07 | Two Schneider Electric GT500 MVX inverters at CW_Cluster07 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 523977 | 4994673 |
| CW_Inv08 | Two Schneider Electric GT500 MVX inverters at CW_Cluster08 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524046 | 4994556 |
| CW_Inv09 | Two Schneider Electric GT500 MVX inverters at CW_Cluster09 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524115 | 4994452 |
| CW_Inv10 | Two Schneider Electric GT500 MVX inverters at CW_Cluster10 | Inv_X2_1.0MW_Xnrx_GT500 | Louver_A8370 | 83.8 | 5 | 2.3 | 524166 | 4994371 |
| CW_Sub | 34.5-kV/44-kV/10-MVA substation transformer | Tr_34.5kV_44kV_10MVA | | 86.6 | 5 | 3.5 | 524397 | 4994374 |
| CW_Trans01 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster01 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524313 | 4994444 |
| CW_Trans02 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster02 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524243 | 4994551 |
| CW_Trans03 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster03 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524189 | 4994642 |
| CW_Trans04 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster04 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524116 | 4994763 |
| CW_Trans05 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster05 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524047 | 4994873 |
| CW_Trans06 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster06 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 523914 | 4994780 |

| Source ID | Description | Sound Power ID | Enclosure attenuation ID | Total sound power level (dBA) | Correction (dBA) | Height (m) | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | X | Y |
| CW_Trans07 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster07 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 523982 | 4994673 |
| CW_Trans08 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster08 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524051 | 4994556 |
| CW_Trans09 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster09 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524120 | 4994452 |
| CW_Trans10 | 208-V/34.5-kV/1-MVA WEG transformer at CW_Cluster10 | Tr_200V_34.5kV_1MVA | | 78.3 | 5 | 2 | 524171 | 4994371 |

**Table B.2 Point Sources from Glendale Solar Project (GL) and South Glengarry St. Lawrence-1 Solar Farm (SG) Used in CadnaA, Includes 5.0-dBA Tonality Penalty and Correction Factors to match overall Sound Powers identified in Renewable Energy Approvals (Appendix D)**

| Source ID | Description | Sound Power ID | Enclosure attenuation ID | Total sound power level (dBA) | Correction (dBA) | Height (m) | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | X | Y |
| GL_Sub | 34.5-kV/44-kV/10-MVA substation transformer | GL_T44kV_10MVA | GL_10MW_Tr_Corr | 85.8 | 5 | 3.5 | 522294 | 4993696 |
| GL_Inv1 | Two Sunny Central 800CP at GL_Cluster1 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 521955 | 4994431 |
| GL_Inv2 | Two Sunny Central 800CP at GL_Cluster2 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522162 | 4994354 |
| GL_Inv3 | Two Sunny Central 800CP at GL_Cluster3 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522100 | 4994199 |
| GL_Inv4 | Two Sunny Central 800CP at GL_Cluster4 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522281 | 4994199 |
| GL_Inv5 | Two Sunny Central 800CP at GL_Cluster5 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522390 | 4994010 |
| GL_Inv6 | Two Sunny Central 800CP at GL_Cluster6 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522209 | 4994010 |
| GL_Inv7 | Two Sunny Central 800CP at GL_Cluster7 | GL_SMA_SC800CPX2 | GL_MV_Gen_Corr | 86.3 | 5 | 2.6 | 522498 | 4993829 |
| GL_Trans1 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster1 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 521950 | 4994431 |
| GL_Trans2 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster2 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522157 | 4994354 |
| GL_Trans3 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster3 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522095 | 4994199 |
| GL_Trans4 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster4 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522276 | 4994199 |
| GL_Trans5 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster5 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522384 | 4994010 |
| GL_Trans6 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster6 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522203 | 4994010 |
| GL_Trans7 | 360-V/34.5-kV/1.6-MVA transformer at GL_Cluster7 | GL_T27.6kV_1.6MVA | GL_Tr_Corr | 75.1 | 5 | 2.6 | 522493 | 4993829 |
| SG_NS_01 | Two 500 kW inverters at SG_Cluster01 | SG_Inv_1MW | SG_MV01_Gen_Corr | 88 | 5 | 1.5 | 524587 | 4994981 |
| SG_NS_02 | Two 500 kW inverters at SG_Cluster02 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524595 | 4995076 |
| SG_NS_03 | Two 500 kW inverters at SG_Cluster03 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524627 | 4994781 |
| SG_NS_04 | Two 500 kW inverters at SG_Cluster04 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524638 | 4994914 |
| SG_NS_05 | Two 500 kW inverters at SG_Cluster05 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524652 | 4995066 |
| SG_NS_06 | Two 500 kW inverters at SG_Cluster06 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524754 | 4995247 |
| SG_NS_07 | Two 500 kW inverters at SG_Cluster07 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524896 | 4994772 |
| SG_NS_08 | Two 500 kW inverters at SG_Cluster08 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524908 | 4994905 |
| SG_NS_09 | Two 500 kW inverters at SG_Cluster09 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524921 | 4995057 |
| SG_NS_10 | Two 500 kW inverters at SG_Cluster10 | SG_Inv_1MW | SG_MV_Gen_Corr | 91 | 5 | 1.5 | 524968 | 4994933 |
| SG_NS_11 | 1 MVA transformer at SG_Cluster01 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524592 | 4994980 |
| SG_NS_12 | 1 MVA transformer at SG_Cluster02 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524600 | 4995075 |

| Source ID | Description | Sound Power ID | Enclosure attenuation ID | Total sound power level (dBA) | Correction (dBA) | Height (m) | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | X | Y |
| SG_NS_13 | 1 MVA transformer at SG_Cluster03 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524622 | 4994782 |
| SG_NS_14 | 1 MVA transformer at SG_Cluster04 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524634 | 4994914 |
| SG_NS_15 | 1 MVA transformer at SG_Cluster05 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524647 | 4995067 |
| SG_NS_16 | 1 MVA transformer at SG_Cluster06 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524750 | 4995247 |
| SG_NS_17 | 1 MVA transformer at SG_Cluster07 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524901 | 4994772 |
| SG_NS_18 | 1 MVA transformer at SG_Cluster08 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524913 | 4994905 |
| SG_NS_19 | 1 MVA transformer at SG_Cluster09 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524926 | 4995056 |
| SG_NS_20 | 1 MVA transformer at SG_Cluster10 | SG_Trans_1MVA | SG_Tr_Corr | 69 | 5 | 1.5 | 524963 | 4994933 |
| SG_NS_21 | 10 MVA substation transformer | SG_Trans_10MVA | SG_10MW_Tr_Corr | 88 | 5 | 2.0 | 525013 | 4994843 |

**Note:**

1. Attenuation SG _MV01_Gen_Corr is a correction applied in order to meet overall levels noted in the 2013 South Glengarry REA (Appendix D)
2. Attenuation SG _MV_Gen_Corr is a correction applied in order to meet overall levels noted in the 2013 South Glengarry REA (Appendix D)
3. Attenuation SG _Tr_Corr is a correction applied in order to meet overall levels noted in the 2013 South Glengarry REA (Appendix D)
4. Attenuation SG_ 10MW_ Tr_Corr is a correction applied in order to meet overall levels noted in the 2013 South Glengarry REA (Appendix D)
5. Attenuation GL_MV_Gen_Corr is a correction applied in order to meet overall levels noted in the 2012 Glendale REA (Appendix D)
6. Attenuation GL_Tr_Corr is a correction applied in order to meet overall levels noted in the 2012 Glendale REA (Appendix D)
7. Attenuation GL_ 10MW_ Tr_Corr is a correction applied in order to meet overall levels noted in the 2012 Glendale REA (Appendix D)

**Table B.3 Noise Source Spectra Excluding Tonality Penalties and Adjustments to Achieve Overall REA Levels**

| Spectra ID | Octave Spectrum (dB) | | | | | | | | | | Total (dBA) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weight | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| GL_SMA_SC800CPX2 | | | 89.3 | 90.0 | 89.1 | 85.5 | 78.7 | 72.9 | 64.0 | 73.8 | 86.3 |
| GL_T27.6kV_1.6MVA | | 71.3 | 77.3 | 79.3 | 74.3 | 74.3 | 68.3 | 63.3 | 58.3 | 51.3 | 74.7 |
| GL_T44kV_10MVA | | 82.4 | 88.4 | 90.4 | 85.4 | 85.4 | 79.4 | 74.4 | 69.4 | 62.4 | 85.8 |
| SG_Trans_10MVA | | | 86.5 | 88.5 | 83.5 | 83.5 | 77.5 | 72.5 | 67.5 | 60.5 | 83.9 |
| SG_Trans_1MVA | | | 75.0 | 77.0 | 72.0 | 72.0 | 66.0 | 61.0 | 56.0 | 49.0 | 72.4 |
| Tr_200V_34.5kV_1MVA | | 69.9 | 75.9 | 77.9 | 72.9 | 72.9 | 66.9 | 61.9 | 56.9 | 49.9 | 73.3 |
| Tr_34.5kV_44kV_10MVA | | 78.2 | 84.2 | 86.2 | 81.2 | 81.2 | 75.2 | 70.2 | 65.2 | 58.2 | 81.6 |
| Inv_X2_1.0MW_Xnrx_GT500 | | | 81.7 | 89.3 | 89.1 | 85.6 | 86.0 | 80.6 | 75.9 | 88.1 | 91.5 |
| Fan_CWB_101_4 | | | 73.0 | 72.0 | 78.0 | 69.0 | 63.0 | 66.0 | 58.0 | 52.0 | 73.2 |

**Table B.4 Transmission Loss Used in CadnaA to Model Enclosures of Cornwall Solar Project**

| Spectra ID | Octave Spectrum (dB) | | | | | | | | | Rw |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| Louver_A8370 | 0.0 | 9.0 | 7.0 | 7.0 | 11.0 | 18.0 | 19.0 | 14.0 | 13.0 | 16.0 |

**Table B.5 Transmission Loss Used in CadnaA to Model Enclosures of South Glengarry St. Lawrence-1 Solar Farm**

| Spectra ID | Octave Spectrum (dB) | | | | | | | | | Rw |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| SG_Louver | 0.0 | 0.0 | 0.0 | 1.0 | 4.0 | 7.0 | 6.0 | 0.0 | 0.0 | 6.0 |

# GT500 480, GT500 600, GT500 MVX

The GT500 is a Grid Tie Solar Inverter for large commercial and utility applications with a CEC efficiency of 96 percent. The GT500 features an industrial design for improved reliability. A two-section enclosure, with inverter and DC section in one cabinet and transformer and AC section in another, reduces installation time and simplifies site preparation requirements. This new inverter design also integrates high-quality Schneider Electric components, including AC and DC circuit breakers and a transformer.

GT500 480

GT500 MVX

## > Features

- Ultra-efficient design with CEC efficiency of 97% (GT500 MVX version)
- Option to connect directly to medium voltage using a customer-supplied transformer or transformer supplied by Schneider Electric
- Integrated design with isolation transformer (480 V and 600 V only) in one unit
- Includes AC and DC disconnects
- Integrated ground fault detection and interruption
- Soft-start circuit to reduce nuisance trips (480 V and 600 V only)
- Sensitive components are protected from the environment while heat-generating components are in the cooling airflow
- Back and sides of unit designed for zero clearance installations to minimize inverter space requirements
- Wiring access points on bottom and sides of inverter
- Designed for forklift or sling transportation
- Zinc-primed and powder-coated steel enclosure for maximum corrosion resistance
- Designed to help maximize reliability with film-type capacitors and bus bars in the power path
- Bright fluorescent green vacuum display with UV cover for ease of reading in sunlight
- RS485/Modbus communications

## > Options

- PV Box solution with multiple inverters and medium-voltage transformers
- Fused sub-array combiner integrated with the inverter enclosure
- Sub-array string monitoring
- Positive-ground configuration
- Remote monitoring and control options
- Preventive maintenance programs
- Warranty extensions and service contracts with uptime guarantees

Make the most of your energy℠

Schneider Electric™

| Device short name | GT500 480 | GT500 600 | GT500 MVX |
|---|---|---|---|
| **Electrical specifications** | | | |
| Input (DC) | | | |
| Photovoltaic power | 521 kW | 521 kW | 521 kW |
| Input voltage range, MPPT | 310 to 480 V | 310 to 480 V | 310 to 480 V |
| Max. input voltage, open circuit | 600 V | 600 V | 600 V |
| Max. input current | 1,720 A | 1,720 A | 1,700 A |
| Output (AC) | | | |
| Nominal output power | 500 kW | 500 kW | 500 kW |
| Output voltage | 480 V | 600 V | 208 V (for direct connection to a medium-voltage isolation transformer) |
| Frequency | 60 Hz | 60 Hz | 60 Hz |
| Nominal output current | 610 A | 490 A | 1,400 A |
| Power factor | > 0.99 | > 0.99 | > 0.99 (+/- 0.9 adjustable) |
| Harmonic distortion | < 3% at rated power | < 3% at rated power | < 3% at rated power |
| **Efficiency** | | | |
| Peak | 97.0% | 97.0% | 98% not including MV transformer |
| CEC weighted | 96.0% | 96.0% | 97% not including MV transformer |
| **General specifications** | | | |
| Power consumption, night time | < 161 W | < 161 W | < 161 W |
| NEMA® degree of protection | Type 3R (outdoor rating) | Type 3R (outdoor rating) | Type 3R (outdoor rating) |
| Product weight | 3,103 kg (6,840 lb) | 3,103 kg (6,840 lb) | 1,587 kg (3,499 lb) |
| Product dimensions (H × W × D) | 224.0 × 463.8 × 108.7 cm (88.2 × 182.6 × 42.8 in) | 224.0 × 463.8 × 108.7 cm (88.2 × 182.6 × 42.8 in) | 224.6 × 228.6 × 126 cm (88.4 × 90.0 × 49.6 in) |
| Ambient air temperature for operation | -20 °C to 50 °C (-4 °F to 122 °F) | | |
| Operating altitude | Up to 2,012 m (6,600 ft) without derating | | |
| Relative humidity | 0 to 95% non-condensing | | |
| Part number | 820-0076-01-01 | 820-0076-02-01 | 820-0150-01-01* |
| **Features and options** | | | |
| Type of cooling | Forced convection cooling | | |
| Display type | Standard bright fluorescent green vacuum display | | |
| Communication interface | Standard RS485/Modbus communications interface kit | | |
| AC/DC disconnect | Standard and integrated within the inverter enclosure | | |
| Ground fault detection/interruption | Standard and integrated within the inverter enclosure | | |
| Sub-array combiner | Optional integrated with the inverter enclosure, 100 A, 150 A, or 200 A circuits | | |
| **Regulatory approvals** | | | |
| Safety | CSA certified to UL 1741 Ed. 2, CSA 107.1-01 | | |
| Interconnect | IEEE 1547 | | |

Specifications are subject to change without notice.
* Other options available upon request.

> For more information, visit www.schneider-electric.com.

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# MEMORANDUM



**DATE:** 20 July 2009
**TO:** Tony Fuertsch **EMAIL:** Tony.Fuertsch@Xantrex.com
**FROM:** J. Byron Davis, VACC **EMAIL:** byron@va-consult.com
**SUBJECT:** Xantrex Power Inverter – Sound Power Measurements (00485)

Dear Tony,

We are pleased to submit this report regarding the recent testing of a Xantrex GT500 inverter.

## *Background*

As we understand it, Xantrex has a client that requires detailed noise testing of the GT500, a 500kW power inverter for solar applications. Xantrex requested that we perform the noise testing to satisfy this and future client requests.

We visited Xantrex's facility in Livermore, CA on Wednesday 8 July 2009 to perform testing. The testing space was a large, high-bay warehouse-type setting, illustrated in Figure 1. The ceiling was lined with exposed fiberglass insulation, resulting in less reverberation than expected for this type of room. Adjacent equipment not included in the package included a DC power supply simulator and a large freestanding transformer. We chose to develop sound power data using the sound intensity method in order to minimize contamination from adjacent sources.

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.

## *Test Conditions*

We measured sound power using our standard testing suite:

| Instrument | Make / Model | Identification |
|---|---|---|
| Signal Analyzer | Larson-Davis 3000 | S/N 175 |
| Intensity Probe | Gras I50AIC | S/N 6637 |
| Paired Microphones | Gras 40AI | S/N 23083 & 23089 |
| Paired Microphone Preamps | Gras 6AA | S/N 15082 & 15083 |
| Residual Intensity Calibrator | Larson-Davis CAL291 | S/N 156 |
| SPL Calibrator | Bruel & Kjaer 4231 | S/N 2292439 |

The instrument was calibrated in the field. We performed testing using the "rectangular prism" moving microphone method. Intensity and power data were computed by the Larson-Davis built-in intensity module. Temperature was estimated at about 25°C; barometric pressure was measured to be about 1005mbar. Background noise levels were modest and consistent. In the majority of 1/3 octave bands, the ambient condition (ex power supply and transformer) was 10dB or more below the test (forced) condition. In the lowest 1/3 octave bands of 50~80Hz and in the 250Hz and 400Hz bands, background levels were 3~8dB below the minimum-observed forced condition. No significant transients occurred during testing; however, irrelevant noise due to the DC power supply simulator changed somewhat with the different test configurations.

We measured the inverter under three input voltage conditions: 305V, 345V, and 408V. In all cases, the inverter was loaded to 100% at the given voltage. Our understanding is that the 408V@100% condition is the highest-load condition.

Xantrex requested data across the frequency spectrum from the 63Hz octave band through the 6.3kHz. It was anticipated that significant sound power would be present in the 6.3kHz band due to the internal electronics switching frequency within that band. We therefore performed the measurement twice for each voltage condition: the first (low-frequency) measurement was performed using the 100mm spacer between the probe microphones, while the second (high-frequency) measurement was performed using the 25mm spacer.

### *Data Reporting*

Data were collected in 1/3 octave bands. We overlapped the data, taking our 50~200Hz data from the "long spacer" measurement and the 800Hz~10kHz data from the "short-spacer" measurement. Data from 250~630Hz were taken as the average of the "long-spacer" and "short-spacer" data sets. Data in the overlap regime of 250~630Hz differed by 1dB or less in each 1/3 octave band. To quantify directionality, we also present average sound pressure level data taken along the front, back, sides, and top of the unit.

We considered the good agreement in the 250~630Hz bands to be indicative of good data. In addition, the consistency of reported PWL (despite changing SPLs due to more-or-less noise being generated by the power supply and transformer) also give us confidence in the results.

The results are presented in Tables 1~4 in terms of sound power levels, PWL, in decibels referenced to $1\times10^{-12}$W and sound pressure levels, SPL, in decibels referenced to 20μPa. All figures are unweighted.

### *Discussion*

From test condition to test condition, the data indicate very stable noise performance at most frequencies. This is consistent with our qualitative observation that cooling fan noise dominates in most frequency bands. As illustrated in Table 1, the reported sound power level is the same (to within 1dB) from 50Hz through the 3.15kHz band.

High frequency noise becomes considerably more apparent at higher input voltages. As the system voltage increases to 408V, a tone emerges in the 6.3kHz band. Xantrex staff speculate that this is due to the switching frequency of the internal DC-to-AC electronics.

The directionality in the noise generation appears to be modest. Fan noise is most prominent at the rear of the unit, at the intake for the cooling fans. Over the entire spectrum, SPLs measured at the rear of the unit were typically 3~5dB higher than at the front of the unit. This includes not only the broadband fan noise but the high-frequency switching noise, as well.

From the perspective of sound propagation modeling, we would consider modeling the unit as a box with one rear noise source at an elevation of about 42" (the elevation of the opening in the intake shroud) and a front noise source at an elevation of about 80" (the elevation of the opening along the top front of the unit for exhaust.

* * *

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 byron@va-consult.com.

