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October 22, 2013

Vic Schroter
Director, Section 47.5 Environmental Protection Act
Environmental Approvals Branch
Ontario Ministry of the Environment
2 St Clair Ave W, Floor 12 A
Toronto ON M4V1L5

**Re: Renewable Energy Approval Amendment Application - Penn Energy – Hamilton_Port
Hope-4 Solar Farm**

Dear Mr. Schroter:

Canadian Solar Solutions Inc., on behalf of the Hamilton Solar Farm Partnership, is pleased to present you with the attached application to amend REA #0905-8S7M96. We believe that this amendment is minor in nature as it does not increase any potential negative impacts of the project and does not expand the Project Location. Included with the application are the following documents:

- REA Amendment Application Form
- A Project Modifications Document
- Original Site Plan
- Revised Site Plan
- *Acoustic Assessment Report, Penn Energy – Hamilton_Port Hope-4 Solar Farm, August 28, 2013*
- Map showing the extent of the Natural Heritage Assessment study area
- Map showing the extent of the Archaeological Assessment.

We have been consulting with the MNR and MTCS about these proposed changes and have received the following confirmations:

From Paige Campbell (Archaeological Review Officer):

“ I have examined these maps and concur that the proposed configuration changes dated September 19, 2013 do not in any way affect the validity of the archaeological assessment by Northeastern Archaeological Associates completed in 2011, nor is any further archaeological

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assessment required due to these changes. The ministry agrees that no negative impact to archaeological resources will result from the proposed changes.”

From Kathy Woeller (Regional Land Use Planning Supervisor, Southern Region MNR)

“Upon review of the modifications, MNR is satisfied that the Natural Heritage Assessment requirements of Ontario Regulation 359/09 have been met.”

All landowners within 120m of the project location, municipalities, and Aboriginal communities will be notified of the proposed changes as detailed in the above noted e-mail.

If you have any questions or require any further information, please do not hesitate to contact me.

Best Regards,



Terry Rasmussen
Project Manager – Solar Farms
Canadian Solar Solutions Inc.
T:519 837 1881 x 2291
E: Terry.Rasmussen@canadiansolar.com

cc. Max Frable – PENN Energy Renewables
Karen Bellamy, Peterborough District Manager

General Information and Instructions

Form Version 1.1

General

Information requested in this form is collected under the authority of the *Environmental Protection Act*, R.S.O. 1990 (EPA) and will be used to evaluate this application for a Renewable Energy Project. Questions about this collection of information should be directed to: Information Unit Supervisor, Environmental Assessment and Approvals Branch, 2 St. Clair Ave. W, Floor 12A, Toronto ON M4V 1L5. Telephone outside Toronto 1-800-461-6290 or in Toronto 416-314-8001.

Instructions

1. **Applicants are responsible for ensuring that they complete the most recent application form.** Application forms and supporting documentation are available from the Environmental Assessment and Approvals Branch toll free at 1-800-461-6290 (locally at 416-314-8001), from your local District Office of the Ministry of the Environment, and in the "Publications" section of the Ministry of the Environment website at www.ene.gov.on.ca.
2. Questions regarding completion and submission of this application should be directed to the Environmental Assessment and Approvals Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5, telephone number 1-800-461-6290 or (416) 314-8001, or to your local District Office of the Ministry of the Environment.
3. **Complete Submission**
In order to be eligible for the issue of a renewable energy approval, a person who proposes to engage in a renewable energy project shall, before submitting an application to the Director,
 - 1) prepare the application in a form or format approved by the Director;
 - 2) obtain or prepare, as the case may be, any documents that,
 - a) are required under Part IV to be submitted as part of the application, or
 - b) are to be submitted as part of the application for the purposes of obtaining an exemption from a provision of Part V; and
 - c) comply with all other requirements of Part IV of Ontario Regulation 359/09.
 - 3) If there is more than one person applying for the issue of a renewable energy approval in respect of a renewable energy project, those persons shall jointly submit one application for the issue of a renewable energy approval.
 - 4) An application to alter the terms and conditions of a renewable energy approval shall be prepared in a form or format approved by the Director and shall be submitted to the Director.