Sincerely,

J. Byron Davis

Vibro-Acoustic Consultants

**Figure 1: Xantrex GT500 Sound Power Measurements – July 2009**
**Photograph of test unit and surrounding area; the front of the unit is to the right**

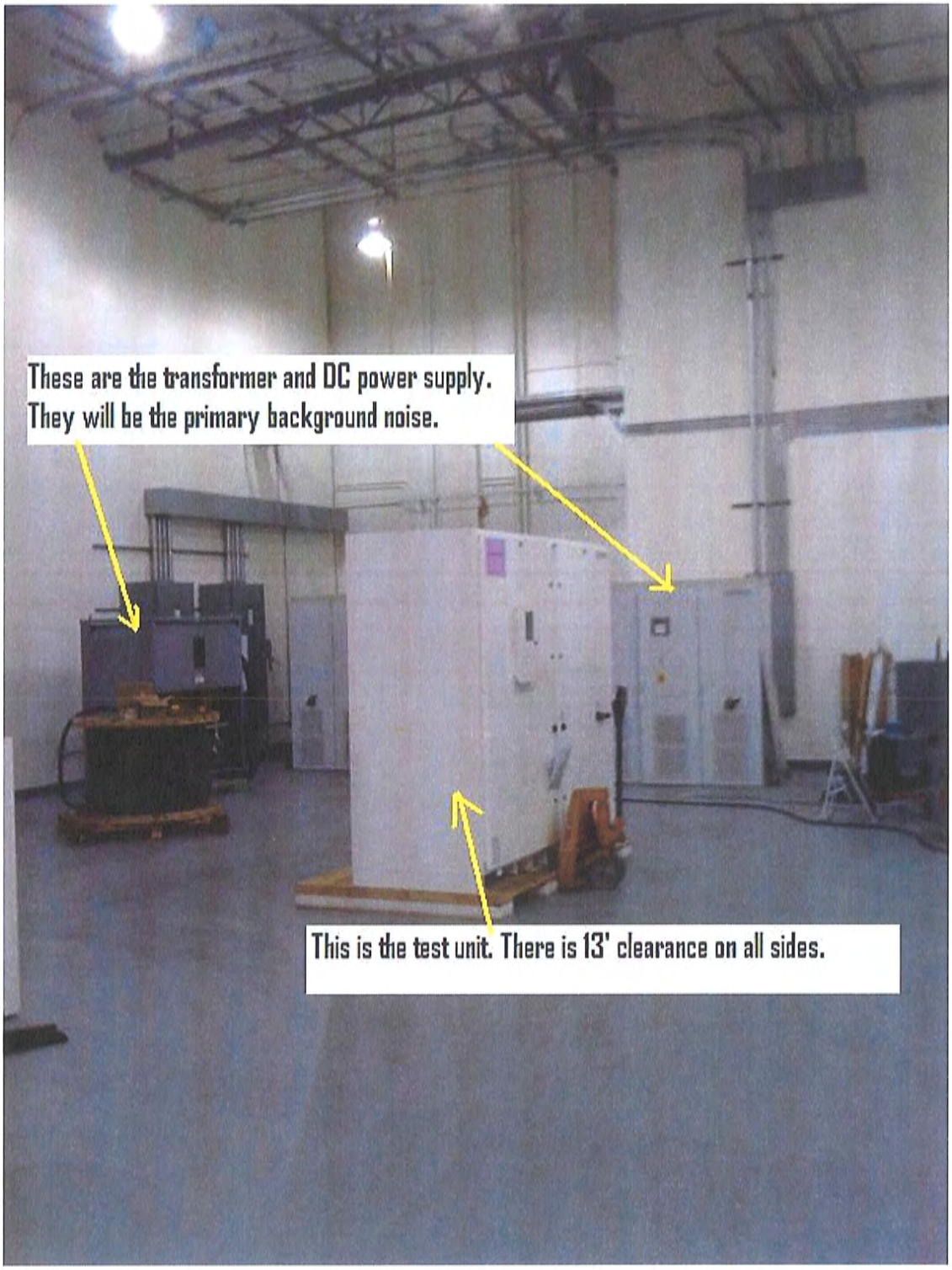

**Figure 2: Xantrex GT500 Sound Power Measurements – July 2009**
**Schematic diagram of GT500 Inverter case outline, with dimensions indicated**

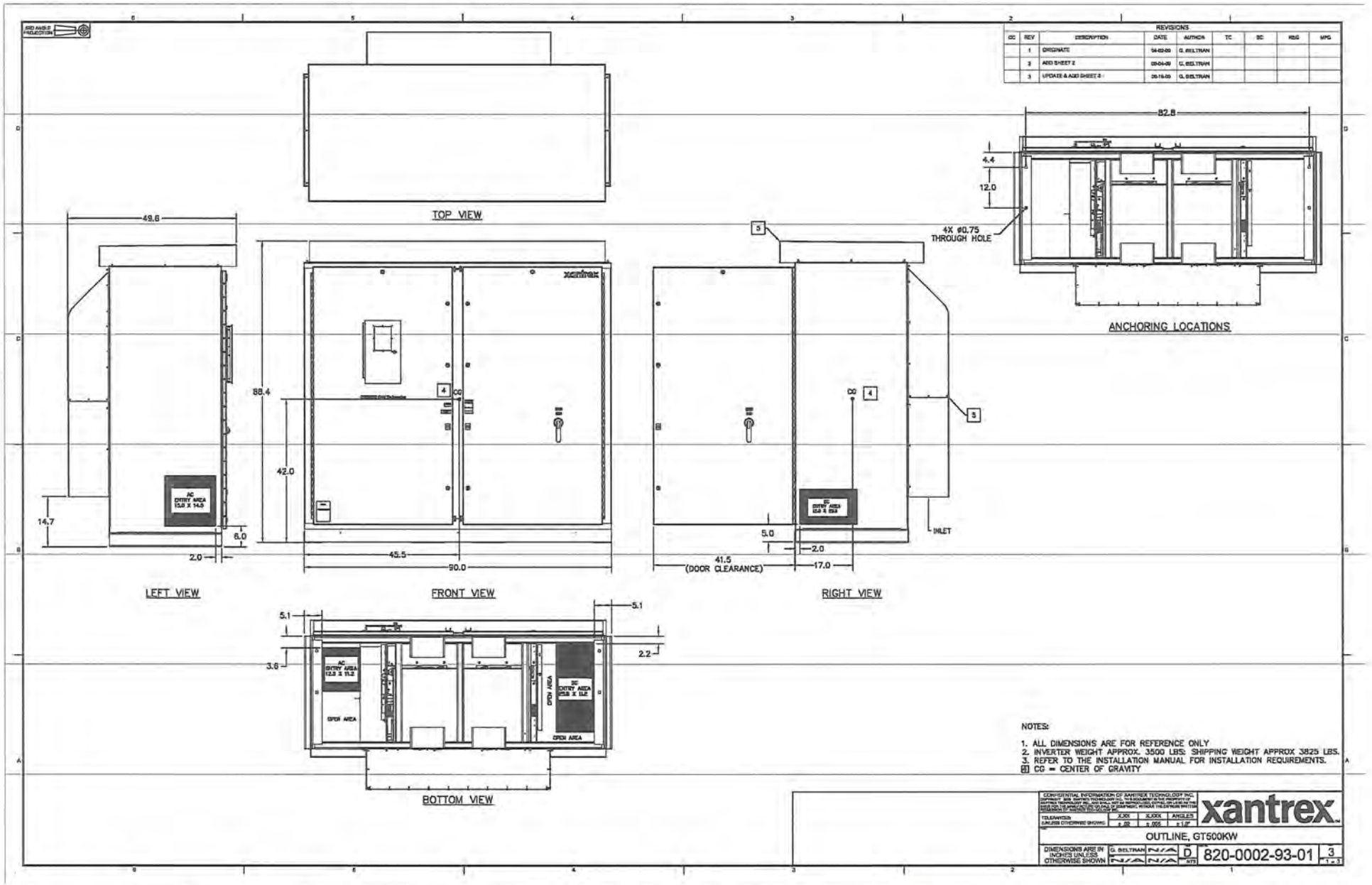


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**Table 1: Xantrex GT500 Sound Power Measurements – Overall Sound Power Level Data, PWL in dB re: $1\times10^{-12}$W**

| 1/3 octave band frequency --> | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total PWL, 305V, 100% Load | 69 | 77 | 71 | 73 | 84 | 78 | 79 | 80 | 83 | 80 | 77 | 75 | 82 | 74 | 72 | 73 | 72 | 71 | 68 | 65 | 64 | 72 | 56 | 50 |
| Total PWL, 345V, 100% Load | 68 | 77 | 71 | 74 | 83 | 78 | 79 | 81 | 82 | 80 | 77 | 75 | 82 | 73 | 72 | 73 | 73 | 71 | 68 | 66 | 66 | 78 | 60 | 48 |
| Total PWL, 480V, 100% Load | 69 | 77 | 72 | 74 | 85 | 79 | 79 | 81 | 83 | 80 | 77 | 75 | 82 | 74 | 72 | 74 | 73 | 71 | 68 | 67 | 69 | 85 | 66 | 47 |

**Table 2: Xantrex GT500 Sound Power Measurements – 305V/100% Load PWL in dB re: $1\times10^{-12}$W and SPL in dB re: 20µPa**

| 1/3 octave band frequency --> | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total PWL, 305V, 100% Load | 69 | 77 | 71 | 73 | 84 | 78 | 79 | 80 | 83 | 80 | 77 | 75 | 82 | 74 | 72 | 73 | 72 | 71 | 68 | 65 | 64 | 72 | 56 | 50 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Average SPL, Front, 1.2m setback | 52 | 62 | 55 | 57 | 71 | 63 | 65 | 67 | 68 | 66 | 62 | 62 | 66 | 58 | 57 | 56 | 55 | 55 | 53 | 51 | 52 | 63 | 50 | 39 |
| Average SPL, Rear, 1.2m setback | 59 | 65 | 59 | 61 | 73 | 66 | 67 | 69 | 71 | 67 | 66 | 65 | 68 | 63 | 61 | 63 | 62 | 61 | 60 | 57 | 56 | 66 | 54 | 46 |
| Average SPL, Left, 1.2m setback | 56 | 64 | 56 | 57 | 71 | 61 | 61 | 64 | 66 | 64 | 62 | 61 | 65 | 59 | 58 | 58 | 58 | 56 | 54 | 52 | 52 | 61 | 48 | 38 |
| Average SPL, Right, 1.2m setback | 56 | 64 | 56 | 57 | 73 | 61 | 63 | 66 | 68 | 65 | 63 | 62 | 66 | 60 | 59 | 59 | 59 | 58 | 56 | 54 | 53 | 62 | 50 | 41 |
| Average SPL, Top, 1.2m setback | 54 | 62 | 56 | 58 | 69 | 61 | 62 | 66 | 69 | 65 | 64 | 63 | 67 | 60 | 59 | 59 | 59 | 58 | 55 | 53 | 53 | 62 | 49 | 40 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Average SPL, Front, 2.0m setback | 53 | 61 | 56 | 59 | 69 | 62 | 64 | 66 | 68 | 65 | 61 | 61 | 64 | 58 | 57 | 56 | 56 | 55 | 54 | 52 | 53 | 63 | 53 | 44 |
| Average SPL, Rear, 2.0m setback | 60 | 64 | 60 | 64 | 75 | 67 | 67 | 68 | 69 | 67 | 64 | 64 | 68 | 62 | 59 | 61 | 61 | 60 | 59 | 57 | 57 | 67 | 58 | 49 |
| Average SPL, Left, 2.0m setback | 55 | 62 | 56 | 59 | 71 | 61 | 61 | 64 | 64 | 61 | 59 | 59 | 63 | 57 | 56 | 56 | 56 | 55 | 53 | 52 | 51 | 60 | 50 | 41 |
| Average SPL, Right, 2.0m setback | 56 | 62 | 55 | 60 | 70 | 60 | 62 | 64 | 67 | 63 | 62 | 63 | 65 | 60 | 59 | 59 | 58 | 57 | 56 | 54 | 53 | 61 | 52 | 44 |

**Table 3: Xantrex GT500 Sound Power Measurements – 345V/100% Load PWL in dB re: $1\times10^{-12}$W and SPL in dB re: 20µPa**

| 1/3 octave band frequency --> | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total PWL, 345V, 100% Load | 68 | 77 | 71 | 74 | 83 | 78 | 79 | 81 | 82 | 80 | 77 | 75 | 82 | 73 | 72 | 73 | 73 | 71 | 68 | 66 | 66 | 78 | 60 | 48 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Average SPL, Front, 1.2m setback | 53 | 63 | 56 | 57 | 69 | 63 | 65 | 67 | 68 | 65 | 62 | 61 | 67 | 59 | 58 | 57 | 57 | 56 | 55 | 54 | 54 | 68 | 51 | 45 |
| Average SPL, Rear, 1.2m setback | 60 | 65 | 60 | 61 | 71 | 66 | 67 | 69 | 70 | 67 | 65 | 63 | 69 | 63 | 61 | 63 | 63 | 61 | 59 | 58 | 58 | 71 | 55 | 47 |
| Average SPL, Left, 1.2m setback | 56 | 64 | 56 | 58 | 69 | 61 | 61 | 64 | 65 | 63 | 61 | 60 | 66 | 59 | 58 | 58 | 58 | 57 | 55 | 54 | 53 | 66 | 50 | 41 |
| Average SPL, Right, 1.2m setback | 56 | 64 | 56 | 57 | 70 | 61 | 62 | 66 | 67 | 64 | 62 | 61 | 67 | 60 | 59 | 59 | 59 | 58 | 57 | 55 | 55 | 67 | 53 | 47 |
| Average SPL, Top, 1.2m setback | 54 | 62 | 56 | 59 | 67 | 62 | 62 | 67 | 68 | 65 | 63 | 62 | 68 | 60 | 59 | 59 | 59 | 58 | 56 | 54 | 54 | 67 | 51 | 43 |

**Table 4: Xantrex GT500 Sound Power Measurements –408V/100% Load PWL in dB re: $1\times10^{-12}$W and SPL in dB re: 20µPa**

| 1/3 octave band frequency --> | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total PWL, 480V, 100% Load | 69 | 77 | 72 | 74 | 85 | 79 | 79 | 81 | 83 | 80 | 77 | 75 | 82 | 74 | 72 | 74 | 73 | 71 | 68 | 67 | 69 | 85 | 66 | 47 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Average SPL, Front, 1.2m setback | 54 | 63 | 56 | 57 | 71 | 63 | 65 | 67 | 68 | 65 | 63 | 63 | 67 | 60 | 59 | 59 | 58 | 57 | 56 | 56 | 59 | 77 | 58 | 47 |
| Average SPL, Rear, 1.2m setback | 60 | 66 | 60 | 62 | 73 | 67 | 67 | 69 | 72 | 67 | 65 | 66 | 69 | 63 | 62 | 64 | 63 | 62 | 60 | 60 | 62 | 80 | 64 | 51 |
| Average SPL, Left, 1.2m setback | 56 | 62 | 56 | 57 | 71 | 61 | 61 | 64 | 65 | 63 | 62 | 62 | 66 | 59 | 58 | 59 | 58 | 57 | 55 | 55 | 57 | 74 | 57 | 44 |
| Average SPL, Right, 1.2m setback | 56 | 63 | 56 | 57 | 72 | 61 | 63 | 67 | 68 | 65 | 63 | 65 | 67 | 61 | 59 | 60 | 60 | 60 | 59 | 58 | 59 | 75 | 59 | 49 |
| Average SPL, Top, 1.2m setback | 55 | 61 | 57 | 59 | 68 | 62 | 62 | 67 | 69 | 65 | 64 | 65 | 68 | 62 | 60 | 60 | 60 | 59 | 57 | 56 | 58 | 75 | 59 | 46 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Average SPL, Rear, 2.0m setback | 60 | 63 | 60 | 63 | 73 | 66 | 67 | 68 | 69 | 66 | 65 | 65 | 69 | 63 | 61 | 62 | 61 | 60 | 59 | 60 | 63 | 79 | 68 | 56 |

# MODEL A8370

C/S 8″ (203.2 mm) STANDARD FIXED ACOUSTICAL LOUVER

## AIRFLOW DATA

***For a 4 Foot by 4 Foot Unit.*** *Tested with mill finish and no screen.*

- Free area = 3.68 $ft^2$
- Percent free area = 23.0%
- Free area velocity at point of beginning water penetration (@0.01 oz./$ft^2$ = 942 FPM (4.79 m/s)
- Maximum recommended air intake velocity = 742 FPM (3.77 m/s)
  Air volume @ 742 FPM free area velocity = 2731 CFM (1.29 $m^3$/s)
  Pressure drop @ 742 FPM intake velocity = 0.05 in. $H_2O$ (12.4 Pa)
- Maximum recommended air exhaust velocity = 1750 FPM (8.89 m/s)
  Air volume @ 1750 FPM free area velocity = 6440 CFM (3.04 $m^3$/s)
  Pressure drop @ 1750 FPM exhaust velocity = 0.37 in. $H_2O$ (91.9 Pa)

## SUGGESTED SPECIFICATIONS:

**GENERAL:** Furnish and install where indicated on the drawings C/S 8″ (203.2 mm) STANDARD FIXED ACOUSTICAL LOUVER **MODEL A-8370** as manufactured by Construction Specialties, Inc. Cranford, New Jersey and Mississauga, Ontario. Complete details shall be submitted to the architect for approval prior to fabrication. Supplier must be a member of AMCA or BSRIA

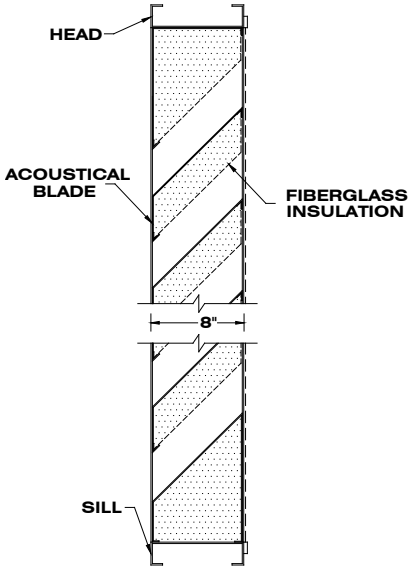
**MATERIAL:** Fixed blades and frame to be formed from 1100 series aluminum alloy. Interior acoustical material to be fiberglass insulation protected by a woven fire retardant (self-extinguishing) 100% polyester sheeting Material thickness shall be as follows: Heads, sills, jambs, mullion, and fixed blades to be: 0.081" (2.06 mm). All fasteners to be non-corrosive. All louvers to be furnished with 5/8″ (15.87 mm) flattened expanded mesh, aluminum bird screen with a .055″ (1.4 mm) thick extruded aluminum frame. Screens and screen frames to be standard mill finish.

**STRUCTURAL DESIGN:** Structural supports shall be designed and furnished by the louver manufacturer to carry a wind load of not less than_____ psf (Pascals). (Note: If this paragraph is omitted or if the design wind load is not specified, the louvers will be manufactured in self-supporting units up to a maximum of 5′ (1524 mm) wide by 8′ (2438 mm) high. Any additional structural supports required to adequately secure these units within the opening shall be the responsibility of others.)