Supporting documents

- 1) A person who proposes to engage in a renewable energy project shall submit a document set out in Column 1 of Table 1 of the Regulation as part of an application for the issue of a renewable energy approval in respect of the project if it is a project described opposite the document in Column 3.
- 2) If a document set out in Column 1 of Table 1 of the Regulation is submitted as part of an application for the issue of a renewable energy approval, the person who is engaging in the renewable energy project shall ensure that the document meets the requirements set out opposite the document in Column 2 of Table 1 of the Regulation.
- 3) Any document submitted as part of an application for the issue of a renewable energy approval shall be in writing.
- 4) Any document submitted as part of an application for the issue of a renewable energy approval that is a diagram, map or plan shall be drawn to scale and shall include a scale bar and a north arrow.

INCOMPLETE APPLICATIONS WILL BE RETURNED TO THE APPLICANT.

The Ministry may require additional information during the technical review of any application.

4. If you are submitting your application electronically, electronic PDF application form should be completed and submitted by email to REAESubmission@ontario.ca. Once the application has been received, you will receive an acknowledgement email with an MOE reference number for your application and additional instructions for submitting your hard copy application package and supporting information.

If you are not submitting your application electronically, the original application form and all required supporting documents must be sent to:

**The Ministry of the Environment,
Director, Environmental Assessment and Approvals Branch,
2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5**

A copy of the complete application must be sent to any local Ministry District Office having jurisdiction over the project location. To locate the appropriate local Ministry District Office, please visit the Ministry of the Environment Internet site at: www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist

A cover letter addressed to the Director of Environmental Assessment and Approvals Branch should accompany both submissions and indicate that a copy of the complete submission has been sent to each District Office that has jurisdiction over the project location.

5. Information collected by the Ministry of the Environment is subject to the *Freedom of Information and Protection of Privacy Act* (FOIPPA). If you are of the view that any part of your application is confidential on the grounds such information constitutes a trade secret or scientific, technical, commercial, financial or labour relations information, please make this known now. Otherwise, the Ministry may make the information available to the public without further notice to you.

For Office Use Only		
Reference Number	Date (y/m/d)	Initials

Form ID: 523705

Application Summary

Project Name *(Project identifier to be used as a reference in correspondence)*
 Hamilton_Port Hope-4 Solar Energy Facility

Project Description Summary
(This summary should reflect the description in the documents upon which consultation has been completed and if it does not, the difference should be highlighted)
 Please see original REA application submitted July 12, 2011.

Required Information	Completed (yes or no)
<input checked="" type="checkbox"/> Project Name & Description	Yes
<input checked="" type="checkbox"/> Section 1: Applicant Information	Yes
<input checked="" type="checkbox"/> Section 2: Project Information	Yes
<input checked="" type="checkbox"/> Section 3: Site Information	Yes
<input checked="" type="checkbox"/> Section 4: Required Documents	Yes
Application Status: FORM COMPLETE.	
<input type="button" value="Email Form"/> <input type="button" value="Print Completed Form"/>	

Summary:

Type of Application Amendment to REA 0905-8S7M96	Type of Renewable Energy Generation Facility Solar Photo Voltaic Class 3.
Total Maximum Name Plate Capacity 10 MW	
Total Expected Generation Capacity 10 MW	

Section 1: Applicant Information

Form ID: 523705



1.1 Applicant Information (Owner of works/facility)

Applicant Name (legal name of individual or organization as evidenced by legal documents) Hamilton Solar Farm Partnership		Business Identification Number 220747042
Business Name (the name under which the entity is operating or trading - also referred to as trade name) Hamilton Solar Farm Partnership		<input checked="" type="checkbox"/> same as Applicant Name
Applicant Type: <input type="checkbox"/> Corporation <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Partnership <input type="checkbox"/> Sole Proprietor	<input type="checkbox"/> Federal Government <input type="checkbox"/> Municipal Government <input type="checkbox"/> Provincial Government <input type="checkbox"/> Other (describe):	North American Industry Classification System (NAICS) Code 221119 Other Electric Power Generation
Business Activity Description (a description of the business endeavour, this may include products sold, services provided or machinery/equipment used, etc.)		



1.2 Applicant Physical Address

Civic Address- Street information (includes street number, name, type and direction) 1 Yonge Street				Unit Identifier (i.e. apartment number) Suite 1801
Survey Address <i>(Not required if Street Information is provided)</i>	Lot	Conc.	Part	Reference Plan
Municipality /Unorganized Township Toronto	County/District	Province/State Ontario	Country Canada	Postal Code M5E 1W7
Telephone Number (include area code & ext.) (610)668-0300 ext.	Fax Number (include area code) (610)668-0365	Mobile Number (include area code)	E-mail Address	



1.3 Applicant Mailing Address

Same as Applicant Physical Address? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If no, please provide site address information below)	
Civic Address - Street information (civic numbering and street information including street number, name, type and direction) 620 Righters Ferry Road	
Delivery Designator	Delivery Identifier
Municipality /Unorganized Township Bala cynwyd	Province/State Pennsylvania
Country USA	Postal Code 19004



1.4 Statement of Applicant

I, the undersigned hereby declare that, to the best of my knowledge:		
<ul style="list-style-type: none"> • The information contained herein is complete and accurate in every way and I am aware of the penalties against providing false information as per s.184(2) of the <i>Environmental Protection Act</i>. • I understand that by submitting this form, I am guaranteeing the completeness and accuracy of all the information provided on this form and included in the draft reports. Failure to submit the correct information will result in an incomplete application being returned. • The Project Technical Information Contact identified below is authorized to act on my behalf for the purpose of obtaining approval under section 47.3 of the EPA for the Project identified herein. 		
Name of Signing Authority (please print) Glen Tomkinson	Title Project Manager/REA Coordinator	
Telephone Number (including area code & extension) (610)668-0300 ext. 1000	Fax Number (including area code) (610)668-0365	E-mail Address glen@pennenergyrenewables.com
Mobile Number (including area code) (484)888-3107	Signature 	Date (y/m/d) 2013/10/9

Section 2: Project Information

Form ID: 523705

2.1 Application Type

Type of Application: <input type="checkbox"/> New Renewable Energy Approval Where Applicable provide Existing Renewable Energy Approval Number: <input checked="" type="checkbox"/> Amendment to Renewable Energy Approval 0905-8S7M96			
Application Initiated by: <input checked="" type="checkbox"/> Proponent <input type="checkbox"/> Environmental Assessment and Approvals Branch <input type="checkbox"/> Provincial Officer Order (attach copy) <input type="checkbox"/> Other (specify): _____			
Current Certificate(s) of Approval <i>(please attach a separate list if more space is required)</i>			
Certificate of Approval Number	Date of Issue (yyyy/mm/dd)	Certificate of Approval Number	Date of Issue (yyyy/mm/dd)
Certificate of Approval Number	Date of Issue (yyyy/mm/dd)	Certificate of Approval Number	Date of Issue (yyyy/mm/dd)
Current Permit(s) to Take Water <i>(please attach a separate list if more space is required)</i>			
Permit Number	Date of Issue (yyyy/mm/dd)	Permit Number	Date of Issue (yyyy/mm/dd)
Permit Number	Date of Issue (yyyy/mm/dd)	Permit Number	Date of Issue (yyyy/mm/dd)
Project Schedule Estimated date for start of construction/installation (yyyy/mm/dd) 2012/03/01		Estimated date for start of operation (yyyy/mm/dd) 2014/01/31	

2.2 Statement of Project Technical Information Contact

Is the Project Technical Information Contact the same as the Applicant (identified in Section 1)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
I, the undersigned hereby declare that, to the best of my knowledge: <ul style="list-style-type: none"> The information contained herein and the information submitted in support of this application (electronically and in hard copy) is complete and accurate in every way and I am aware of the penalties against providing false information as per s.184(2) of the <i>Environmental Protection Act</i>. I understand that by submitting this form, I am guaranteeing the completeness and accuracy of this form and the draft documents. Failure to submit the correct information will result in the application being returned as incomplete. That the information contained in the electronically submitted application form is the same as the information submitted in the hard copy submission. I have used the most recent application form (as obtained from the "publications" section of the Ministry of the Environment website at www.ene.gov.on.ca or from the Environmental Assessment and Approvals Branch at 1-800-461-6290). 			
Name of Project Technical Information Contact Glen Tomkinson		Company N/A	
Telephone Number <i>(include area code & ext.)</i> (610)668-0300 ext. 1000	Fax Number <i>(include area code)</i> (610)668-0365	Mobile Number <i>(include area code)</i> (484)888-3107	E-mail Address glen@pennenergyrenewables.com
Signature (hard copy submission MUST be signed) 		Date (yyyy/mm/dd) 2013/10/9	
Address Information: Same as Applicant Mailing Address? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>(If no, please provide technical information contact address information below)</i>			
Civic Address - Street information <i>(civic numbering and street information including street number, name, type and direction)</i> 620 Righters Ferry Road			Unit Identifier <i>(i.e. apartment number)</i>
Delivery Designator 	Delivery Identifier 	Postal Station 	
Municipality /Unorganized Township Bala cynwyd	Province/State Pennsylvania	Country USA	Postal Code 19004