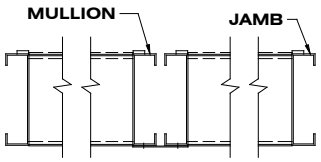
**TEST DATA:** The louver manufacturer shall submit test data from an accredited acoustical laboratory in accordance with ASTM Standard E90-90. The minimum acceptable performance through all octave bands is as follows: STC = 15

| Frequency (hz): | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|
| Transmission Loss: | 9 | 7 | 7 | 11 | 18 | 19 | 14 | 13 |
| Noise Reduction: | 15 | 13 | 13 | 17 | 24 | 25 | 20 | 19 |

**FINISH:** All louvers shall be finished with C/S Powder Coat, a coating to be 1.5 to 3 mil. thick full strength **100% resin Fluoropolymer coating. Finish to allow zero VOCs** to be emitted into facility of application. Finish to adhere to a 4H Hardness rating. All finishing procedures shall be one continuous operation in the plant of the manufacturer. **The coating shall meet or exceed all requirements of AAMA specification 2605-5** "Voluntary Specification for High Performance Organic Coatings on Architectural extrusions and Panels." The louver manufacturer shall supply an industry standard **20-year limited warranty against failure or excessive fading** of the Fluoropolymer Powder Coat finish. This limited warranty shall begin on the date of material shipment.




SECTION VIEW




PLAN VIEW

# PERFORMANCE DATA MODEL A8370

**Width in Inches** and Meters

**Height in Inches** and Meters

| | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| | 0.30 | 0.46 | 0.61 | 0.76 | 0.91 | 1.07 | 1.22 | 1.37 | 1.52 |
| **18** | **0.17** | **0.29** | **0.42** | **0.54** | **0.67** | **0.79** | **0.92** | **1.05** | **1.17** |
| 0.46 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.09 | 0.10 | 0.11 |
| **24** | **0.33** | **0.59** | **0.84** | **1.09** | **1.34** | **1.59** | **1.84** | **2.09** | **2.34** |
| 0.61 | 0.03 | 0.05 | 0.08 | 0.10 | 0.12 | 0.15 | 0.17 | 0.19 | 0.22 |
| **30** | **0.33** | **0.59** | **0.84** | **1.09** | **1.34** | **1.59** | **1.84** | **2.09** | **2.34** |
| 0.76 | 0.03 | 0.05 | 0.08 | 0.10 | 0.12 | 0.15 | 0.17 | 0.19 | 0.22 |
| **36** | **0.50** | **0.88** | **1.25** | **1.63** | **2.01** | **2.38** | **2.76** | **3.14** | **3.51** |
| 0.91 | 0.05 | 0.08 | 0.12 | 0.15 | 0.19 | 0.22 | 0.26 | 0.29 | 0.33 |
| **42** | **0.67** | **1.17** | **1.67** | **2.17** | **2.68** | **3.18** | **3.68** | **4.18** | **4.68** |
| 1.07 | 0.06 | 0.11 | 0.16 | 0.20 | 0.25 | 0.30 | 0.34 | 0.39 | 0.43 |
| **48** | **0.67** | **1.17** | **1.67** | **2.17** | **2.68** | **3.18** | **3.68** | **4.18** | **4.68** |
| 1.22 | 0.06 | 0.11 | 0.16 | 0.20 | 0.25 | 0.30 | 0.34 | 0.39 | 0.43 |
| **54** | **0.84** | **1.46** | **2.09** | **2.72** | **3.34** | **3.97** | **4.60** | **5.23** | **5.85** |
| 1.37 | 0.08 | 0.14 | 0.19 | 0.25 | 0.31 | 0.37 | 0.43 | 0.49 | 0.54 |
| **60** | **1.00** | **1.76** | **2.51** | **3.26** | **4.01** | **4.77** | **5.52** | **6.27** | **7.02** |
| 1.52 | 0.09 | 0.16 | 0.23 | 0.30 | 0.37 | 0.44 | 0.51 | 0.58 | 0.65 |
| **66** | **1.17** | **2.05** | **2.93** | **3.80** | **4.68** | **5.56** | **6.44** | **7.32** | **8.19** |
| 1.68 | 0.11 | 0.19 | 0.27 | 0.35 | 0.43 | 0.52 | 0.60 | 0.68 | 0.76 |
| **72** | **1.17** | **2.05** | **2.93** | **3.80** | **4.68** | **5.56** | **6.44** | **7.32** | **8.19** |
| 1.83 | 0.11 | 0.19 | 0.27 | 0.35 | 0.43 | 0.52 | 0.60 | 0.68 | 0.76 |
| **78** | **1.34** | **2.34** | **3.34** | **4.35** | **5.35** | **6.35** | **7.36** | **8.36** | **9.36** |
| 1.98 | 0.12 | 0.22 | 0.31 | 0.40 | 0.50 | 0.59 | 0.68 | 0.78 | 0.87 |
| **84** | **1.51** | **2.63** | **3.76** | **4.89** | **6.02** | **7.15** | **8.28** | **9.41** | **10.54** |
| 2.13 | 0.14 | 0.24 | 0.35 | 0.45 | 0.56 | 0.66 | 0.77 | 0.87 | 0.98 |
| **90** | **1.51** | **2.63** | **3.76** | **4.89** | **6.02** | **7.15** | **8.28** | **9.41** | **10.54** |
| 2.29 | 0.14 | 0.24 | 0.35 | 0.45 | 0.56 | 0.66 | 0.77 | 0.87 | 0.98 |
| **96** | **1.67** | **2.93** | **4.18** | **5.43** | **6.69** | **7.94** | **9.20** | **10.45** | **11.71** |
| 2.44 | 0.16 | 0.27 | 0.39 | 0.50 | 0.62 | 0.74 | 0.85 | 0.97 | 1.09 |
| **102** | **1.84** | **3.22** | **4.60** | **5.98** | **7.36** | **8.74** | **10.12** | **11.50** | **12.88** |
| 2.59 | 0.17 | 0.30 | 0.43 | 0.56 | 0.68 | 0.81 | 0.94 | 1.07 | 1.20 |
| **108** | **2.01** | **3.51** | **5.02** | **6.52** | **8.03** | **9.53** | **11.04** | **12.52** | **14.05** |
| 2.74 | 0.19 | 0.33 | 0.47 | 0.61 | 0.75 | 0.89 | 1.03 | 1.16 | 1.31 |
| **114** | **2.01** | **3.51** | **5.02** | **6.52** | **8.03** | **9.53** | **11.04** | **12.52** | **14.05** |
| 2.90 | 0.19 | 0.33 | 0.47 | 0.61 | 0.75 | 0.89 | 1.03 | 1.16 | 1.31 |
| **120** | **2.17** | **3.80** | **5.43** | **7.07** | **8.70** | **10.33** | **11.96** | **13.59** | **15.22** |
| 3.05 | 0.20 | 0.35 | 0.50 | 0.66 | 0.81 | 0.96 | 1.11 | 1.26 | 1.41 |
| **126** | **2.34** | **4.10** | **5.85** | **7.61** | **9.36** | **11.12** | **12.88** | **14.63** | **16.39** |
| 3.20 | 0.22 | 0.38 | 0.54 | 0.71 | 0.87 | 1.03 | 1.20 | 1.36 | 1.52 |
| **132** | **2.34** | **4.10** | **5.85** | **7.61** | **9.36** | **11.12** | **12.88** | **14.63** | **16.39** |
| 3.35 | 0.22 | 0.38 | 0.54 | 0.71 | 0.87 | 1.03 | 1.20 | 1.36 | 1.52 |
| **138** | **2.51** | **4.39** | **6.27** | **8.15** | **10.03** | **11.91** | **13.80** | **15.68** | **17.56** |
| 3.51 | 0.23 | 0.41 | 0.58 | 0.76 | 0.93 | 1.11 | 1.28 | 1.46 | 1.63 |
| **144** | **2.68** | **4.68** | **6.69** | **8.70** | **10.70** | **12.71** | **14.72** | **16.72** | **18.73** |
| 3.66 | 0.25 | 0.43 | 0.62 | 0.81 | 0.99 | 1.18 | 1.37 | 1.55 | 1.74 |
| **150** | **2.68** | **4.68** | **6.69** | **8.70** | **10.70** | **12.71** | **14.72** | **16.72** | **18.73** |
| 3.81 | 0.25 | 0.43 | 0.62 | 0.81 | 0.99 | 1.18 | 1.37 | 1.55 | 1.74 |
| **156** | **2.84** | **4.97** | **7.11** | **9.24** | **11.37** | **13.50** | **15.64** | **17.77** | **19.90** |
| 3.96 | 0.26 | 0.46 | 0.66 | 0.86 | 1.06 | 1.25 | 1.45 | 1.65 | 1.85 |
| **162** | **3.01** | **5.27** | **7.53** | **9.78** | **12.04** | **14.30** | **16.56** | **18.81** | **21.07** |
| 4.11 | 0.28 | 0.49 | 0.70 | 0.91 | 1.12 | 1.33 | 1.54 | 1.75 | 1.96 |
| **168** | **3.18** | **5.56** | **7.94** | **10.33** | **12.71** | **15.09** | **17.47** | **19.86** | **22.24** |
| 4.27 | 0.30 | 0.52 | 0.74 | 0.96 | 1.18 | 1.40 | 1.62 | 1.85 | 2.07 |
| **174** | **3.18** | **5.56** | **7.94** | **10.33** | **12.71** | **15.09** | **17.47** | **19.86** | **22.24** |
| 4.42 | 0.30 | 0.52 | 0.74 | 0.96 | 1.18 | 1.40 | 1.62 | 1.85 | 2.07 |
| **180** | **3.34** | **5.85** | **8.36** | **10.87** | **13.38** | **15.89** | **18.39** | **20.90** | **23.41** |
| 4.57 | 0.31 | 0.54 | 0.78 | 1.01 | 1.24 | 1.48 | 1.71 | 1.94 | 2.17 |
| **186** | **3.51** | **6.15** | **8.78** | **11.41** | **14.05** | **16.68** | **19.31** | **21.95** | **24.58** |
| 4.72 | 0.33 | 0.57 | 0.82 | 1.06 | 1.31 | 1.55 | 1.79 | 2.04 | 2.28 |
| **192** | **3.51** | **6.15** | **8.78** | **11.41** | **14.05** | **16.68** | **19.31** | **21.95** | **24.58** |
| 4.88 | 0.33 | 0.57 | 0.82 | 1.06 | 1.31 | 1.55 | 1.79 | 2.04 | 2.28 |

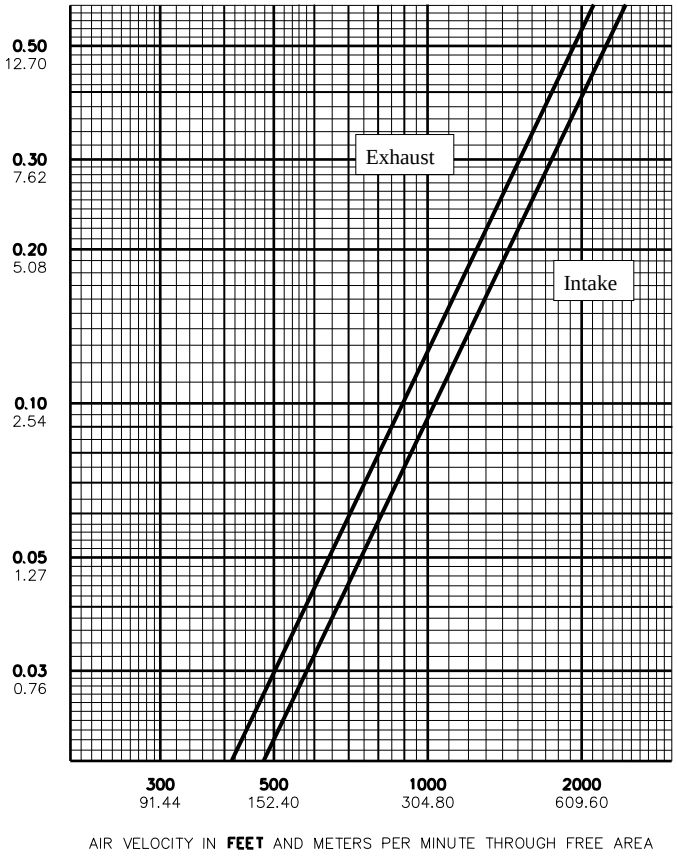
**Upper Numerals English Units**/Lower Numerals Metric Units

**Water Penetration Statement**

AMCA defines the point of beginning water penetration as the free area velocity at which the AMCA water test has yielded 0.01 or less ounces of water per square foot of louver free area during a 15-minute test period.

Tests on non-drainable louvers have shown that the point of beginning water penetration for 4 and 6 inch deep louvers usually occurs at between 600 and 800 FPM free area velocity. In addition, the total amounts of water penetration for non-drainable louvers significantly higher in comparison to drainable louvers when intake velocities exceed the 600 to 800 FPM range.

Because of these characteristics, C/S recommends that drainable blade louvers be used for air intake applications whenever water entrainment must be minimized. In addition, we suggest that non-drainable louver air intake velocities be held to 600 FPM through the free area. This will help to limit significant water penetration during times of average rain conditions.




**For a 48″ X 48″ sized louver**


***Construction Specialties, Inc.***
***Manufacturing & Sales Location***
www.c-sgroup.com

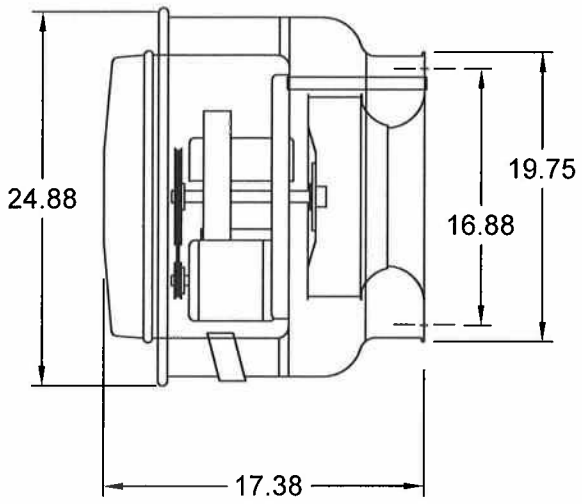
Cranford, New Jersey
49 Meeker Avenue 07016
Telephone: (800) 631-7379
Fax: (908) 272-2920

Mississauga, Ontario
895 Lakefront Promenade L5E 2C2
Telephone: (888) 895-8955
Fax: (905) 274-6241

*A member of the C/S Group of Companies*
*For assistance with overseas requirements, call C/S International (908) 236-0800*

GREENHECK
Building Value in Air.

**Printed Date:** 6/3/2010
**Job:** DEEPWELL - GT500MV
**Product Type:** Fan
**Mark:** EF-1




# Model: CWB-101-4

## Belt Drive Centrifugal Sidewall Exhaust Fan

### Standard Construction Features:

- Aluminum housing - Backward inclined aluminum wheel - Birdscreen mounted to the discharge perimeter - Removable mounting plate - Ball bearing motors - Motor and drives isolated on shock mounts - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Bearing meet or exceed temperature rating of fan - Static free belts - Corrosion resistant fasteners

### Options & Accessories:

UL/cUL 705 Listed - "Power Ventilators"
Switch, Nema-1, Toggle, Junction Box Mounted and Wired
Damper, WD-323-PB-12X12, Gravity Actuated (Shipped Loose)
Birdscreen, Galvanized

### Dimensional

| Qty | Weight w/o Accessories (lb) | Weight with Accessories (lb) | Wall Opening (in) | Optional Damper (in) |
|---|---|---|---|---|
| 1 | 61 | 69 | 12.5 x 12.5 | 12 x 12 |

### Performance

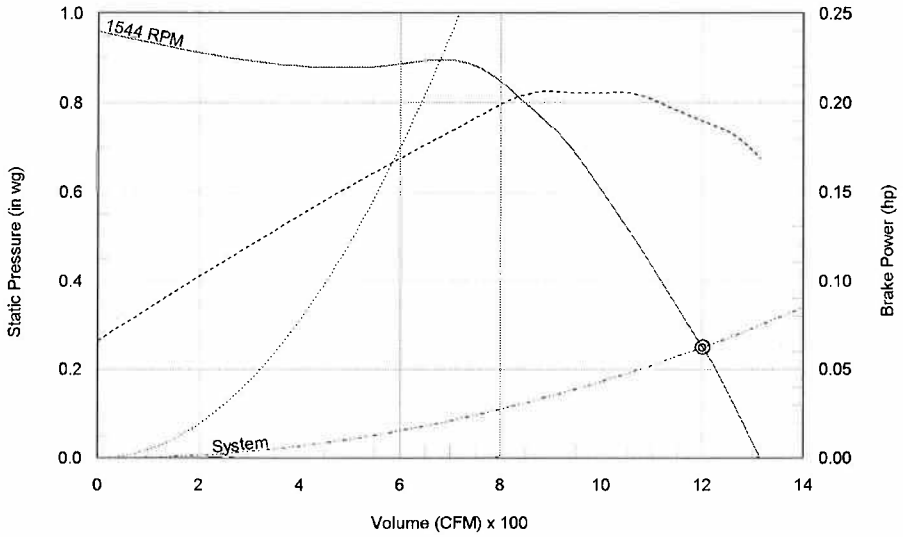
| Requested Volume (CFM) | Actual Volume (CFM) | Requested SP (in wg) | Actual SP (in wg) | Fan RPM | Operating Power (hp) | Elevation (ft) | Airstream Temperature (F) |
|---|---|---|---|---|---|---|---|
| 1,200 | 1,200 | 0.25 | 0.25 | 1,544 | 0.19 | 777 | 70 |

### Motor

| Motor Mounted | Size (hp) | V/C/P | Encl. | Motor RPM | Windings | NEC FLA* (Amps) |
|---|---|---|---|---|---|---|
| Yes | 1/4 | 208/60/1 | ODP | 1725 | 1 | 3.2 |

### Sound Power by Octave Band

| Sound Data | 62.5 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | LwA | dBA | Sones |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inlet | 73 | 72 | 78 | 69 | 63 | 66 | 58 | 52 | 73 | 62 | 11.2 |




RPM Curve
System Curve
Brake Power Curve
Do not select to the left of this surge curve
Desired operating point
Actual operating point

amca CERTIFIED RATINGS SOUND AND AIR PERFORMANCE AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

### Notes:

All dimensions shown are in units of in.
*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighed sound pressure level, based on 11.5 dB attenuation per Octave band at 5.0 ft - dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5.0 ft

CUSTOMER NOTE: N.P. DWG. IS FOR YOUR INFO & REVIEW. THE IMPEDANCE, MANUFACTURE DATE, AND ABB SERIAL NUMBER ARE LEFT BLANK SINCE DRAWING IS SUBMITTED PRIOR TO MANUFACTURING. THE ACTUAL VALUES ARE ENGRAVED ON THE NAMEPLATE AT TIME OF SHIPMENT. THIS DRAWING IS NOT SUBSEQUENTLY REVISED TO ADD TESTED VALUES.

# SMALL POWER TRANSFORMERS
# SOUTH BOSTON, VA.

| VOLTS | | THREE PHASE | FULL LOAD KVA | |
|---|---|---|---|---|
| HV | 44000- | NATURAL ESTER FLUID INSULATED | 6700 | KNAN |
| LV | 34500Y/19920 | SUBSTATION TRANSFORMER | 10000 | KNAF |
| 60 HERTZ | | CLASS KNAN/KNAF INSULDUR INSULATION | 65 | °C RISE |
| | | | LITERS LIQUID | 9195 |

INSTRUCTION BOOK: PC-1002 | MFR ID: 1LUS | SERIAL: BS41540 -#### | MANUFACTURE DATE: ##/##

FULL WAVE IMPULSE TEST LEVEL: H.V. 250 KV., L.V. 200 KV.

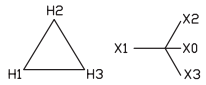
IMPEDANCE: IMP_VAL1 % AT 6700 KVA 44000 TO 34500Y VOLTS.