2.3 Other Approvals for Facility – Please attach a separate list if more space is required

Separate list attached? Yes No

List all other environmental approvals/permits applied for related to this project or received in relation to this project

Approval Number	Approval Date <small>(yyy/mm/dd)</small>	Approval Number	Approval Date <small>(yyy/mm/dd)</small>	Approval Number	Approval Date <small>(yyy/mm/dd)</small>

Ontario Power Authority (OPA) Registration ID (if applicable) FIT-Z958C	Ontario Power Authority (OPA) Reference Number (if applicable) FIT-FQWKQZF
-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------

2.4 Type of Renewable Energy Generation Facility (select all that apply)

Wind Facility	Biofuel / Biogas / Other	Anaerobic Digestion Facility	Thermal Treatment Facility	Solar Photo Voltaic Facility
<input type="checkbox"/> Class 2	<input type="checkbox"/> Biofuel	<input type="checkbox"/> Class 1	<input type="checkbox"/> Class 1	<input checked="" type="checkbox"/> Class 3
<input type="checkbox"/> Class 3	<input type="checkbox"/> Biogas	<input type="checkbox"/> Class 2	<input type="checkbox"/> Class 2	
<input type="checkbox"/> Class 4	<input type="checkbox"/> Other	<input type="checkbox"/> Class 3	<input type="checkbox"/> Class 3	
<input type="checkbox"/> Class 5	If other, please describe:			

2.5 Generation of Electricity

Total Maximum Name Plate Capacity 10.0 MW (1 MW = 1000 kW / 1 kW = 0.001 MW)	Total Expected Generation Capacity 10.0 MW (1 MW = 1000 kW / 1 kW = 0.001 MW)
Days and Hours of Operation 365 days/year; 24 hours/day	

Section 3: Site Information

Form ID: 523705



3.1 Project Location - (the site/location where project will be located)

Same as Applicant Physical Address? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If no, please provide site address information below)					
Civic Address- Street information (includes street number, name, type and direction)					Unit Identifier (i.e. apartment number)
2700 Payne Road (estimated)					
Survey Address <small>(Legal description of the site)</small>	Lot	Conc.	Part	Reference Plan	
	3	2	(all)	(n/a)	
Municipality / Unorganized Township	County/District		Postal Code		
Township of Hamilton	Northumberland county		K0K 1C0		
Non Address Information (where the project spans many locations or a large rural area, specify how the project area relates to the address provided)					
Please see original REA application submitted July 12, 2011.					
Geo Reference (southwest corner of property)					
Map Datum	Zone	Accuracy Estimate	Geo Referencing Method	UTM Easting	UTM Northing
NAD83	17	n/a	Delorme XMap	730925	4877100



3.2 Municipal or local authority information - (List all municipal or board authorities where the project is located)

Local Municipality / Unorganized Township (Include each Single Tier or Lower Tier in which the project location is situated. Attach a separate list if more space is necessary)		
Name of Municipality	Address	Phone
Township of Hamilton	8285 Majestic Hills Drive, Cobourg, ON K9E 4W5	(905)342-2810
Clerk's Name	Clerk's Phone/Fax	E-Mail Address
Kate Surerus	(905)342-2810	ksurerus@hamiltontownship.ca
Is the project location situated in one or more Upper Tier Municipality? (i.e., county, regional or district municipality.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
<small>List all Upper Tier Municipalities that the project location is situated in. Attach a separate list if more space is necessary</small>		
Name of Municipality	Address	Phone
Northumberland County	555 Courthouse Road, Cobourg, ON K9A 5J6	(800)354-7050
Clerk's Name	Clerk's Phone/Fax	E-Mail Address
Diane Cane	(905)372-3329	caned@northumberlandcounty.ca
Is the project location situated in a Local Roads Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<small>List all Local Roads Areas that the project location is situated in. Attach a separate list if more space is necessary</small>		
Name of local roads board	Address	Phone
Secretary-treasurer's Name	Secretary-treasurer's Phone/Fax	E-Mail Address
Is the project location in a Local Service Board area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<small>List all Local Service Board areas the project location is situated in. Attach a separate list if more space is necessary</small>		
Name of Local Service Board	Address	Phone
Secretary's Name	Secretary's Phone/Fax	E-Mail Address