APPROX. WEIGHT IN KGS. CORE AND COILS: 19538 | CASE: 4922 | LIQUID: 8372 | TOTAL: 32832

MADE IN U.S.A. ABB INC. 1LUSBS41540N1

SOUND LEVEL: 63 dB | FAN POWER IN WATTS: 293.2

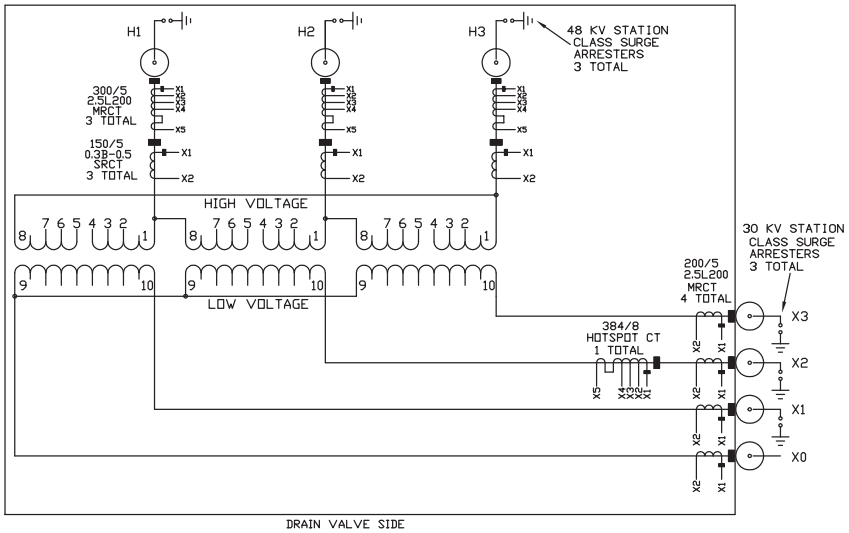
DYN1




"BUILT TO CSA C88-M90"

CONNECTIONS

| WINDING | VOLTS | 10000 KVA AMPERES | TAP CHANGER POS. | TAP CHANGER CONNECTS |
|---|---|---|---|---|
| HIGH VOLTAGE DELTA COPPER | 46200 | 124.9 | 1 | 4 TO 5 |
| | 45100 | 128.0 | 2 | 3 TO 5 |
| | 44000 | 131.2 | 3 | 3 TO 6 |
| | 42900 | 134.5 | 4 | 2 TO 6 |
| | 41800 | 138.1 | 5 | 2 TO 7 |
| LOW VOLTAGE WYE COPPER | 34500 | 167.3 | | |




THE OPERATING PRESSURE IS LIMITED BY THE SEALEDAIRE FLUID PRESERVATION SYSTEM, UNLESS REMOVED TO 6.5 PSI (44.8 kPA) POSITIVE AND 6.5 PSI (44.8 kPA) NEGATIVE.
THE TRANSFORMER TANK IS DESIGNED TO WITHSTAND A POSITIVE OR NEGATIVE PRESSURE OF 15 LBS. PSI (103.4 KPA).
THE 25°C LIQUID LEVEL IS 13.40 INCHES (340.3 MM) BELOW HIGHEST MANHOLE FLANGE.
LIQUID LEVEL CHANGES .54 INCH (13.7 MM) FOR EACH 10°C CHANGE IN AVERAGE LIQUID TEMPERATURE.
THE TRANSFORMER MUST NOT BE ENERGIZED FROM ANY VOLTAGE SOURCE WHEN TAP CHANGER IS OPERATED.
SUITABLE FOR OPERATION AT OR BELOW 3300 FEET (1005 METERS) ALTITUDE AT NAMEPLATE RATING.
AT THE TIME OF SHIPMENT THIS UNIT CONTAINED LESS THAN 1 PPM OF PCBS.

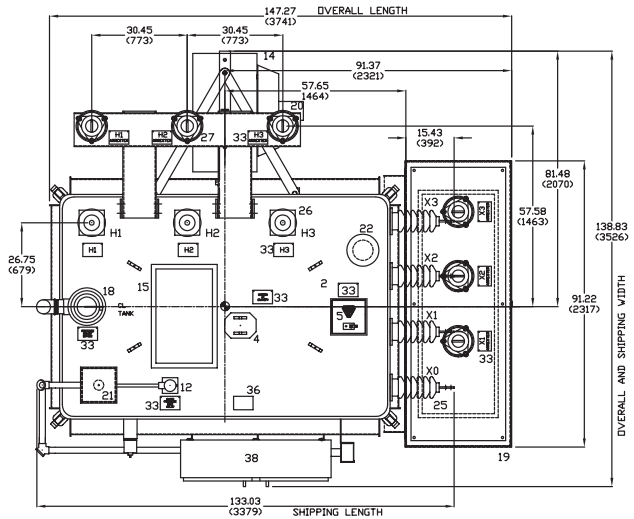
5/16 INCH HOLES FOR 190-32 X 3/16 SCREW
SIZE 6.25 INCHES X 10.0 INCHES AREA 62.5 SQUARE INCHES
DISTANCE BETWEEN CENTERS OF HOLES ON LONG EDGE 9 19/32 INCH ± 1/64 ON SHORT EDGE 5 27/32 INCH ± 1/64

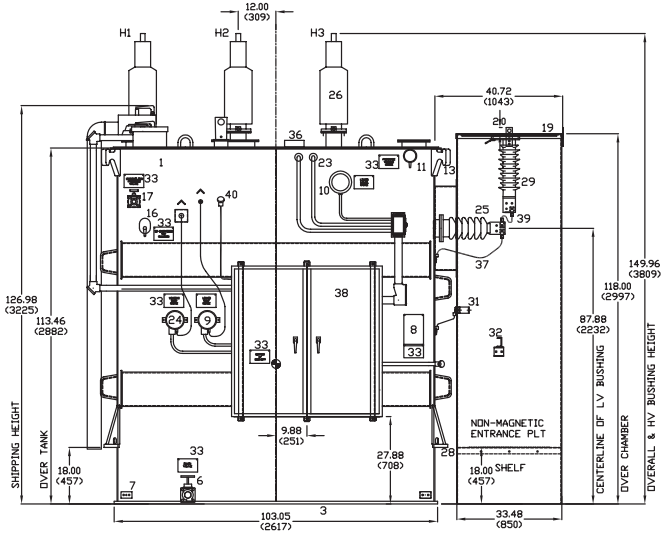
| | 1 | 2 | 3 | |
|---|---|---|---|---|
| | | UPDATED NAMEPLATE TO 6.7/10 MVA | ADDED 200/5 2.5L200 SRCT TO X1,X2,X3 ADDED SOUND LEVEL | |
| N.P.DRAFT. | | | | |
| DRAFT. | | | | |
| ENGINEER | J.Richardson | J.Richardson | J.Richardson | |
| DATE | 03/04/13 | 03/04/13 | 04/03/13 | |

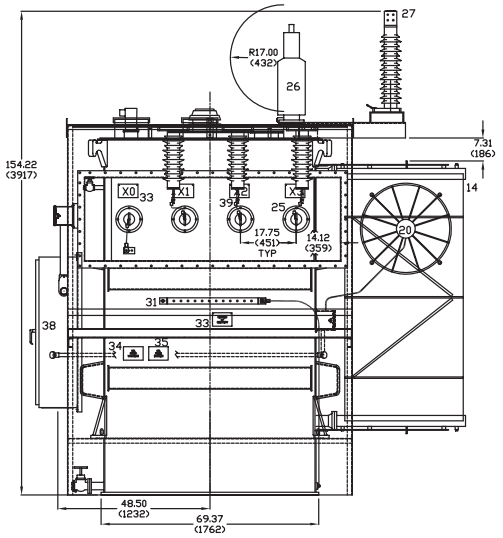
WESTBURNE ELECTRIC
CORNWALL SOLAR PROJECT
6700/10000
44000 DELTA HV - 34500 WYE LV

| MFR. ID | SHOP ORDER |
|---|---|
| 1LUS | BS41540 |
| MFR. ID | DRAWING # |
| 1LUS | BS41540N1 |

| IT | CHANGE |
|---|---|
| 2 | CORRECTED KVA RATING TO 6700/10000 KVA<br>J.RICHARDSON 4/22/13 |
| 3 | REVISED PER CUSTOMER COMMENTS<br>ADDED COOLER BRACING<br>30 DELETED ITEM 30 (ATC SPACE HEATER)<br>J.RICHARDSON 5/9/13<br>M. CLARK 5/9/13 |
| 1 | |




NOTES:

ALL EXTERNAL HARDWARE IS STAINLESS STEEL WITH SILICON BRONZE NUTS.

CONDUIT IS GALVANIZED STEEL RIGID WITH SHORT RUNS OF FLEX.

NON-SKID SURFACE ON COVER

TANK BASE IS UNDERCOATED + 2 INCHES (51) UP THE SIDES.

ABB INC.
SMALL POWER TRANSFORMERS
SOUTH BOSTON, VIRGINIA U.S.A.

APPROXIMATE NET WEIGHTS

| | | |
|---|---|---|
| CORE AND COILS | 43074 LBS. | (19538 KGS.) |
| TANK AND FITTINGS | 10851 LBS. | (4922 KGS.) |
| LIQUID- NATURAL ESTER FLUID -2429 GAL. (9195 LITRES) - | 18458 LBS. | (8372 KGS.) |
| TOTAL WEIGHT | 72383 LBS. | (32832 KGS.) |
| APPROXIMATE TRANSFORMER SHIPPING WEIGHT | 70430 LBS. | (31947 KGS.) |
| COOLER LIQUID TOTAL - 41 GAL. (155 LITRES) - | 312 LBS. | (142 KGS.) |
| MAXIMUM COOLER ASSEMBLY WEIGHT EACH | 1106 LBS. | (502 KGS.) |
| (COOLER WEIGHTS ARE INCLUDED IN TANK AND FITTINGS WEIGHT) | | |
| (COOLER LIQUID WEIGHT IS INCLUDED IN LIQUID WEIGHT) | | |
| LV CHAMBER WEIGHT | 1297 LBS. | (588 KGS.) |

ITEM

1 SEALED TANK - BRACED FOR 15 PSI (103 KPA) - COLOR ANSI 70
2 WELDED COVER WITH GASKET AND LIFTING LOOPS FOR LIFTING COVER ONLY.
3 BASE - DESIGNED FOR ROLLING PARALLEL TO CENTERLINES AND TYPICAL ANCHORING IS WELDED.
4 FALL ARREST MOUNTING BASE - FOR MANUFACTURING PURPOSES.
5 REMOVABLE EXTERNAL CORE GROUND LOCATED INSIDE ENCLOSURE.
6 2.0 (50.8) DRAIN VALVE/LOWER FILTER PRESS WITH .38 (9.65) SAMPLER.
7 METRIC STAINLESS STEEL GROUND PADS - 2 HOLE NEMA DRILLING - 04 TOTAL.
8 NAMEPLATE AND WARNING DECAL.
9 LIQUID TEMPERATURE GAUGE WITH ALARM CONTACTS.
10 MAGNETIC LIQUID LEVEL GAUGE WITH ALARM CONTACTS.
11 METRIC VACUUM PRESSURE GAUGE WITH AIR TEST VALVE AND SEALEDAIRE VALVE.
12 RAPID PRESSURE RISE RELAY WITH SEAL-IN RELAY PANEL.
13 STAINLESS STEEL LIFTING HOOK FOR LIFTING COMPLETE TRANSFORMER. THE TRANSFORMER IS DESIGNED FOR LIFTING WITH 4 VERTICAL SLINGS. THIS MAY REQUIRE THE USE OF A SPREADER OR LIFTING BEAM. IF VERTICAL SLINGS ARE NOT POSSIBLE, THE MINIMUM PERMISSIBLE SLING ANGLE RELATIVE TO HORIZONTAL IS 60 DEGREES.
14 REMOVABLE PANEL COOLERS WITH SHUT-OFF VALVES.

15 BOLTED MANHOLE - 30.00 X 18.00 (762 X 457) OPENING, WITH CORTITE GASKET.
16 DE-ENERGIZED TAP CHANGER - WITH .38 (9.7) HOLE FOR PADLOCKING.
17 1.0 (25.4) VALVE FOR UPPER FILTER PRESS CONNECTION.
18 RELIEF DEVICE WITH ALARMS AND 4 INCH (102) QUALITROL DIRECTIONAL SHIELD.
** 19 LV FREE STANDING AIR TERMINAL CHAMBER WITH NON-MAGNETIC ENTRANCE PLATE.
** 20 AIR BLAST FAN ENCLOSED IN SAFETY CAGE - 01 TOTAL.
21 JUNCTION BOX FOR CURRENT TRANSFORMER LEADS.
22 PROCESSING PORT FOR MANUFACTURING.
23 CURRENT TRANSFORMER FEED THROUGH - 2 TOTAL.
24 REMOTE HOT SPOT WINDING TEMPERATURE INDICATOR WITH ALARMS.
25 LV BUSHING STYLE 8D12241H01 17.75 (451) CL TO CL - SEE DETAIL 25
** 26 HV BUSHING STYLE 5028C99H05 30.44 (773) CL TO CL - SEE DETAIL 26
** 27 48 KV HV ARRESTERS - 3 TOTAL - STYLE NO. Q048SA039A.
28 JACKING PROVISIONS ON TANK FOR JACKING COMPLETE UNIT
** 29 30 KV LV ARRESTERS - 3 TOTAL - STYLE NO. Q030SA024A.
31 GROUND BAR LOCATED IN LV ATC.
32 FIBERGLASS CABLE SUPPORT.
33 STAINLESS STEEL ID TAGS - 27 TOTAL.
34 "MR. OUCH" WARNING DECAL (EXTERNAL)
35 "MR. OUCH" DANGER DECAL (INTERNAL)
36 DIGITAL IMPACT RECORDER
37 XO GROUND CABLE
38 CONTROL CABINET
39 ARRESTER TO BUSHING CABLE
40 10 OHM COPPER RTD

** ITEMS ARE REMOVED FOR SHIPMENT

RENEWAL PARTS FOR OUTLINE

A SPARE SET OF ALL GASKETS AND
1 OF EACH STYLE BUSHING IS RECOMMENDED FOR STOCK.
FOR PRICES CONTACT YOUR FIELD SALES OFFICE

ORDER RENEWAL PARTS BY STYLE NUMBER AS FOLLOWS:

STYLE NUMBER = OUTLINE NUMBER - ITEM NUMBER - QUANTITY.

EXAMPLE: BS4154001-26-1.

FOR GASKETS ONLY PLACE A 'G' IN FRONT OF OUTLINE NUMBER
EXAMPLE: GBS4154001-26-1. (ONE GASKET )
EXAMPLE: GBS4154001 (ALL GASKETS)

| | | | |
|---|---|---|---|
| DESIGNATES CENTER OF GRAVITY COMPLETE | | TEMP RISE | KNAN/KNAF KVA - |
| FROM GROUND IN FRONT VIEW | 44.623(1133) | 65° C | 6700/10000 |
| RIGHT OF CENTERLINE TOP VIEW | .062(2) | | |
| ABOVE CENTERLINE TOP VIEW | .137(3) | | |
| DESIGN IMPEDANCE 4.690 % | | | |

WESTBURNE ELECTRIC
CORNWALL SOLAR PROJECT
6700/10000 KVA
44000 DELTA HV
34500 WYE LV

| | | | | | |
|---|---|---|---|---|---|
| HV 250 KV BIL | LV 200 KV BIL | | | | |
| APPARATUS SUBSTATION TRANSFORMER | | | | CLASS KNAN/KNAF | OUTDOOR |
| 60 HERTZ | 6700 KVA | | HV 44000-DELTA | LV 34500Y/19920 | 3 PH |
| DFTM Mark Clark | 04/15/13 | WIRING DIAGRAM | ILUSBS4154001 | MFR. ID | DRAWING NUMBER |
| CHKD JRichardson | 04/15/13 | NAME PLATE | ILUSBS4154001 | ILUS | BS4154001 |
| APPD | | INSTRUCTION BOOK | PC-1002 | | |
| SMALL POWER TRANSFORMER | | | DIMENSIONS IN INCHES-SCALE NTS | | |

**WEG Transformers USA**
One Pauwels Drive, Washington, MO 63090, USA
www.weg.net T: 1-636-239-9300 F: 1-636-239-9395

# TECHNICAL SPECS

**Date:** 1/17/2020
**Quotation Number:** 95927501
**Item Number:** 10

| | | | |
|---|---|---|---|
| **Customer Line No.:** | Cornwall Algonquin | **Quantity:** | 10 |
| **Unit Price:** | $ | **Extended Price:** | |

**Three Phase Pad-Mount Transformer(s)**

| | | | |
|---|---|---|---|
| **kVA Rating:** | 1000 kVA | **Model #:** | |
| | Mineral Oil Immersed | **Cooling Class:** | ONAN |
| | | **Frequency:** | 60 Hz |
| | | **Avg. Winding Temp.** | 65 °C |
| **Primary Voltage:** | 34500 Delta volts | **Secondary Voltage:** | Dual Input 208Y/120 volts |
| **Primary BIL Rating:** | 150 kV | **Secondary BIL Rating:** | 30 kV |
| **HV Winding Matl:** | Copper | **LV Winding Matl:** | Copper |

**High Voltage Taps:** B Taps - Two 2.5% Taps below Nominal and Two 2.5% Taps above Nominal

**No Load Loss:** 1435 Watts **Load Loss:** 8106 Watts **Total Loss:** 9541 Watts

**Impedance:** 5 %

**Tank Enclosure:**
Welded Cover w/(1) Handhole(s) - 14x24
Stainless Steel Exterior Hardware
Cabinet Depth: 30 Inches, Pentahead Security Bolts
Steel HV-LV Barrier

**Bushings:**
Loop Feed ANSI Minimum Dimensions
Dead Front Primary Terminations: Integral Non-Loadbreak Bushings 600Amp
Secondary Terminations: Epoxy Bushings w/Non-removable 6 & 12 hole, Spade Support

**Protection:**
PRCLF (38kV - 65A HiTech), Weak Link Cartridge (Curve #7 ABB)

**Accessories:**
Pressure Relief Valve Viat, Cover-Mounted Pressure Relief Device (), Drain valve w/Sampler
Liquid Level Gauge, Liquid Temperature Gauge, Pressure Vacuum Gauge

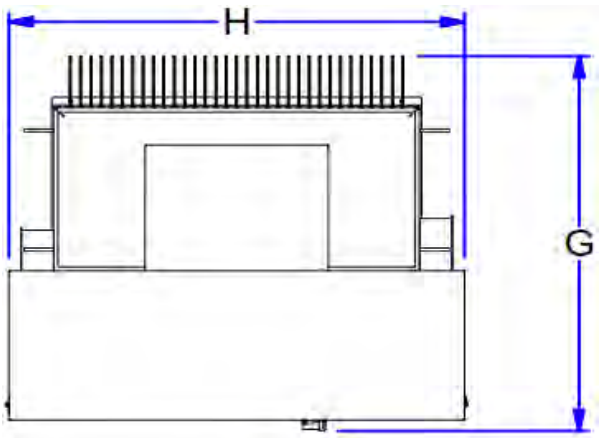
4-Winding Double Tier SOLARPAD: Stadium Style Stacked Core Construction with Semi-Round Windings, Reduced Flux Density, Electrostatic Winding Shields, Increased Cooling, Door Gasketing, Hold down anchoring (x4 holes), Isolated Core Ground, Nitrogen Blanket, Schrader Valve, UL Listed

-Drain Valve & Sampler in external lockable box
-Gauges and MV switch in external lockable enclosures
-Losses are at 20C core and 85C winding and are for reference. ANSI tolerances will apply to quoted losses.