**3.3 Site Information** - (information about the site/location where project will be located)

Site Name Penn Energy - Hamilton_Port Hope-4	MOE District Office Peterborough District Office
Is in any portion of the Project location on federally owned land or a reserve? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is in any portion of the Project location on Crown Land? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the Project location that is the subject of this application owned by the Applicant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>If no, please attach the owner's name, address and a signed letter granting consent for the installation and operation of the facilities</i>	
Is the Applicant the operating authority of the facility that is the subject of this application? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>If no, please attach the operating authority name, address and phone number</i>	
Is the Project location in the area of the Niagara Escarpment Plan? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the Project location in the area subject to the Oak Ridges Moraine Conservation Plan? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the Project location in the Protected Countryside as shown in Schedule 1 to the Greenbelt Belt Plan? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the Project location in the Lake Simcoe Watershed as defined in the Lake Simcoe Protection Act, 2008? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Is the Project location in the Central Pickering Development Planning Area as shown in Schedule 1 to the Central Pickering Development Plan? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Has an Archaeological Report (s. 22) been prepared as part of the complete submission? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Has a Heritage Report (s.23) been prepared as part of the complete submission? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Has an Environmental Impact Study Report (s.38, s. 41 or s. 43) been prepared as part of the complete submission? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Has a Water body Report (s.39, s. 40, s.44 s. 45) been prepared as part of the complete submission? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	



Hamilton SOLAR FARM PARTNERSHIP

Penn Energy – Hamilton_Port Hope-4 Solar Energy Facility

Project Modification Document

Proposed Amendments to REA Number 0905-8S7M96

**Submitted by Canadian Solar Services Inc. on behalf of the Hamilton
Solar Farm Partnership**

Date Submitted: October 22, 2013



Hamilton SOLAR FARM PARTNERSHIP

Introduction

Canadian Solar Solutions Inc., on behalf of the Hamilton Solar Farm Partnership, is applying for an amendment to the REA Number 0905-8S7M96. The changes to the project design are minor in nature and result in a reduction of environmental impacts and potential noise impacts. The project location has not changed from the original permitted area. Details of the changes, the rationale behind the changes and any potential impacts are described below.

Proposed Changes and Rational:

Details of the proposed changes are discussed below listing the change, the rationale behind the change and any potential impacts to the environment

1. Change in inverter and transformer types to less noisy models. The original inverter type, Xantrex GT-500 (500 kW each) by Schneider Electric, will be replaced with Advanced Energy Solaron 500 HE inverters. Transformers will switch from Schneider Electric transformers to ones manufactured by ABB Inc.

Rationale – To reduce any potential noise impacts to adjacent noise receptors.

Additional Negative Impacts to the Environment – None. This will result in a net reduction of noise.
2. Removal of fan from inverter stations as these are no longer required.

Rationale – To reduce any potential noise impacts

Additional Negative Impacts to the Environment – None. This will result in a net reduction of noise.
3. Change in transformer substation location. Moved to north and east of original location

Rationale – Moved further away from receptors. Completed to meet engineering requirements as well as to reduce noise impacts.

Additional Negative Impacts to the Environment – None. This will result in a net reduction of noise.
4. Change in inverter station locations.

Rationale – Facility redesigned to better match existing topography and to reduce grading of the site.

Additional Negative Impacts to the Environment – None.
5. Change in internal road locations and reduction in road length and coverage

Rationale – Facility redesigned to better match existing topography and reduce grading.

Additional Negative Impacts to the Environment – None. Reduction in road surface coverage will also reduce storm water runoff.



Hamilton SOLAR FARM PARTNERSHIP

6. Change in module racking and panel locations

Rationale – Facility redesigned to better match existing topography and reduce grading.

Additional Negative Impacts to the Environment – None

Reports Requiring Revisions:

The proposed amendments listed above will require minor changes to the Design & Operations Report and the Site Plan. The changes are listed in Table 1 below.