**Switching:**
L.V. Neutral Bushing with Removable Grounding Strap, One ON/OFF Transformer Switch (300 Amps)

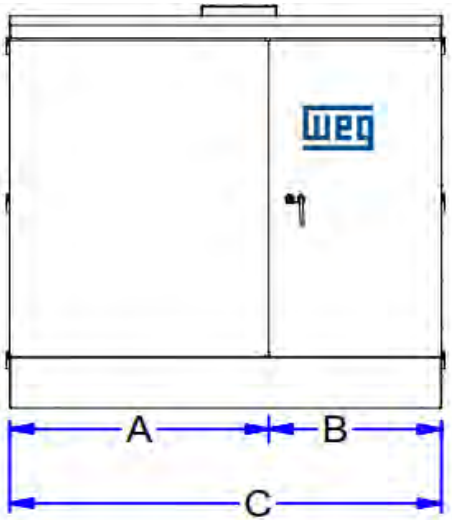
**Paint Color:**
GREEN (Munsell 7.0GY3.29/1.5), Touch-up Paint Spray Can,

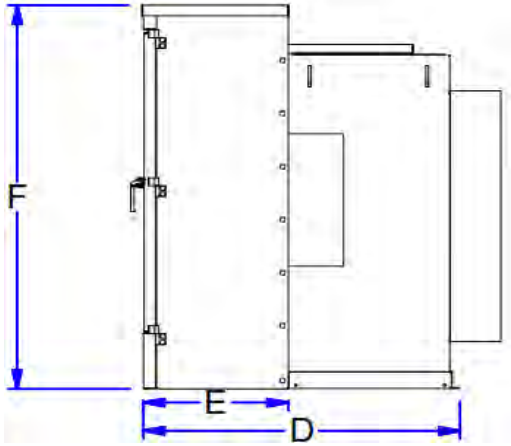
**Standards:**
Quoted in compliance with the latest applicable ANSI standards unless otherwise specified by the customer.




| ITEM | KVA | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|
| 0010 | 1000 | 41.62 | 32 | 73.62 | 58 | 30 | 79 | 70 | 73.62 |

0010: Weight 8,222 lbs; Volume 319 Gal

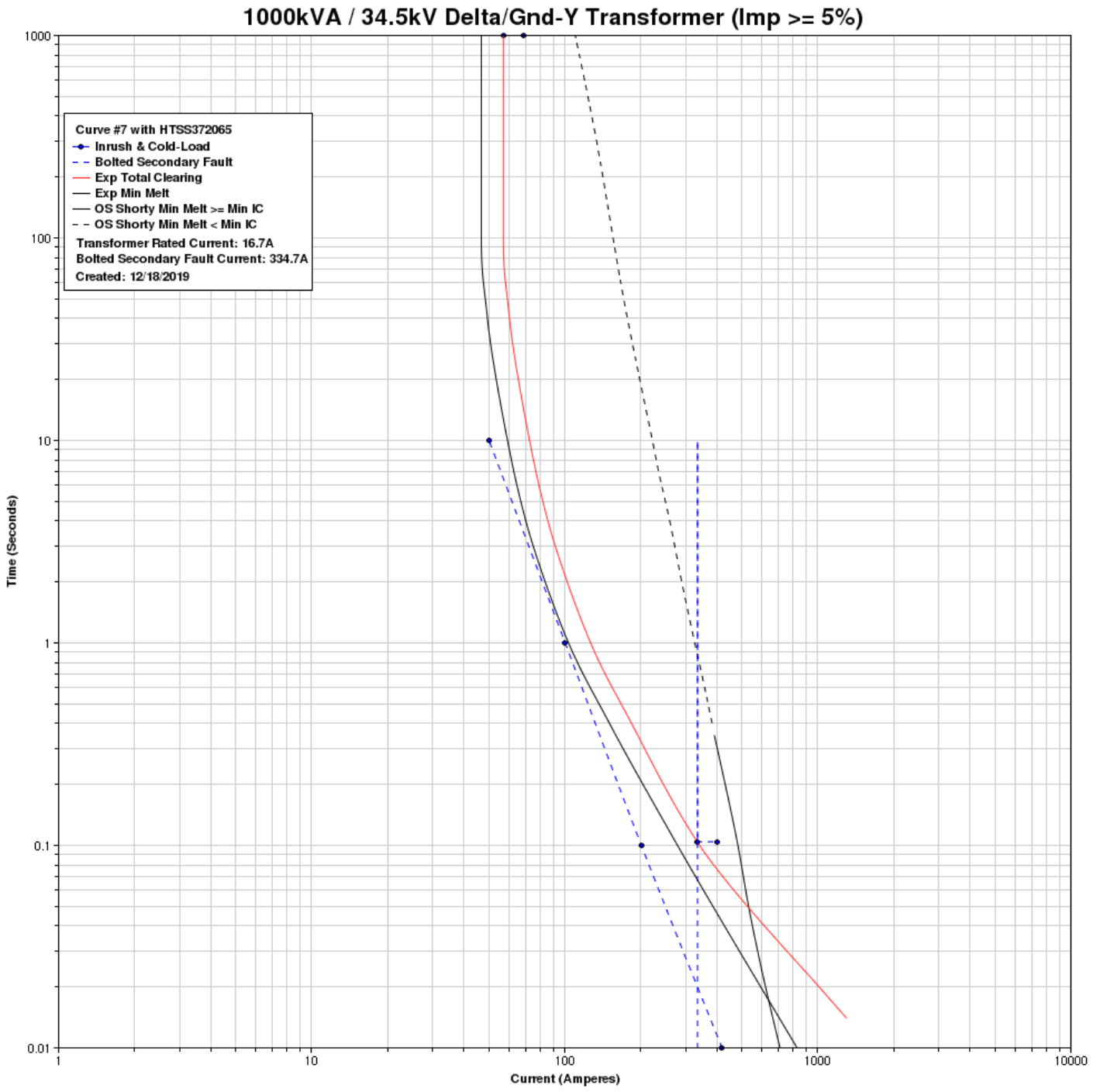



| | | | | | |
|---|---|---|---|---|---|
| TITLE: | Cornwall Algonquin | | | | |
| QUOTE DRAWING | | | | | |
| QUOTE NO: | 495927501 | | | | |
| PRELIMINARY DIMENSIONS NOT FOR CONSTRUCTION | | | | | |
| DRAWN BY | REVISION | DATE | SCALE | UNITS | |
| JW | 3 | 1/17/2020 | NTS | IN | |

# Hi-Tech® FACT

| Distribution Transformer Configuration | | Recommendations |
|---|---|---|
| **Phase** | 3 Phase | **Voltage:** 38 kV **Current:** 65 A |
| **kVA** | 1000 | **Hi-Tech Fuse Part#:** HTSS372065 |
| **kV** | 34.5 | **Maximum I²T:** 12,100Amp²-Sec **Min IC:** 390A **Max IC:** 50kA |
| **Transformer Rated Current:** | 16.7 A | **Expulsion Fuse:** Curve #7 |
| **Bolted Secondary Fault Current:** | 334.7 A | • *The expulsion fuses selected is based on expulsion fuse manufacturer recommendations* |
| **Minimum Imp %** | 5 | • *ABB Transformer Components* |
| **Primary Connection** | DELTA | |
| **Secondary Connection** | gndY | |
| **Preferred Expulsion Fuse** | ABB Weak Link | |




Thomas&Betts
A Member of the ABB Group

**Product/Design Testing:**

WEG performs the routine tests as defined in the current IEEE standards C57.12.00 and C57.12.90, which include:

- **Winding resistance measurements (Section 5):** Of all windings on the rated voltage tap and at the tap extremes. Acceptance Criteria: Total Loss within tolerance.
- **Ratio test and phase relation (Section 6, 7):** On the rated voltage connection and on all tap connections. Acceptance Criteria: ±0.5% of Calculated Ratio.
- **No-load and excitation current (Section 8):** At 100% and 110% voltage and at rated frequency. Acceptance Criteria: +10% of Guaranteed NLL.
- **Impedance voltage and load loss (Section 9):** At rated current and frequency on the rated voltage connection and at the tap extremes. Acceptance Criteria: +6% of Guaranteed Total Losses ±7.5 of guaranteed %IZ.
- Low Frequency Test
    - **Applied Voltage (Section 10.6):** On rated voltage connection of primary and secondary windings. HV & LV Winding Test Voltage. Acceptance Criteria: See IEEE C57.12.90
    - **Induced Voltage (Section 10.7) - Class I Power Transformer Test:** On the rated voltage connection of primary & secondary windings. AC Level: 2 times rated voltage for 7200 cycles. Acceptance Criteria: See IEEE C57.12.90
- **Lightning Impulse Test (Section 10.4):** Quality Control test. One reduced wave followed by one full wave on HV phase terminals only. Chopped wave and switching impulse are not included. Acceptance Criteria: See IEEE C57.12.90
- **Auxiliary Wiring Dielectric** Test: Dielectric megger of 1000VDC to ground. Acceptance Criteria: See IEEE C57.12.90
- **Bushing Current Transformers:** Dielectric megger of 2500VDC to ground. Check of polarity and ratio of bushing current transformers. Acceptance Criteria: ±0.5% of Calculated Ratio
- **Standard Leak test of Fully Assembled Transformer (Section 8.2 of C57.12.00):** 5 psig of dry air (oil at ambient temperature) for 24 hours. Acceptance Criteria: No leaks.
- **Mechanical inspection:** Conformance to specs, standards and drawings, Check of layout, dimensions, clearances, etc., Check of nameplate data, Functional test of all accessories and auxiliary devices.

This proposal is based upon standard factory testing. These tests are the routine tests as defined by IEEE C57.12.00. Certified test reports can be provided at no additional charge, if requested.

## Sound Power Level Calculation for Schneider Electric GT500 MVX inverter

| Third octave, as provided by Vibro - Acoustics Consultants | | |
|---|---|---|
| Freq # | Freq (Hz) | Lw (dB) |
| 1 | 25 | |
| 2 | 31.5 | |
| 3 | 40 | |
| 4 | 50 | 69.0 |
| 5 | 63 | 77.0 |
| 6 | 80 | 72.0 |
| 7 | 100 | 74.0 |
| 8 | 125 | 85.0 |
| 9 | 160 | 79.0 |
| 10 | 200 | 79.0 |
| 11 | 250 | 81.0 |
| 12 | 315 | 83.0 |
| 13 | 400 | 80.0 |
| 14 | 500 | 77.0 |
| 15 | 630 | 75.0 |
| 16 | 800 | 82.0 |
| 17 | 1000 | 74.0 |
| 18 | 1250 | 72.0 |
| 19 | 1600 | 74.0 |
| 20 | 2000 | 73.0 |
| 21 | 2500 | 71.0 |
| 22 | 3150 | 68.0 |
| 23 | 4000 | 67.0 |
| 24 | 5000 | 69.0 |
| 25 | 6300 | 85.0 |
| 26 | 8000 | 66.0 |
| 27 | 10000 | 47.0 |
| | Total Lw | 92.2 |

| Full octave, as used in CADNA-A model | | | | | | | |
|---|---|---|---|---|---|---|---|
| Freq # | Freq (Hz) | Lw, 1 inverter (dB) | A-Weight (dB) | LwA, 1 inverter (dBA) | LwA, 2 inverters (dBA) | LwA, 3 inverters (dBA) | LwA, 4 inverters (dBA) |
| | 31.5 | | -39.4 | | | | |
| 5 | 63 | 78.7 | -26.2 | 52.5 | 55.5 | 57.3 | 58.5 |
| 8 | 125 | 86.2 | -16.1 | 70.1 | 73.2 | 74.9 | 76.2 |
| 11 | 250 | 86.1 | -8.6 | 77.5 | 80.5 | 82.2 | 83.5 |
| 14 | 500 | 82.6 | -3.2 | 79.4 | 82.4 | 84.2 | 85.4 |
| 17 | 1000 | 83.0 | 0.0 | 83.0 | 86.0 | 87.8 | 89.0 |
| 20 | 2000 | 77.6 | 1.2 | 78.8 | 81.8 | 83.6 | 84.8 |
| 23 | 4000 | 72.8 | 1.0 | 73.8 | 76.9 | 78.6 | 79.9 |
| 26 | 8000 | 85.1 | -1.1 | 84.0 | 87.0 | 88.7 | 90.0 |
| | **Total** | **92.2** | | **88.5** | **91.5** | **93.2** | **94.5** |

Calculation example for 8000 Hz:

$$10\log\left(10^{\frac{85.0}{10}}+10^{\frac{66.0}{10}}+10^{\frac{47.0}{10}}\right)=85.1dB$$

$$85.1-1.1=84.0dBA$$

$$10\log\left(2*10^{\frac{84.0}{10}}\right)=87.0dBA$$

$$10\log\left(3*10^{\frac{84.0}{10}}\right)=88.7dBA$$

$$10\log\left(4*10^{\frac{84.0}{10}}\right)=90.0dBA$$

Calculating the cumulative noise impact from increasing number of inverters

**Figure B.1 Schneider Electric GT500 MVX inverter Sound Power Calculation**

## Estimated Frequency Spectra for Transformers
## Substation Transformer - 10MVA - ONAF

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

Values Highlighted in Green are Used in This Study

*Transformer Details:*

*Oil Immersed*
*10 MVA*
*ONAF Cooling Class*
*height* 2.88 m
*width* 3.53 m
*depth* 3.74 m

| | | | |
|---|---|---|---|
| Average LpA | 63.0 | dBA | Based on guaranteed characteristic sound pressure level provided by ABB |
| Estimated surface area | 41.9 | m^2 | Based on provided transformer dimensions from ABB |

Correction factors are in dB

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | -11 | -5 | -3 | -8 | -8 | -14 | -19 | -24 | -31 | Outdoors, indoors in mechanical room over 140 $m^3$ |
| C2 | -11 | -2 | 3 | -2 | -2 | -11 | -19 | -24 | -31 | Indoors |
| C3 | -11 | -2 | 3 | 2 | 2 | -4 | -9 | -14 | -21 | Serious Noise Problems |

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

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 based [dB] | 78.2 | 84.2 | 86.2 | 81.2 | 81.2 | 75.2 | 70.2 | 65.2 | 58.2 | **90.3** |
| C2 based [dB] | 78.2 | 87.2 | 92.2 | 87.2 | 87.2 | 78.2 | 70.2 | 65.2 | 58.2 | **95.3** |
| C3 based [dB] | 78.2 | 87.2 | 92.2 | 91.2 | 91.2 | 85.2 | 80.2 | 75.2 | 68.2 | **97.3** |

Resulting A-weighted sound power level

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dBA] |
|---|---|---|---|---|---|---|---|---|---|---|
| **dBA Reduction** | **-39.4** | **-26.2** | **-16.1** | **-8.6** | **-3.2** | **0** | **1.2** | **1** | **-1.1** | |
| C1 based [dB] | 38.8 | 58.0 | 70.1 | 72.6 | 78.0 | 75.2 | 71.4 | 66.2 | 57.1 | **81.6** |
| C2 based [dB] | 39 | 61 | 76 | 79 | 84 | 78 | 71 | 66 | 57 | **86.6** |
| C3 based [dB] | 39 | 61 | 76 | 83 | 88 | 85 | 81 | 76 | 67 | **91.4** |

**Figure B.2 34.5-kV/44-kV/10-MVA Substation Transformer Sound Power Calculation**

Values Highlighted in Green are Used in This Study

*Transformer Details:*

*Oil Immersed*
*1000 kVA*
*ONAN Cooling Class*

| | | |
|---|---|---|
| *height* | *79.00 in* | 2.01 m |
| *width* | *73.62 in* | 1.87 m |
| *depth* | *70 in* | 1.78 m |

| | | | |
|---|---|---|---|
| Average LpA | 58.0 | dBA | Based on NEMA TR1-1993 (R2000), Table 0-2, immersed power transformers |
| Estimated surface area | 19.5 | m^2 | Based on provided transformer dimensions from WEG |

Correction Factors (dB)

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | -11 | -5 | -3 | -8 | -8 | -14 | -19 | -24 | -31 | Outdoors, indoors in mechanical room over 140 $m^3$ |
| C2 | -11 | -2 | 3 | -2 | -2 | -11 | -19 | -24 | -31 | Indoors |
| C3 | -11 | -2 | 3 | 2 | 2 | -4 | -9 | -14 | -21 | Serious Noise Problems |

Sound Power Level: Lw = (Average LpA) + 10*log(Estimated Area) + C + 10 [From Crocker pg. 1335]

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 based [dB] | 69.9 | 75.9 | 77.9 | 72.9 | 72.9 | 66.9 | 61.9 | 56.9 | 49.9 | **81.9** |
| C2 based [dB] | 69.9 | 78.9 | 83.9 | 78.9 | 78.9 | 69.9 | 61.9 | 56.9 | 49.9 | **87.0** |
| C3 based [dB] | 69.9 | 78.9 | 83.9 | 82.9 | 82.9 | 76.9 | 71.9 | 66.9 | 59.9 | **89.0** |

Resulting A-weighted Sound Power Level

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dBA] |
|---|---|---|---|---|---|---|---|---|---|---|
| **dBA Reduction** | **-39.4** | **-26.2** | **-16.1** | **-8.6** | **-3.2** | **0** | **1.2** | **1** | **-1.1** | |
| C1 based [dB] | 30.5 | 49.7 | 61.8 | 64.3 | 69.7 | 66.9 | 63.1 | 57.9 | 48.8 | **73.3** |
| C2 based [dB] | 30 | 53 | 68 | 70 | 76 | 70 | 63 | 58 | 49 | **78.2** |
| C3 based [dB] | 30 | 53 | 68 | 74 | 80 | 77 | 73 | 68 | 59 | **83.1** |

**Figure B.3 208-V/34.5-kV/1-MVA Cluster Transformer Sound Power Calculation**

# Appendix C
## Noise Maps from CadnaA, Coordinates of the Noise Receptor Centers

**Table C.1 Coordinates of the Noise Receptor Centers**

| ID | Description | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|
| | | X | Y |
| R001 | Existing | 524571.8 | 4994421.3 |
| R002 | Existing | 524610.4 | 4994423.7 |
| R003 | Existing | 524775.8 | 4994473.4 |
| R004 | Existing | 524833.7 | 4994504.3 |
| R005 | Existing | 524883.5 | 4994536.9 |
| R006 | Existing | 524915.1 | 4994542.3 |
| R007 | Existing | 524982.9 | 4994590.8 |
| R008 | Existing | 525040.2 | 4994530.3 |
| R009 | Existing | 525102.2 | 4994541.2 |
| R010 | Existing | 525131.7 | 4994624.5 |
| R011 | Existing | 525202.6 | 4994661.8 |
| R012 | Existing | 525221.8 | 4994790.7 |
| R013 | Existing | 524950.5 | 4995404.4 |
| R014 | Existing | 523307.7 | 4994686.4 |
| R015 | Vacant | 523491.1 | 4994768.6 |
| R016 | Existing | 523536.3 | 4994466.5 |
| R017 | Existing | 523532.2 | 4994410.6 |
| R018 | Existing | 523603.9 | 4994577.2 |
| R019 | Existing | 523608.0 | 4994369.7 |
| R020 | Existing | 523613.4 | 4994186.9 |
| R021 | Vacant | 523660.4 | 4993427.0 |
| R022 | Vacant | 523672.7 | 4994115.6 |
| R023 | Vacant | 523665.7 | 4995325.5 |
| R024 | Existing | 523692.7 | 4994475.5 |
| R025 | Existing | 523704.7 | 4994242.5 |
| R026 | Existing | 523789.7 | 4994283.5 |
| R027 | Existing | 523767.9 | 4994143.1 |
| R028 | Existing | 523855.1 | 4994183.3 |
| R029 | Existing | 523865.7 | 4994287.5 |
| R030 | Existing | 523897.7 | 4994105.1 |
| R031 | Existing | 523937.6 | 4994028.1 |
| R032 | Existing | 523950.7 | 4994223.5 |
| R033 | Vacant | 523977.8 | 4994296.2 |
| R034 | Existing | 524102.0 | 4994301.3 |
| R035 | Vacant | 524143.9 | 4993736.0 |
| R036 | Vacant | 524222.1 | 4993524.6 |

| ID | Description | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|
| | | X | Y |
| R037 | Existing | 524319.2 | 4994299.8 |
| R038 | Existing | 524512.9 | 4994334.5 |
| R039 | Existing | 524544.2 | 4994411.6 |
| R040 | Existing | 524770.0 | 4994384.6 |
| R041 | Existing | 524844.3 | 4994403.5 |
| R042 | Existing | 524949.8 | 4994580.5 |
| R043 | Existing | 524952.6 | 4994449.8 |
| R045 | Existing | 524999.6 | 4994480.2 |
| R046 | Existing | 525087.7 | 4994572.5 |
| R047 | Existing | 525136.7 | 4994483.6 |
| R048 | Existing | 525175.4 | 4994412.5 |
| R049 | Vacant | 525211.3 | 4994338.5 |
| R050 | Existing | 525246.3 | 4994476.7 |
| R051 | Vacant | 525298.1 | 4994200.1 |
| R052 | Vacant | 525306.2 | 4994731.1 |
| R053 | Existing | 525326.5 | 4994328.9 |
| R054 | Existing | 523065.3 | 4993968.7 |
| R055 | Existing | 523146.0 | 4993986.0 |
| R056 | Existing | 523171.2 | 4993990.6 |
| R057 | Existing | 523186.3 | 4994291.5 |
| R059 | Existing | 523205.4 | 4994127.3 |
| R060 | Existing | 523228.9 | 4994330.1 |
| R061 | Existing | 523284.3 | 4994644.4 |
| R062 | Existing | 523311.6 | 4994077.0 |
| R063 | Existing | 523337.6 | 4993978.6 |
| R064 | Existing | 523408.2 | 4994002.4 |
| R065 | Existing | 523408.7 | 4994108.6 |
| R066 | Existing | 523444.7 | 4993917.6 |
| R067 | Existing | 523445.6 | 4994133.8 |
| R068 | Existing | 523464.7 | 4994025.6 |
| R069 | Existing | 523503.7 | 4994046.6 |
| R070 | Existing | 523509.7 | 4994186.6 |
| R071 | Existing | 523531.6 | 4994057.8 |
| R072 | Vacant | 523592.5 | 4994077.8 |
| R073 | Existing | 524709.1 | 4994437.8 |
| R074 | Existing | 523628.2 | 4994234.7 |
| R075 | Vacant | 523176.0 | 4996026.1 |

| ID | Description | UTM Coordinates NAD 83, Zone 18 | |
|---|---|---|---|
| | | X | Y |
| R076 | Existing | 524716.9 | 4994355.6 |
| R077 | Vacant | 523436.9 | 4996177.7 |
| R078 | Existing | 524590.2 | 4994337.1 |
| R079 | Existing | 525042.0 | 4994510.2 |
| R080 | Existing | 522918.6 | 4995836.3 |
| R081 | Existing | 524162.0 | 4993684.7 |
| R082 | Existing | 523611.9 | 4994564.9 |
| R083 | Existing | 523619.6 | 4996230.5 |
| R084 | Vacant | 522806.9 | 4995752.8 |
| R085 | Existing | 523336.6 | 4994679.0 |
| R086 | Existing | 525279.6 | 4994479.6 |
| R087 | Vacant | 523722.9 | 4996416.5 |
| R088 | Existing | 525094.4 | 4994856.7 |

**From:** Tse, Enoch (ENE) [mailto:Enoch.Tse@ontario.ca]
**Sent:** Friday, October 26, 2012 2:11 PM
**To:** Steven Hitchinson
**Cc:** Sean Fairfield; Zangeneh, Mahdi (ENE); Boucher, Noel; Colella, Nick (ENE)
**Subject:** RE: Cornwall Solar Project layout changes

Steven,

As per discussed, if a dwelling is the owner of a particular solar facility, then that dwelling does not need to be considered as a Point of Reception (POR) for that particular solar facility. But it is considered as a POR for the other adjacent solar facilities.

**Enoch Tse,** P.Eng.
Senior Noise Engineer
Approval Services Unit - Team 1
Environmental Approvals Branch

**Ministry of the Environment**
Operations Division
2 St. Clair Avenue West, Floor 12A
Toronto ON M4V 1L5
Tel: 416 212-4201 Fax: 416 314-8452
Toll Free: 1 800 461-6290
E-mail: enoch.tse@ontario.ca

---

**From:** Colella, Nick (ENE)
**Sent:** October 26, 2012 12:14 PM
**To:** Boucher, Noel
**Cc:** Sean Fairfield; Steven Hitchinson; Tse, Enoch (ENE); Zangeneh, Mahdi (ENE)
**Subject:** Cornwall Solar Project layout changes

Hi Noel,

This email is a follow up to our conversation yesterday and call earlier in the week. I understand that there are changes proposed for the Cornwall Solar Project, which require a revision of the Noise Report. With respect to the next steps regarding this project change, I will require the following:

- revised site plan
- revised noise report
- indication if, as a result of the project change, the overall impact at the receptors is (a) lower, (b) the same, (c) higher but insignificant, or (d) higher and significant (based on your determination)
- a description of whether the project changes will have any additional negative effects on the environment (e.g. additional impacts to water bodies, vegetation, noise, visuals etc.), outside of what has already been identified in the project documentation

Please note that the appropriate course of action regarding this project change will be determined based on our review of the information requested above. Generally speaking, this change will require submission of a Modification Document (I will advise on what should be included in this document). However, depending on our review of the requested information, we may also require you to provide notification of the project changes to the public, Aboriginal communities, and municipalities. Should it be determined that the overall noise/environmental impact is significant, we may require an additional public meeting.

Yesterday we spoke briefly about the issue where R42 was at 43dbA, without considering the Cornwall project (from my understanding, this is primarily because R42 was not assessed for the South Glengarry project). I have discussed this with the Noise Engineer for this file, Enoch Tse. Please contact Enoch with respect to this issue and he will provide guidance (contact info below).

Enoch Tse
416-212-4201
Enoch.Tse@ontario.ca

As always, please contact me if you have any questions.

Thanks
Nick

**Nick Colella**
Project Evaluator
Environmental Approvals Branch
Ministry of the Environment
2 St. Clair Ave. W., Floor 12A | Toronto, ON., M4V 1L5 |
T: 416-212-3691 | F: 416-314-8452 |
nick.colella@ontario.ca

523000
524000
525000
4996000
4995000
4994000
GLEN FALLOCH RD
GLEN FALLOCH RD
9 MILE RD
COUNTY RD 20
CASHION RD
KINLOCH RD
ST RD
R087
R083
R077
R075
R080
R084
R013
R023
R015
R014
R061
R018
R082
R016
R024
R017
R019
R060
R057
R026
R029
R033
R034
R037
R032
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R070
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R012
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R053
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CW_Cluster5
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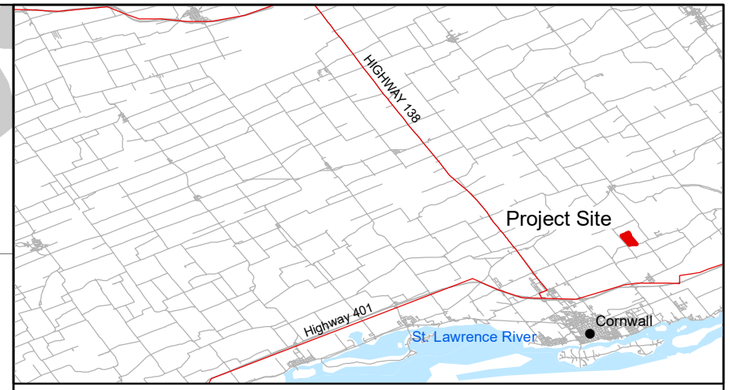


**Legend**

- Cluster # — Inverter Cluster
- SUB — Substation Transformer
- # — Noise Receptor - Existing
- # — Noise Receptor - Vacant
- Road
- Project Site
- 1000 m from Project Site
- South Glengarry St. Lawrence-1 Solar Farm Project Site
- Glendale Solar Project Site
- Parcel
- Waterbody
- Wetland
- Wooded Area

Sound Pressure Level (dBA)

| 40.0 - 41.0 | 41.1 - 44.0 | 44.1 - 47.0 | 47.1 - 49.0 | 49.1 - 52.0 | > 52.1 |
|---|---|---|---|---|---|

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.

0 100 200 400 600 Metres

NORTH

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Figure C.1.1

Cornwall Solar Inc.

**Cornwall Solar Project**
**Noise Contours at 4.5 m**

HATCH

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524000 524250 524500 524750 525000

4995500 4995250 4995000 4994750 4994500

SG_Cluster3
SG_Cluster1
SG_Cluster2
SG_Cluster6
SG_Cluster4
SG_Cluster5
SG_Cluster9
SG_Cluster8
SG_Sub
SG_Cluster7
SG_Cluster10
CW_Cluster5
CW_Cluster6
CW_Cluster4
CW_Cluster7
CW_Cluster3
CW_Cluster8
CW_Cluster2
CW_Cluster9
CW_Cluster1
CW_Cluster10
CW_Sub
R013
R088
R012
R011
R010
R042
R007
R046
R006
R009
R005
R008
R079
R004
R045
R047
R003
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R048
R001
R002
R039
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R083
R034
R037
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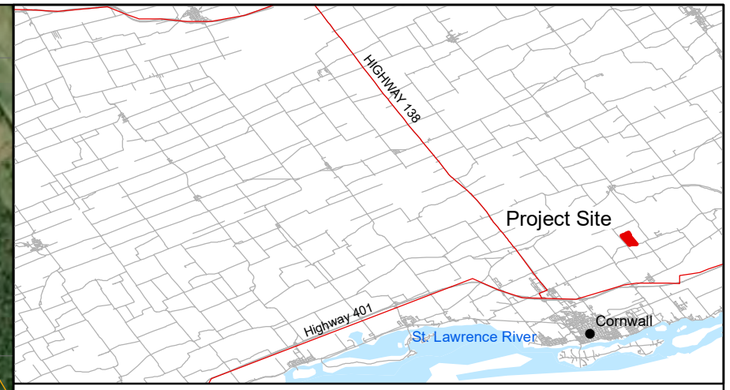
CASHION RD
COUNTY RD 19




**Legend**

Cluster #
Inverter Cluster
SUB
Substation Transformer
# Noise Receptor - Existing
# Noise Receptor - Vacant
Point of Reception
Noise Receptor Footprint
Road
South Glengarry St. Lawrence-1 Solar Farm Project Site
Project Site
Parcel

Sound Pressure Level (dBA)

40.0 - 41.0 | 41.1 - 44.0 | 44.1 - 47.0 | 47.1 - 49.0 | 49.1 - 52.0 | > 52.1

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2012.
2. Spatial referencing UTM NAD 83.
3. Imagery obtained from Google Earth Pro, 2007.

0 50 100 200 Metres

NORTH

1:5,000

Figure C.1.2

Cornwall Solar Inc.

**Cornwall Solar Project**
**Noise Contours at 4.5 m**

HATCH

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4995500 4995250 4995000 4994750 4994500

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SG_Cluster1
SG_Cluster2
SG_Cluster6
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CW_Cluster8
CW_Cluster2
CW_Cluster9
CW_Cluster1
CW_Cluster10
CW_Sub
R013
9 MILE RD
R088
R012
R011
R010
R042
R007
R046
R005
R006
R009
R008
R079
R004
R003
R045
R047
R043
CASHION RD
R001
R002
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R076
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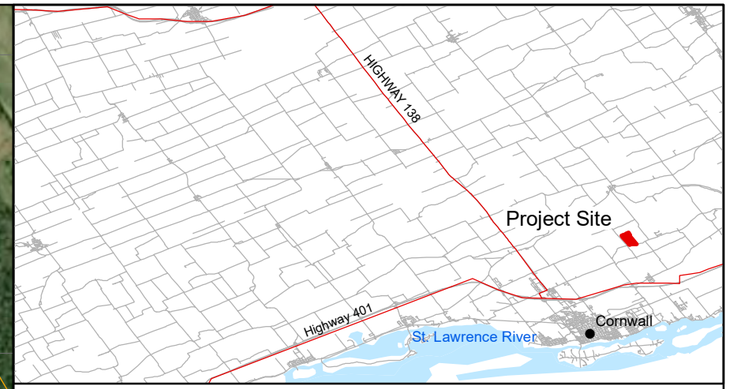
COUNTY RD 19
R029
R083
R034
R037




**Legend**

- Cluster # — Noise Receptor - Existing
- SUB — Noise Receptor - Vacant
- # — Point of Reception
- # — Road
- Noise Receptor Footprint
- 30 m from Noise Receptor Footprint
- Inverter Cluster
- Substation Transformer
- South Glengarry St. Lawrence-1 Solar Farm Project Site
- 30 m from Noise Receptor
- Project Site
- Parcel

Sound Pressure Level (dBA)

40.0 - 41.0 | 41.1 - 44.0 | 44.1 - 47.0 | 47.1 - 49.0 | 49.1 - 52.0 | > 52.1

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.
3. Imagery obtained from Google Earth Pro, 2007.

0 50 100 200 Metres

NORTH

1:5,000

Figure C.2

Cornwall Solar Inc.

**Cornwall Solar Project**
**Noise Contours at 1.5 m**

HATCH

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# Appendix D
## Adjacent Facility Renewable Energy Approvals

Ontario

**Ministry of the Environment**
**Ministère de l'Environnement**

## RENEWABLE ENERGY APPROVAL

NUMBER 1565-8ULQT7
Issue Date: June 26, 2012

Northland Power Solar Glendale GP Inc.
30 St. Clair Ave W 17th Floor
Toronto, Ontario
M4V 3A1

Project Location: 18085 County Road 19
Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry
K6H 5R6

*You have applied in accordance with Section 47.4 of the Environmental Protection Act for approval to engage in a renewable energy project in respect of a Class 3 solar facility consisting of the following:*

- the construction, installation, operation, use and retiring of a Class 3 solar facility with a total name plate capacity of up to approximately 10 megawatts (AC)

*For the purpose of this renewable energy approval, the following definitions apply:*

1. "Acoustic Assessment Report" means the report included in the Application and entitled *Glendale Solar Project Noise Assessment Study Report* , dated January 27, 2012, prepared by HATCH and signed by Oleg Belashov P.Eng. on May 7, 2012;

2. "Acoustic Audit" means an investigative procedure consisting of measurements and/or acoustic modelling of all sources of noise emissions due to the operation of the Equipment, assessed to determine compliance with the Noise Performance Limits set out in this Approval;

3. "Acoustic Audit Report" means a report presenting the results of an Acoustic Audit;

4. "Acoustical Consultant" means a person currently active in the field of environmental acoustics and noise/vibration control, who is knowledgeable about Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from solar facilities;

5. "Act" means the *Environmental Protection Act* , R.S.O 1990, c.E.19, as amended;

6. "Adverse Effect" has the same meaning as in the Act;

7. "Application" means the application for a Renewable Energy Approval dated October 5, 2011 and signed by John Brace, President & CEO, Northland Power Solar Glendale GP Inc. and all supporting documentation submitted with the application, including amended documentation submitted up to the date this Approval is issued;

8. "Approval" means this Renewable Energy Approval issued in accordance with Section 47.4 of the Act, including any schedules to it;

9. "A-weighting" means the frequency weighting characteristic as specified in the International Electrotechnical Commission (IEC) Standard 61672, and intended to approximate the relative sensitivity of the normal human ear to different frequencies (pitches) of sound. It is denoted as "A";

10. "A-weighted Sound Pressure Level" means the Sound Pressure Level modified by application of an A-weighting network. It is measured in decibels, A-weighted, and denoted "dBA";

11. "Class 1 Area" means an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum";

12. "Class 2 Area" means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 Areas:

    (a) sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours);

    (b) low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours);

    (c) no clearly audible sound from stationary sources other than from those under impact assessment.

13. "Class 3 Area" means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as the following:

    (a) a small community with less than 1000 population;

    (b) agricultural area;

    (c) a rural recreational area such as a cottage or a resort area; or

    (d) a wilderness area.

14. "Company" means Northland Power Solar Glendale GP Inc., as general partner for and on behalf of Northland Power Solar Glendale L.P., the partnership under the laws of Ontario, and includes its successors and assignees;

15. "Decibel" means a dimensionless measure of Sound Level or Sound Pressure Level, denoted as dB;

16. "Director" means a person appointed in writing by the Minister of the Environment pursuant to section 5 of the Act as a Director for the purposes of section 47.5 of the Act;

17. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Facility is geographically located;

18. "Equipment" means the two (2) 800 kilowatt (kW) inverters and one (1) 1.6 megavolt ampere (MVA) transformer within each array, and (1) transformer substation, identified in this Approval and as further described in the Application, to the extent approved by this Approval;

19. "Equivalent Sound Level" is the value of the constant sound level which would result in exposure to the same total A-weighted energy as would the specified time-varying sound, if the constant sound level persisted over an equal time interval. It is denoted $L_{eq}$ and is measured in dB A-weighting (dBA);

20. "Facility" means the renewable energy generation facility, including the Equipment, as described in this Approval and as further described in the Application, to the extent approved by this Approval;

21. "Independent Acoustical Consultant" means an Acoustical Consultant who is not representing the Company and was not involved in preparing the Acoustic Assessment Report. The Independent Acoustical Consultant shall not be retained by the Acoustical Consultant involved in the noise impact assessment;

22. "Ministry" means the ministry of the government of Ontario responsible for the Act and includes all officials, employees or other persons acting on its behalf;

23. "Noise Receptor" has the same meaning as in O. Reg. 359/09;

24. "O. Reg. 359/09" means Ontario Regulation 359/09 "Renewable Energy Approvals under Part V.0.1 of the Act" made under the Act;

25. "Point of Reception" has the same meaning as in Publication NPC-205 or Publication NPC-232, as applicable, and is subject to the same qualifications described in those documents;

26. "Publication NPC-103" means the Ministry Publication NPC-103, "Procedures", August 1978;

27. "Publication NPC-104" means the Ministry Publication NPC-104, "Sound Level Adjustments", August 1978;

28. "Publication NPC-205" means the Ministry Publication NPC-205, "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October 1995;

29. "Publication NPC-232" means the Ministry Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October 1995;

30. "Publication NPC-233" means the Ministry Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October 1995;

31. "Sound Level" means the A-weighted Sound Pressure Level;

32. "Sound Level Limit" is the limiting value described in terms of the one hour A-weighted Equivalent Sound Level $L_{eq}$;

33. "Sound Power Level" is ten times the logarithm to the base of 10 of the ratio of the sound power (Watts) of a noise source to standard reference power of $10^{-12}$ Watts;

34. "Sound Pressure" means the instantaneous difference between the actual pressure and the average or barometric pressure at a given location. The unit of measurement is the micro pascal (μPa);

35. "Sound Pressure Level" means twenty times the logarithm to the base 10 of the ratio of the effective pressure (μPa) of a sound to the reference pressure of 20 μPa;

36. "UTM" means Universal Transverse Mercator coordinate system.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

**TERMS AND CONDITIONS**

**A - GENERAL**

A1. The Company shall construct, install, use, operate, maintain and retire the Facility in accordance with the terms and conditions of this Approval and the Application and in accordance with the following schedules attached hereto:

Schedule A – Facility Description
Schedule B – Coordinates of the Equipment and Noise Specifications

A2. Where there is a conflict between a provision of this Approval and any document submitted by the Company, the conditions in this Approval shall take precedence. Where there is a conflict between one or more of the documents submitted by the Company, the document bearing the most recent date shall take precedence.

A3. The Company shall ensure a copy of this Approval is:

(1) accessible, at all times, by Company staff operating the Facility and;

(2) submitted to the clerk of each local municipality and upper-tier municipality in which the Facility is situated.