Hamilton SOLAR FARM PARTNERSHIP

Table 1: Revisions/Updates to REA Documents

Report	Page/Section	Original Text	Revised Text	MTCS and MNR comments
Project Description Report		No changes to this document are proposed. There are no changes to the description of the project, project location and there are no new potential negative environmental effects or increases to existing potential negative environmental effects.		
Design & Operations Report	Page 6, Section 3.0 – Table 1 “Inverters”	Xantrex GT-500 (500 kW each) by Schneider Electric, or similar	Solaron 500 HE (approximately 500 kW each) by Advanced Energy, or similar	
	Page 6, Section 3.0 – Table 1 “Secondary Transformers”	Class 7230 Pad-Mounted Small Power transformer (208 V to 27.6 kV) by Schneider Electric, or similar	Class 7230 Pad-Mounted Small Power transformer (208 V to 27.6 kV) by ABB, or similar	
	Page 6, Section 3.0 – Table 1 “Primary Transformers”	Class 7240 Substation Small Power transformer (27.6 kV to 44 kV) by Schneider Electric, or similar utilizing biodegradable transformer oil.	Class 7240 Substation Small Power transformer (27.6 kV to 44 kV) by ABB, or similar, utilizing biodegradable transformer oil.	
	Page 6, Section 3.1	10-15 collection houses are anticipated	10 collection houses are anticipated	
	Page 12, Section 4.4.4	None. The <i>Acoustic Assessment Report</i> by HGC Engineering concluded the following... <i>““The acoustic measurements and analysis indicate that the predicted sound levels of the facility will be within the applicable sound level limits specified</i>	None. The <i>Acoustic Assessment Report</i> by HGC Engineering on August 28, 2013 concluded the following... <i>“The acoustical analysis indicates that the predicted sound levels of the Hamilton Solar Farm will be within the applicable sound level limits specified in MOE</i>	



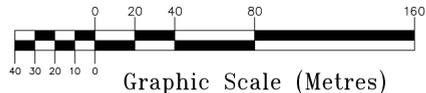
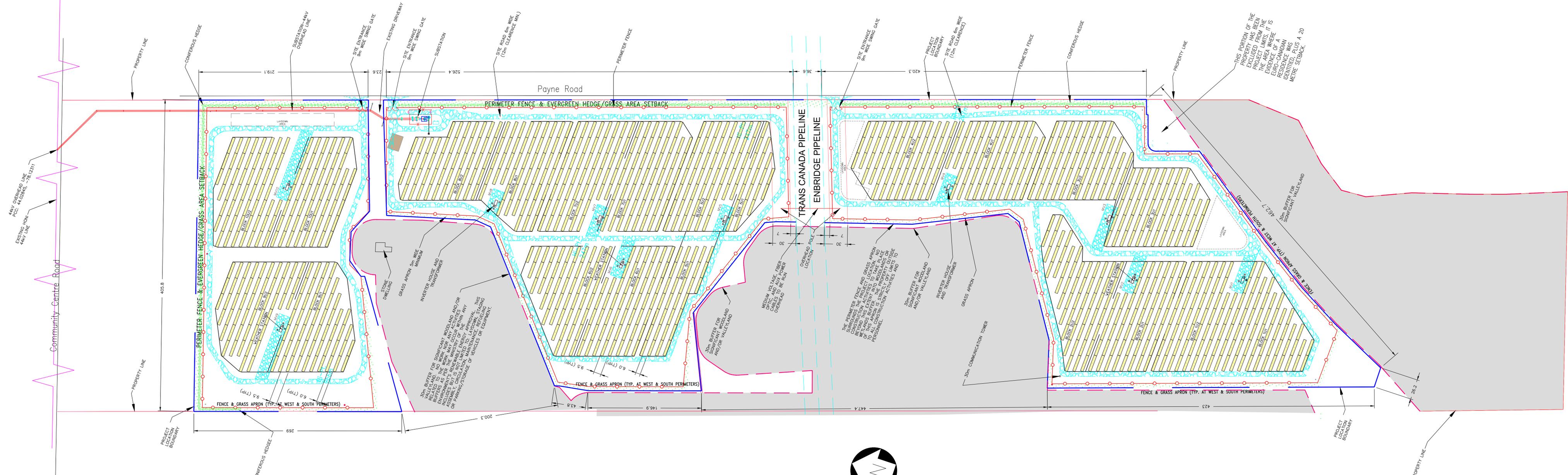
Hamilton SOLAR FARM PARTNERSHIP