A4. If the Company has a publicly accessible website, the Company shall ensure that the Approval and the Application are posted on the Company's publicly accessible website within five (5) business days of receiving this Approval.

A5. The Company shall, at least six (6) months prior to the anticipated retirement date of the entire Facility, or part of the Facility, review its Decommissioning Plan Report to ensure that it is still accurate. If the Company determines that the Facility cannot be decommissioned in accordance with the Decommissioning Plan Report, the Company shall provide the Director and District Manager a written description of plans for the decommissioning of the Facility.

A6. The Facility shall be retired in accordance with the Decommissioning Plan Report and any directions provided by the Director or District Manager.

A7. The Company shall provide the District Manager and the Director at least ten (10) days written notice of the following:

(1) the commencement of any construction or installation activities at the project location; and

(2) the commencement of the operation of the Facility.

**B - EXPIRY OF APPROVAL**

B1. Construction and installation of the Facility must be completed within three (3) years of the later of:

(1) the date this Approval is issued; or

(2) if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

B2. This Approval ceases to apply in respect of any portion of the Facility not constructed or installed before the later of the dates identified in Condition B1.

**C - NOISE PERFORMANCE LIMITS**

C1. The Company shall ensure that:

(a) the Sound Levels from the Equipment, at the Points of Reception identified in the Acoustic Assessment Report, comply with the Sound Level Limit of 40 dBA as described in Publication NPC-232, subject to adjustment for tonality as described in Publication NPC-104;

(b) the Equipment is constructed and installed at either of the following locations:

(i) at the locations identified in Schedule B of this Approval; or

(ii) at a location that does not vary by more than 10 metres from the locations identified in Schedule B of this Approval and provided that,

1) the Equipment will comply with Condition C1 (a), and

2) all setback prohibitions established under O. Reg. 359/09 are complied with.

(c) the Equipment complies with the noise specifications set out in Schedule B of this Approval; and

C2. If the Company determines that some or all of the Equipment cannot be constructed in accordance with Condition C1 (b), prior to the construction and installation of the Equipment in question, the Company shall apply to the Director for an amendment to the terms and conditions of the Approval.

C3. Within three (3) months of the completion of the construction of the Facility, the Company shall submit to the Director a written confirmation signed by an individual who has the authority to bind the Company that the UTM coordinates of the "as constructed" Equipment comply with the requirements of Condition C1 (b).

**D - GROUNDWATER MONITORING**

D1. The Company shall implement the pre construction survey and groundwater monitoring program described in the June 4, 2012 "Baseline Well Water Monitoring Program and Construction Response Plan" included in the Application.

D2. The Company shall implement the groundwater monitoring program described in Condition D1 for a minimum period of two (2) years after the start of construction of the Facility.

D3. The Company shall report the summary of the results of the groundwater monitoring program on an annual basis to the District Manager.

**E - STORMWATER MANAGEMENT**

E1. Prior to the construction and installation of the Facility, the Company shall:

(a) prepare a stormwater management plan which shall include best management practices for stormwater management during the construction, installation, use, operation, maintenance and retiring of the Facility;

(b) prepare an erosion and sediment control plan which shall include methods to address surface water runoff and best management practices for sediment and erosion control during the construction, installation, use, operation, maintenance and retiring of the Facility;

(c) provide the stormwater management plan and erosion and sediment control plan to the District Manager; and

(d) implement the stormwater management plan and erosion and sediment control plan.

## F - WATER TAKING ACTIVITIES

F1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

## G - SEWAGE WORKS

G1. The Company shall, prior to the commercial operation date of the Facility, retain an independent Professional Engineer licensed in Ontario and familiar with electrical transformer substations and its associated sewage works to prepare a design report on the spill containment facility and, obtain approval (in the form of a letter) from the Director for a transformer substation spill containment area and associated sewage works that shall contain the following:

(1) final design drawings and specifications of the spill containment and associated sewage works;

(2) an operation and maintenance procedures manual including an emergency/contingency plan; and

(3) a monitoring program, including a groundwater monitoring program in the event of subsurface disposal system.

G2. The Company shall design the sewage works in Condition G1 such that the concentration of the effluent parameter named in the table below does not exceed the maximum concentration objective shown for that parameter in the effluent, and shall comply with the following requirements:

| Effluent Parameters | Maximum Concentration Objective |
|---|---|
| Oil and Grease | 15mg/L |

(1) notify the District Manager, as soon as reasonably possible, of any exceedance of the maximum concentration objective set out in the table above;

(2) take immediate action to identify the cause of the exceedance; and

(3) take immediate action to prevent further exceedances.

## H - TRAFFIC MANAGEMENT PLANNING

H1. Within three (3) months of receiving this Approval, the Company shall prepare a Traffic Management Plan and provide it to the Township of South Glengarry.

## I - ARCHAEOLOGICAL RESOURCES

I1. The Company shall implement all of the recommendations, if any, for further archaeological fieldwork and for the protection of archaeological sites found in the consultant archaeologist's report included in the Application, and which the Company submitted to the Ministry of Tourism, Culture and Sport in order to comply with clause 22 (2) (b) of O. Reg. 359/09.

I2. Should any previously undocumented archaeological resources be discovered, the Company shall:

(1) cease all alteration of the area in which the resources were discovered immediately;

(2) engage a consultant archaeologist to carry out the archaeological fieldwork necessary to further assess the area and to either protect and avoid or excavate any sites in the area in accordance with the *Ontario Heritage Act* , the regulations under that act and the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists* ; and

(3) notify the Director as soon as reasonably possible

## J - OPERATION AND MAINTENANCE

J1. Prior to the commencement of the operation of the Facility, the Company shall prepare a written manual for use by Company staff outlining the operating procedures and a maintenance program for the Equipment that includes as a minimum the following:

(1) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(2) emergency procedures;

(3) procedures for any record keeping activities relating to operation and maintenance of the Equipment; and

(4) all appropriate measures to minimize noise emissions from the Equipment.

J2. The Company shall;

(1) update, as required, the manual described in Condition J1; and

(2) make the manual described in Condition J1 available for review by the Ministry upon request.

J3. The Company shall ensure that the Facility is operated and maintained in accordance with the Approval and the manual described in Condition J1.

## K - RECORD CREATION AND RETENTION

K1. The Company shall create written records consisting of the following:

(1) an operations log summarizing the operation and maintenance activities of the Facility;

(2) within the operations log, a summary of routine and Ministry inspections of the Facility; and

(3) a record of any complaint alleging an Adverse Effect caused by the construction, installation, use, operation, maintenance or retirement of the Facility.

K2. A record described under Condition K1 (3) shall include:

(1) a description of the complaint that includes as a minimum the following:

(a) the date and time the complaint was made;

(b) the name, address and contact information of the person who submitted the complaint;

(2) a description of each incident to which the complaint relates that includes as a minimum the following:

(a) the date and time of each incident;

(b) the duration of each incident;

(c) the wind speed and wind direction at the time of each incident;

(d) the ID of the Equipment involved in each incident and its output at the time of each incident;

(e) the location of the person who submitted the complaint at the time of each incident; and

(3) a description of the measures taken to address the cause of each incident to which the complaint relates and to prevent a similar occurrence in the future.

K3. The Company shall retain, for a minimum of five (5) years from the date of their creation, all records described in Condition K1, and make these records available for review by the Ministry upon request.

## L - NOTIFICATION OF COMPLAINTS

L1. The Company shall notify the District Manager of each complaint within two (2) business days of the receipt of the complaint.

L2. The Company shall provide the District Manager with the written records created under Condition J2 within eight (8) business days of the receipt of the complaint.

L3. If the Company receives a complaint related to groundwater, the Company shall contact the District Manager within one (1) business day of the receipt of the complaint to discuss appropriate measures to manage any potential groundwater issues.

## M - CHANGE OF OWNERSHIP

M1. The Company shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any of the following changes:

(1) the ownership of the Facility;

(2) the operator of the Facility;

(3) the address of the Company;

(4) the partners, where the Company is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act* , R.S.O. 1990, c.B.17, as amended, shall be included in the notification; and

(5) the name of the corporation where the Company is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

## SCHEDULE A

### Facility Description

The Facility shall consist of the construction, installation, operation, use and retiring of the following:

(a) seven (7) arrays of photovoltaic (PV) modules or panels with a total name plate capacity of up to approximately 10 megawatts (AC), with each array containing one (1) cluster consisting of two (2) 800 kilowatt (kW) inverters and one (1) 1.6 megavolt ampere (MVA) transformer;

(b) one (1) 10 MVA (megavolt ampere) transformer substation; and

(c) associated ancillary equipment, systems and technologies including on-site access roads, underground cabling and overhead distribution lines,

all in accordance with the Application.

## SCHEDULE B

### Coordinates of the Equipment and Noise Specifications

Coordinates of the Equipment are listed below in UTM, Z17-NAD83 projection:

| | Source ID | Sound Power Level (dBA) | Easting (m) | Northing (m) | Source Description |
|---|---|---|---|---|---|
| 1 | GL_Sub | **85.8** | 522,294 | 4,993,696 | 44-kV/10-MVA substation transformer |
| 2 | GL_Inv1 | **86.3** | 521,955 | 4,994,431 | Inverter Cluster 1: 1.6 MW |
| 3 | GL_Inv2 | **86.3** | 522,162 | 4,994,354 | Inverter Cluster 2: 1.6 MW |
| 4 | GL_Inv3 | **86.3** | 522,100 | 4,994,199 | Inverter Cluster 3: 1.6 MW |
| 5 | GL_Inv4 | **86.3** | 522,281 | 4,994,199 | Inverter Cluster 4: 1.6 MW |
| 6 | GL_Inv5 | **86.3** | 522,390 | 4,994,010 | Inverter Cluster 5: 1.6 MW |
| 7 | GL_Inv6 | **86.3** | 522,209 | 4,994,010 | Inverter Cluster 6: 1.6 MW |
| 8 | GL_Inv7 | **86.3** | 522,498 | 4,993,829 | Inverter Cluster 7: 1.6 MW |
| 9 | GL_Trans1 | **75.1** | 521,950 | 4,994,431 | 27.6 kV/1.6MVA transformer at Cluster 1 |
| 10 | GL_Trans2 | **75.1** | 522,157 | 4,994,354 | 27.6 kV/1.6MVA transformer at Cluster 2 |
| 11 | GL_Trans3 | **75.1** | 522,095 | 4,994,199 | 27.6 kV/1.6MVA transformer at Cluster 3 |
| 12 | GL_Trans4 | **75.1** | 522,276 | 4,994,199 | 27.6 kV/1.6MVA transformer at Cluster 4 |
| 13 | GL_Trans5 | **75.1** | 522,384 | 4,994,010 | 27.6 kV/1.6MVA transformer at Cluster 5 |
| 14 | GL_Trans6 | **75.1** | 522,203 | 4,994,010 | 27.6 kV/1.6MVA transformer at Cluster 6 |
| 15 | GL_Trans7 | **75.1** | 522,493 | 4,993,829 | 27.6 kV/1.6MVA transformer at Cluster 7 |

Note: The inverter Sound Power Level values in the above table correspond to the combined output of all the inverters in each cluster, and include the 5 Decibel (dB) adjustment for tonality as prescribed in Publication NPC-104

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition A1 and A2 are included to ensure that the Facility is constructed, installed, used, operated, maintained and retired in the manner in which it was described for review and upon which Approval was granted. These conditions are also included to emphasize the precedence of conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition A3 and A4 are included to require the Company to provide information to the public and the local municipality.

3. Condition A5 and A6 are included to ensure that final retirement of the Facility is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure long-term protection of the health and safety of the public and the environment.

4. Condition A7 is included to require the Company to inform the Ministry of the commencement of activities related to the construction, installation and operation of the Facility.

5. Condition B is intended to limit the time period of the Approval.

6. Condition C1 is included to provide the minimum performance requirement considered necessary to prevent an Adverse Effect resulting from the operation of the Equipment and to ensure that the noise emissions from the Equipment will be in compliance with applicable limits set in Publication NPC-232.

7. Condition C2 and C3 are included to ensure that the Equipment is constructed, installed, used, operated, maintained and retired in a way that meets the regulatory setback prohibitions set out in O. Reg. 359/09.

8. Condition D, E, F, G and H are included to ensure that the Facility is constructed, installed, used, operated, maintained and retired in a way that does not result in an Adverse Effect or hazard to the natural environment or any persons.

9. Condition I is included to protect archaeological resources that may be found at the project location.

10. Condition J is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, O. Reg. 359/09 and this Approval.

11. Condition K is included to require the Company to keep records and provide information to the Ministry so that compliance with the Act, O. Reg. 359/09 and this Approval can be verified.

12. Condition L are included to ensure that any complaints regarding the construction, installation, use, operation, maintenance or retirement of the Facility are responded to in a timely and efficient manner.

13. Condition M is included to ensure that the Facility is operated under the corporate name which appears on the application form submitted for this Approval and to ensure that the Director is informed of any changes.

## NOTICE REGARDING HEARINGS

*In accordance with Section 139 of the Environmental Protection Act, within 15 days after the service of this notice, you may by further written notice served upon the Director, the Environmental Review Tribunal and the Environmental Commissioner, require a hearing by the Tribunal.*

*Section 142 of the Environmental Protection Act provides that the notice requiring the hearing shall state:*

1. The portions of the renewable energy approval or each term or condition in the renewable energy approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The signed and dated notice requiring the hearing should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The renewable energy approval number;
6. The date of the renewable energy approval;
7. The name of the Director;
8. The municipality or municipalities within which the project is to be engaged in;

*This notice must be served upon:*

| | | | | |
|---|---|---|---|---|
| The Secretary*<br>Environmental Review Tribunal<br>655 Bay Street, 15th Floor<br>Toronto, Ontario<br>M5G 1E5 | AND | The Environmental Commissioner<br>1075 Bay Street, 6th Floor<br>Suite 605<br>Toronto, Ontario<br>M5S 2B1 | AND | The Director<br>Section 47.5, *Environmental Protection Act*<br>Ministry of the Environment<br>2 St. Clair Avenue West, Floor 12A<br>Toronto, Ontario<br>M4V 1L5 |

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

*Under Section 142.1 of the Environmental Protection Act, residents of Ontario may require a hearing by the Environmental Review Tribunal within 15 days after the day on which notice of this decision is published in the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca, you can determine when this period ends.*

*Approval for the above noted renewable energy project is issued to you under Section 47.5 of the Environmental Protection Act subject to the terms and conditions outlined above.*

DATED AT TORONTO this 26th day of June, 2012

Vic Schroter, P.Eng.
Director
Section 47.5, *Environmental Protection Act*

DM/

c: District Manager, MOE Cornwall
Sean Male, Hatch

## AMENDMENT TO RENEWABLE ENERGY APPROVAL

NUMBER 2189-8NQPZ5
Issue Date: November 15, 2013

South Glengarry General Partner 1 Inc. and South Glengarry General Partner 2 Inc. operating as South Glengarry Solar Farm Partnership
620 Righters Ferry Rd
Bala Cynwyd, Pennsylvania
USA 19004

Site Location: 18423 County Road 19 and 18461 County Road 19
Lot 40, 41, 41a, Concession 5IL
South Glengarry Township, United Counties of Stormont, Dundas and Glengarry
K0C 2J0

*You are hereby notified that I have amended Approval No. 2189-8NQPZ5 issued on December 19, 2011 for a Class 3 solar facility , as follows:*

**A. The description of the Class 3 solar facility on page 1 of the Approval is deleted and replaced with the following:**

- The construction, installation, operation, use and retiring of a Class 3 solar facility with a total name plate capacity of up to 10 megawatts.

**B. The following definition of Acoustic Assessment Report is added to the definitions of the Approval:**

1a. "Acoustic Assessment Report" means the report included in the Application and entitled "Acoustic Assessment Report - Penn Energy - S. Glengarry_ St. Lawrence-1 Solar Farm" dated May 10, 2013, prepared by Petr Chocensky and Ian Bonsma, Howe Gastmeier Chapnik Limited; and includes additional correspondence submitted up to October, 2013;

**C. The definition of the Application on page 2 of the Approval is deleted and replaced with the following:**

3. "Application" means the application for a Renewable Energy Approval dated July 5, 2011, and signed by Max Frable, Project Manager/ REA Coordinator, Penn Energy Renewables, Ltd., and all supporting documentation submitted with the application, including amended documentation submitted up to December 13, 2011; and as further amended by the application for a Renewable Energy Approval, dated May 18, 2012, and signed by Max Frable, Project Manager/REA Coordinator, Penn Energy Renewables, Ltd. and all supporting documentation submitted with the application, including amended documentation submitted up to July 10, 2012; and as further amended by the application dated June 7, 2013 and signed by Mr. Glen Tomkinson, Project Manager/REA Coordinator, South Glengarry General Partner 1 Inc. and South Glengarry General Partner 2 Inc., operating as South Glengarry Solar Farm Partnership, and all supporting documentation submitted with the application, including amended documentation submitted up to the date this amendment is issued;

**D. Condition No. 8 on page 5 of the Approval is deleted and replaced with the following:**

8. Construction and installation of the *Facility* must be completed within three (3) years of the later of:

   (1) the date this *Approval* is issued; or

   (2) if there is a hearing or other litigation in respect of the issuance of this *Approval*, the date that this hearing or litigation is disposed of, including all appeals.

**E. Schedule A is deleted and replaced with the following Schedule A:**

## SCHEDULE A

**Noise Specifications and Coordinates of the Equipment in UTM, Z18-NAD83 projection:**

| Source ID | Source Description | Maximum Sound Power Level [dBA] | Height [m] | UTM Coordinates | |
|---|---|---|---|---|---|
| | | | | Easting | Northing |
| NS-01 | Inverter House MV1 | 88 | 1.5 | 524587 | 4994981 |
| NS-02 | Inverter House MV2 | 91 | 1.5 | 524595 | 4995076 |
| NS-03 | Inverter House MV3 | 91 | 1.5 | 524627 | 4994781 |
| NS-04 | Inverter House MV4 | 91 | 1.5 | 524638 | 4994914 |
| NS-05 | Inverter House MV5 | 91 | 1.5 | 524652 | 4995066 |
| NS-06 | Inverter House MV6 | 91 | 1.5 | 524754 | 4995247 |
| NS-07 | Inverter House MV7 | 91 | 1.5 | 524896 | 4994772 |
| NS-08 | Inverter House MV8 | 91 | 1.5 | 524908 | 4994905 |
| NS-09 | Inverter House MV9 | 91 | 1.5 | 524921 | 4995057 |
| NS-10 | Inverter House MV10 | 91 | 1.5 | 524968 | 4994933 |
| NS-11 | Transformer 1 MVA (MV1) | 69 | 1.5 | 524592 | 4994980 |
| NS-12 | Transformer 1 MVA (MV2) | 69 | 1.5 | 524600 | 4995075 |
| NS-13 | Transformer 1 MVA (MV3) | 69 | 1.5 | 524622 | 4994782 |
| NS-14 | Transformer 1 MVA (MV4) | 69 | 1.5 | 524634 | 4994914 |
| NS-15 | Transformer 1 MVA (MV5) | 69 | 1.5 | 524647 | 4995067 |
| NS-16 | Transformer 1 MVA (MV6) | 69 | 1.5 | 524750 | 4995247 |
| NS-17 | Transformer 1 MVA (MV7) | 69 | 1.5 | 524901 | 4994772 |
| NS-18 | Transformer 1 MVA (MV8) | 69 | 1.5 | 524913 | 4994905 |
| NS-19 | Transformer 1 MVA (MV9) | 69 | 1.5 | 524926 | 4995056 |
| NS-20 | Transformer 1 MVA (MV10) | 69 | 1.5 | 524963 | 4994933 |
| NS-21 | Transformer 10 MVA | 88 | 2 | 525013 | 4994843 |

**F. Schedule C is deleted and replaced with the following Schedule C:**

**SCHEDULE C**
**Facility Description**

The Facility shall consist of the construction, installation, operation, use and retiring of the following:

(a) Ten (10) ground mounted arrays of photovoltaic (PV) modules or panels with a total name plate capacity of up to 10 megawatts (AC) or 12 megawatts (DC), with each array consisting of approximately 4000-4500 PV modules and one (1) pad-mounted 1 Megavolt-ampere (MVA) three-phase, liquid filled transformer and two (2) 500 kilowatt inverters;

(b) one (1) 10 MVA step up power transformer substation; and

(c) associated ancillary equipment, systems and technologies including on-site access roads, switchgear, control and monitoring equipment, underground cabling and overhead distribution lines;

all in accordance with the Application.

**All other Terms and Conditions remain the same.**

**This Notice shall constitute part of the approval issued under Approval No. 2189-8NQPZ5 dated December 19, 2011.**

**NOTICE REGARDING HEARINGS**

*In accordance with Section 139 of the Environmental Protection Act, within 15 days after the service of this notice, you may by further written notice served upon the Director, the Environmental Review Tribunal and the Environmental Commissioner, require a hearing by the Tribunal.*

*In accordance with Section 47 of the Environmental Bill of Rights, 1993, the Environmental Commissioner will place notice of your request for a hearing on the Environmental Registry.*

*Section 142 of the Environmental Protection Act provides that the notice requiring the hearing shall state:*

1. The portions of the renewable energy approval or each term or condition in the renewable energy approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The signed and dated notice requiring the hearing should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The renewable energy approval number;
6. The date of the renewable energy approval;
7. The name of the Director;
8. The municipality or municipalities within which the project is to be engaged in;

*This notice must be served upon:*

| | | | | |
|---|---|---|---|---|
| The Secretary* | | The Environmental Commissioner | | The Director |
| Environmental Review Tribunal | | 1075 Bay Street, 6th Floor | | Section 47.5, *Environmental Protection Act* |
| 655 Bay Street, 15th Floor | | Suite 605 | | Ministry of the Environment |
| Toronto, Ontario | AND | Toronto, Ontario | AND | 2 St. Clair Avenue West, Floor 12A |
| M5G 1E5 | | M5S 2B1 | | Toronto, Ontario |
| | | | | M4V 1L5 |

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

*Under Section 142.1 of the Environmental Protection Act, residents of Ontario may require a hearing by the Environmental Review Tribunal within 15 days after the day on which notice of this decision is published in the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when this period ends.*

*Approval for the above noted renewable energy project is issued to you under Section 47.5 of the Environmental Protection Act subject to the terms and conditions outlined above.*

DATED AT TORONTO this 15th day of November, 2013

Vic Schroter, P.Eng.
Director
Section 47.5, *Environmental Protection Act*

MK/
c: Area Manager, MOE Cornwall
c: District Manager, MOE Ottawa
Glen Tomkinson, South Glengarry General Partner 1 Inc. and South Glengarry General Partner 2 Inc. operating as South Glengarry Solar Farm Partnership

# Appendix E
## As-built Pictures

| | |
|---|---|
|  |  |
| Cluster 01 | Cluster 02 |
|  |  |
| Cluster 03 | Cluster 04 |
|  |  |
| Cluster 05 | Cluster 06 |


Cluster 07

Cluster 08


Cluster 10

Replacement 208-V/34.5-kV/1-MVA WEG transformers

10 MVA Substation Transformer

# Appendix F
## CadnaA Sample Calculation

Receiver
Name: 45_R037
ID: 45_R037
X: 524321.71 m
Y: 4994307.28 m
Z: 4.50 m

| Point Source, ISO 9613, Name: "CW_Sub", ID: "CW_Sub" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7960 | 524396.80 | 4994374.40 | 3.50 | 0 | DEN | A | 86.6 | 0.0 | 0.0 | 0.0 | 0.0 | 51.1 | 0.4 | -0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.6 |

| Point Source, ISO 9613, Name: "CW_Inv01", ID: "CW_Inv01" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7963 | 524308.30 | 4994443.90 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 53.8 | 2.1 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.8 |

| Point Source, ISO 9613, Name: "CW_Inv10", ID: "CW_Inv10" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7967 | 524166.40 | 4994371.20 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 55.5 | 2.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 24.8 |

| Point Source, ISO 9613, Name: "SG_NS_03", ID: "SG_NS_03" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7971 | 524627.00 | 4994781.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 66.0 | 4.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.6 |

| Point Source, ISO 9613, Name: "CW_Inv09", ID: "CW_Inv09" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7975 | 524115.20 | 4994452.10 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 59.0 | 2.4 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 |

| Point Source, ISO 9613, Name: "CW_Inv02", ID: "CW_Inv02" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7979 | 524238.50 | 4994550.70 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 59.2 | 2.4 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 |

| Point Source, ISO 9613, Name: "CW_Trans01", ID: "CW_Trans01" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7983 | 524313.10 | 4994443.70 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 53.7 | 0.5 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 23.7 |

| Point Source, ISO 9613, Name: "CW_Fan01", ID: "CW_Fan01" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7987 | 524310.74 | 4994445.50 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 53.8 | 0.6 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 22.7 |

| Point Source, ISO 9613, Name: "SG_NS_04", ID: "SG_NS_04" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7990 | 524638.00 | 4994914.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 67.7 | 4.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.5 |

| Point Source, ISO 9613, Name: "CW_Trans10", ID: "CW_Trans10" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7993 | 524171.20 | 4994371.00 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 55.3 | 0.6 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 22.0 |

| Point Source, ISO 9613, Name: "CW_Fan10", ID: "CW_Fan10" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7996 | 524168.84 | 4994372.80 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 55.4 | 0.7 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.9 |

| Point Source, ISO 9613, Name: "SG_NS_07", ID: "SG_NS_07" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 7999 | 524896.00 | 4994772.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 68.4 | 4.7 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.6 |

| Point Source, ISO 9613, Name: "SG_NS_02", ID: "SG_NS_02" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8002 | 524595.00 | 4995076.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.2 | 4.9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.5 |

| Point Source, ISO 9613, Name: "SG_NS_05", ID: "SG_NS_05" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8005 | 524652.00 | 4995066.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.4 | 4.9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.3 |

| Point Source, ISO 9613, Name: "CW_Inv03", ID: "CW_Inv03" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8007 | 524183.80 | 4994642.40 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 62.2 | 2.6 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.9 |

| Point Source, ISO 9613, Name: "SG_NS_08", ID: "SG_NS_08" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8012 | 524908.00 | 4994905.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.5 | 4.9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 |

| Point Source, ISO 9613, Name: "CW_Inv08", ID: "CW_Inv08" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8015 | 524045.80 | 4994555.70 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 62.4 | 2.6 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.7 |

| Point Source, ISO 9613, Name: "SG_NS_10", ID: "SG_NS_10" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8018 | 524968.00 | 4994933.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 70.1 | 5.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.3 |

| Point Source, ISO 9613, Name: "SG_NS_09", ID: "SG_NS_09" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8021 | 524921.00 | 4995057.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 70.6 | 5.3 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.6 |

| Point Source, ISO 9613, Name: "SG_NS_01", ID: "SG_NS_01" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8024 | 524587.00 | 4994981.00 | 1.50 | 0 | DEN | A | 88.0 | 0.0 | 0.0 | 0.0 | 0.0 | 68.2 | 4.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.8 |

| Point Source, ISO 9613, Name: "SG_NS_06", ID: "SG_NS_06" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8027 | 524754.00 | 4995247.00 | 1.50 | 0 | DEN | A | 91.0 | 0.0 | 0.0 | 0.0 | 0.0 | 71.3 | 5.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.7 |

| Point Source, ISO 9613, Name: "CW_Trans09", ID: "CW_Trans09" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8030 | 524120.10 | 4994451.90 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 58.9 | 0.8 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.2 |

| Point Source, ISO 9613, Name: "CW_Fan09", ID: "CW_Fan09" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8033 | 524117.68 | 4994453.70 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 59.0 | 1.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.0 |

| Point Source, ISO 9613, Name: "CW_Trans02", ID: "CW_Trans02" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8036 | 524243.30 | 4994550.50 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 59.1 | 0.8 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.0 |

| Point Source, ISO 9613, Name: "CW_Fan02", ID: "CW_Fan02" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8039 | 524240.93 | 4994552.30 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 59.2 | 1.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.8 |

| Point Source, ISO 9613, Name: "CW_Inv04", ID: "CW_Inv04" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8042 | 524110.90 | 4994763.30 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 2.8 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.8 |

| Point Source, ISO 9613, Name: "CW_Inv07", ID: "CW_Inv07" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8045 | 523976.80 | 4994673.00 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 2.8 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.8 |

| Point Source, ISO 9613, Name: "SG_NS_21", ID: "SG_NS_21" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8048 | 525013.00 | 4994843.00 | 2.00 | 0 | DEN | A | 88.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.8 | 2.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.6 |

| Point Source, ISO 9613, Name: "CW_Inv06", ID: "CW_Inv06" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8051 | 523909.20 | 4994779.90 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 66.9 | 3.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.7 |

| Point Source, ISO 9613, Name: "CW_Inv05", ID: "CW_Inv05" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8054 | 524042.00 | 4994873.00 | 2.30 | 0 | DEN | A | 83.8 | 0.0 | 0.0 | 0.0 | 0.0 | 67.0 | 3.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.6 |

| Point Source, ISO 9613, Name: "CW_Trans03", ID: "CW_Trans03" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8057 | 524188.70 | 4994642.20 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 62.1 | 1.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.8 |

| Point Source, ISO 9613, Name: "CW_Fan03", ID: "CW_Fan03" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8060 | 524186.25 | 4994644.00 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 62.2 | 1.3 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.5 |

| Point Source, ISO 9613, Name: "CW_Trans08", ID: "CW_Trans08" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8063 | 524050.60 | 4994555.50 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 62.3 | 1.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.6 |

| Point Source, ISO 9613, Name: "CW_Fan08", ID: "CW_Fan08" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8066 | 524048.20 | 4994557.30 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 62.4 | 1.4 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.3 |

| Point Source, ISO 9613, Name: "CW_Trans07", ID: "CW_Trans07" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8069 | 523981.60 | 4994672.80 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 1.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.7 |

| Point Source, ISO 9613, Name: "CW_Trans04", ID: "CW_Trans04" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8072 | 524115.80 | 4994763.10 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 1.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.7 |

| Point Source, ISO 9613, Name: "CW_Fan07", ID: "CW_Fan07" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8075 | 523979.21 | 4994674.60 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 1.7 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 |

| Point Source, ISO 9613, Name: "CW_Fan04", ID: "CW_Fan04" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8078 | 524113.39 | 4994764.90 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 65.0 | 1.7 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 |

| Point Source, ISO 9613, Name: "CW_Trans06", ID: "CW_Trans06" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8080 | 523914.00 | 4994779.70 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 66.9 | 1.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.5 |

| Point Source, ISO 9613, Name: "CW_Trans05", ID: "CW_Trans05" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8084 | 524046.80 | 4994872.80 | 2.00 | 0 | DEN | A | 78.3 | 0.0 | 0.0 | 0.0 | 0.0 | 67.0 | 1.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.4 |

| Point Source, ISO 9613, Name: "CW_Fan06", ID: "CW_Fan06" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8087 | 523911.62 | 4994781.50 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 66.9 | 2.0 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.0 |

| Point Source, ISO 9613, Name: "CW_Fan05", ID: "CW_Fan05" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8090 | 524044.40 | 4994874.60 | 2.00 | 0 | DEN | A | 78.2 | 0.0 | 0.0 | 0.0 | 0.0 | 67.0 | 2.0 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.9 |

| Point Source, ISO 9613, Name: "GL_Inv7", ID: "GL_Inv7" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8093 | 522498.00 | 4993829.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 76.5 | 3.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 |

| Point Source, ISO 9613, Name: "GL_Inv5", ID: "GL_Inv5" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8096 | 522390.00 | 4994010.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 76.8 | 3.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.5 |

| Point Source, ISO 9613, Name: "GL_Inv4", ID: "GL_Inv4" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8099 | 522281.00 | 4994199.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 77.2 | 4.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 |

| Point Source, ISO 9613, Name: "GL_Inv6", ID: "GL_Inv6" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8102 | 522209.00 | 4994010.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 77.6 | 4.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.4 |

| Point Source, ISO 9613, Name: "GL_Inv2", ID: "GL_Inv2" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8105 | 522162.00 | 4994354.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 77.7 | 4.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 |

| Point Source, ISO 9613, Name: "GL_Inv3", ID: "GL_Inv3" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8126 | 522100.00 | 4994199.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 77.9 | 4.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 |

| Point Source, ISO 9613, Name: "GL_Sub", ID: "GL_Sub" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8129 | 522294.00 | 4993696.00 | 3.50 | 0 | DEN | A | 85.8 | 0.0 | 0.0 | 0.0 | 0.0 | 77.5 | 4.6 | -0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 |

| Point Source, ISO 9613, Name: "GL_Inv1", ID: "GL_Inv1" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8131 | 521955.00 | 4994431.00 | 2.60 | 0 | DEN | A | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 78.5 | 4.4 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.1 |

| Point Source, ISO 9613, Name: "SG_NS_13", ID: "SG_NS_13" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8134 | 524622.00 | 4994782.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 66.0 | 1.6 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |

| Point Source, ISO 9613, Name: "SG_NS_14", ID: "SG_NS_14" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8137 | 524634.00 | 4994914.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 67.7 | 1.8 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -1.8 |

| Point Source, ISO 9613, Name: "SG_NS_11", ID: "SG_NS_11" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8140 | 524592.00 | 4994980.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 68.2 | 1.9 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -2.5 |

| Point Source, ISO 9613, Name: "SG_NS_17", ID: "SG_NS_17" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8143 | 524901.00 | 4994772.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 68.4 | 2.0 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -2.7 |

| Point Source, ISO 9613, Name: "SG_NS_12", ID: "SG_NS_12" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8146 | 524600.00 | 4995075.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.2 | 2.1 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -3.7 |

| Point Source, ISO 9613, Name: "SG_NS_15", ID: "SG_NS_15" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8149 | 524647.00 | 4995067.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.3 | 2.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -3.9 |

| Point Source, ISO 9613, Name: "SG_NS_18", ID: "SG_NS_18" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8152 | 524913.00 | 4994905.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 69.5 | 2.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -4.1 |

| Point Source, ISO 9613, Name: "SG_NS_20", ID: "SG_NS_20" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8155 | 524963.00 | 4994933.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 70.0 | 2.3 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -4.7 |

| Point Source, ISO 9613, Name: "GL_Trans7", ID: "GL_Trans7" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8158 | 522493.00 | 4993829.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 76.5 | 4.2 | -0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5.4 |

| Point Source, ISO 9613, Name: "SG_NS_19", ID: "SG_NS_19" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8161 | 524926.00 | 4995056.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 70.7 | 2.4 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5.5 |

| Point Source, ISO 9613, Name: "GL_Trans5", ID: "GL_Trans5" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8164 | 522384.00 | 4994010.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 76.8 | 4.3 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -5.8 |

| Point Source, ISO 9613, Name: "GL_Trans4", ID: "GL_Trans4" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8167 | 522276.00 | 4994199.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 77.2 | 4.4 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -6.4 |

| Point Source, ISO 9613, Name: "SG_NS_16", ID: "SG_NS_16" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8173 | 524750.00 | 4995247.00 | 1.50 | 0 | DEN | A | 69.0 | 0.0 | 0.0 | 0.0 | 0.0 | 71.3 | 2.6 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -6.3 |

| Point Source, ISO 9613, Name: "GL_Trans6", ID: "GL_Trans6" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8220 | 522203.00 | 4994010.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 77.6 | 4.6 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -6.9 |

| Point Source, ISO 9613, Name: "GL_Trans2", ID: "GL_Trans2" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8222 | 522157.00 | 4994354.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 77.7 | 4.6 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -7.1 |

| Point Source, ISO 9613, Name: "GL_Trans3", ID: "GL_Trans3" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8224 | 522095.00 | 4994199.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 78.0 | 4.8 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -7.5 |

| Point Source, ISO 9613, Name: "GL_Trans1", ID: "GL_Trans1" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 8226 | 521950.00 | 4994431.00 | 2.58 | 0 | DEN | A | 75.1 | 0.0 | 0.0 | 0.0 | 0.0 | 78.5 | 5.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -8.3 |

# APPENDIX C

## Notice of a Proposed Change to an Approved Renewable Energy Project

# NOTICE OF A PROPOSED CHANGE TO AN APPROVED RENEWABLE ENERGY PROJECT

## Cornwall Solar Project

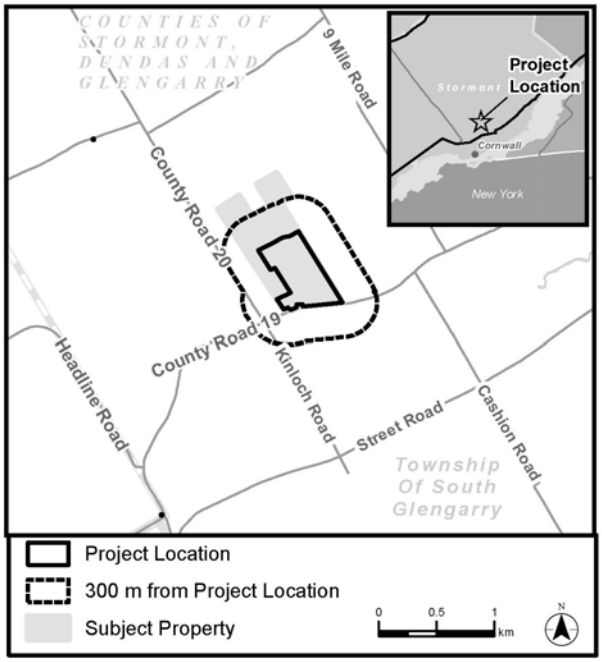
**OPA Reference Number:** FIT-F3SJUUQ

**Project Location:** The Project is located on Part of Lots 5, 6 and 7, Concession 5 within the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry.

**Dated at:** The Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry on this the 16 day of October 2020.

Cornwall Solar Inc. (a subsidiary of Liberty Power) was issued a Renewable Energy Approval on January 15, 2013 and an Amendment to the Renewable Energy Approval on December 17, 2014 in respect of the Cornwall Solar Project. Information with respect to the decision on this Project can be viewed on the Environmental Registry by searching the following EBR Registry Numbers: 011-6841 and 012-3158.

Cornwall Solar Inc. is proposing to make a change to the Project and the Project itself is subject to the provisions of the Environmental Protection Act (the Act) Part V.0.1 and Ontario Regulation (359/09) (the Regulation). This Notice must be distributed in accordance with Section 32.2 of the Regulation. This notice is being distributed to make the public aware of the proposed change to the Project.




**Project Description and Proposed Change:**

Pursuant to the Act and the Regulation, the Project in respect of which the Renewable Energy Approval was issued, is a Class 3 Solar facility.

An application has been made to the Ministry of the Environment and Converstation and Parks to change the Project and alter the terms and conditions of the existing Renewable Energy Approval. The proposed change consists of replacing the existing intermediate transformers with new intermediate transformers in the same locations. If approved with this change, the facility's total maximum name plate capacity of 10MW shall remain unchanged. The Project location, taking the proposed change into account, is shown in the map provided.

**Documents for Public Inspection:**

Cornwall Solar Inc. has developed a Modification Report which summarizes the minor amendment and any revisions to the supporting documents as required. A copy of the Modification Report is currently available for public inspection on the Project website: http://www.cornwallsolarproject.com/home.html

Copies of the final REA documents also remain available on the Project website.

**Project Contacts and Information:**

To learn more about the Project, or to communicate questions or comments, please contact:

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**Liberty Power**
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