Report	Page/Section	Original Text	Revised Text	MTCS and MNR comments
		<p><i>in MOE guidelines NPC-232, during all hours of the day and night, under typical 'predictable worst case' operating conditions at all identified existing off-site receptor locations, with the benefit of the noise control measures specified (i.e. equipping ventilation air inlets and outlets on three of the collection houses with acoustic hoods)."</i></p>	<p><i>guideline NPC-205, during all hours of the day and night, under typical "predictable worst case" operating conditions at all identified off-site receptor locations".</i></p>	
	<p>Page 14, Section 5.1 – Table 2 "Noise"</p>	<p>Their acoustic assessment report was prepared according to Appendix A of the MOE's "Basic Comprehensive Certificates of Approval (Air) – User Guide", dated April 2004 and is submitted herewith. As evidenced in the report, the prescribed noise limits will be adhered to via careful siting of the equipment adequately distanced from any receptors</p>	<p>As evidenced in the report, the prescribed noise limits will be adhered to via careful siting of the suspect equipment and by the selection of low-noise equipment which is adequately distanced from any receptors.</p>	
<p>Construction Plan Report</p>	<p>No changes to this document are proposed. The proposed changes will not alter the construction practices and will not result in new potential negative environmental effects or increases to existing potential</p>			



Hamilton SOLAR FARM PARTNERSHIP

Report	Page/Section	Original Text	Revised Text	MTCS and MNR comments
		negative environmental effects		
Decommissioning Plan Report		No changes to this document are proposed. The proposed changes will not alter the decommissioning practices and will not result in new potential negative environmental effects or increases to existing potential negative environmental effects		
Acoustic Assessment Report		Report has been revised to account for lower noise profiles of equipment as well as to incorporate the adjacent solar facility. Please refer to the <i>Acoustic Assessment Report– Hamilton_Port Hope-4 Solar Farm</i> by HGC Engineering on August 28, 2013		
Archaeological Assessment		No changes to this document are proposed. All proposed changes are within the existing study limits and will not result in an increased risk to known archaeological resources.		
Natural Heritage Assessment		No changes to this document are proposed. All proposed changes are within the existing study limits and will not result in an increased risk to natural heritage features.		



Site Plan
 for Proposed Solar Energy Facility: "Hamilton_Port Hope-4"
 Sept. 19, 2013 © Hamilton Solar Farm Partnership

ACOUSTIC ASSESSMENT REPORT

PENN ENERGY – HAMILTON_PORT HOPE-4 SOLAR FARM

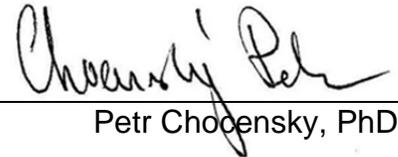
County of Leeds and Grenville, Ontario

FIT Contract ID# F-000687-SPV-130-505
Renewable Energy Approval No. 0905-8S7M96

Prepared for:

Hamilton Solar Farm Partnership
620 Righters Ferry Road,
Bala Cynwyd, PA, 19004
USA

Prepared by



Petr Chodensky, PhD

Reviewed by



Ian Bonsma, PEng

August 28, 2013

VERSION CONTROL

Penn Energy – Hamilton_Port Hope-4 Solar Farm, 2700 Payne Road,
Township of Hamilton, Northumberland County, Ontario

Ver.	Date	Version Description	Prepared By
1	July 7, 2011	Original Acoustic Assessment Report supporting an application for a Renewable Energy Approval	P. Chocensky
2	December 7, 2011	Updated Acoustic Assessment Report addressing MOE requirement to include additional receptor locations	P. Chocensky
3	August 28, 2013	Updated Acoustic Assessment Report in support of a Renewable Energy Approval addressing updated site layout, updated equipment selection and additional receptor locations	P. Chocensky



EXECUTIVE SUMMARY

Penn Energy Renewables Ltd., as assigned to Hamilton Solar Farm Partnership by its subcontractor, ABB Inc., retained HGC Engineering to update an Acoustic Assessment of their proposed Hamilton (Port Hope 4) Solar Farm in the Township of Hamilton, Northumberland County, Ontario. The study is required in support of an application for a Renewable Energy Approval from the Ontario Ministry of The Environment, under the Renewable Energy Act (“REA”). The assessment considers all non-negligible sound sources currently proposed for use at the facility, and has been prepared in accordance with the Ontario Ministry of the Environment publication “Basic Comprehensive Certificates of Approval (AIR) – User Guide”.

Previously, HGC Engineering issued a number of Acoustic Assessment Reports for the Hamilton site, addressing upcoming requirements from the Ministry of the Environment, as well as progress in the site design.

Sound emissions from key items of proposed equipment were based on information provided by the equipment manufacturers and established prediction methods for the transformers. The source sound levels were used as input to a predictive acoustical model to quantify the sound emissions associated with the facility.

The predictive analysis indicates that the sound emissions of the facility will be within the sound level limits as set out in MOE guideline NPC-232 during normal ‘predictable worst case’ operations at the surrounding residential receptors.

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3 SOUND SOURCE SUMMARY.....	3
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- APPENDIX A – Acoustic Assessment Summary Tables**
- APPENDIX B – Zoning Maps**
- APPENDIX C – Equipment Sound Data**
- APPENDIX D – Details of Predictive Acoustical Modeling**
- APPENDIX E – Acoustic Assessment Criteria**
- APPENDIX F – Sample Calculation Results – Condensed, Overall dBA Format**
- APPENDIX G – Sample Calculation Results – Octave Band Format**

ACOUSTIC ASSESSMENT REPORT CHECK-LIST

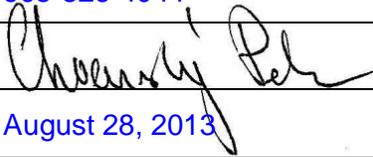
Company Name: Hamilton Solar Farm Partership

Company Address: 620 Righters Ferry Rd
Bala Cynwyd, USA 19004

Location of Facility: 2700 Payne Road, Township of Hamilton
Northumberland County, Ontario

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

Company Contact:	_____
Name:	<u>David Savoia</u>
Representing:	<u>Hamilton Solar Farm Partnership</u>
Phone Number:	<u>610-668-0300</u>
Signature:	<u></u>
Date:	<u>August 28, 2013</u>

Technical Contact:	_____
Name:	<u>Petr Chocensky, PhD</u>
Representing:	<u>HGC Engineering</u>
Phone Number:	<u>905-826-4044</u>
Signature:	<u></u>
Date:	<u>August 28, 2013</u>

ACOUSTIC ASSESSMENT REPORT CHECK-LIST

Required Information		Submitted	Explanation/Reference
1.0	Introduction (Project Background and Overview)	<input checked="" type="checkbox"/> Yes	Section 1
2.0	Facility Description		
	2.1 Operating hours of facility and significant Noise Sources	<input checked="" type="checkbox"/> Yes	Section 2
	2.2 Site Plan identifying all significant Noise Sources	<input checked="" type="checkbox"/> Yes	Figure 3
3.0	Noise Source Summary		
	3.1 Noise Source Summary Table	<input checked="" type="checkbox"/> Yes	Appendix A
	3.2 Source noise emissions specifications	<input checked="" type="checkbox"/> Yes	Appendix A
	3.3 Source power/capacity ratings	<input checked="" type="checkbox"/> Yes	Appendix A
	3.4 Noise control equipment description and acoustical specifications	<input type="checkbox"/> Yes	N/A
4.0	Point of Reception Noise Impact Calculations		
	4.1 Point of Reception Noise Impact Table	<input checked="" type="checkbox"/> Yes	Appendix A
	4.2 Point(s) of Reception (POR) list and description	<input checked="" type="checkbox"/> Yes	Section 4
	4.3 Land-use Zoning Plan	<input checked="" type="checkbox"/> Yes	Appendix B
	4.4 Scaled Area Location Plan	<input checked="" type="checkbox"/> Yes	Figure 1
	4.5 Procedure used to assess noise impacts at each POR	<input checked="" type="checkbox"/> Yes	Appendix D
	4.6 List of parameters/assumptions used in calculations	<input checked="" type="checkbox"/> Yes	Appendix D
5.0	Acoustic Assessment Summary		
	5.1 Acoustic Assessment Summary Table	<input checked="" type="checkbox"/> Yes	Appendix A
	5.2 Rationale for selecting applicable noise guideline limits	<input checked="" type="checkbox"/> Yes	Appendix E
	5.3 Predictable Worst Case Impacts Operating Scenario	<input checked="" type="checkbox"/> Yes	Figures 4
6.0	Conclusions		
	6.1 Statement of compliance with selected noise performance limits	<input checked="" type="checkbox"/> Yes	Sections 6 & 7
7.0	Appendices (provide details such as)	<input checked="" type="checkbox"/> Yes	
	Listing of Insignificant Noise Sources	<input type="checkbox"/> Yes	N/A
	Manufacturer's Noise Specifications	<input checked="" type="checkbox"/> Yes	Appendix C
	Calculations	<input checked="" type="checkbox"/> Yes	Appendices F & G
	Instrumentation	<input type="checkbox"/> Yes	N/A
	Meteorology during Sound Level Measurements	<input type="checkbox"/> Yes	N/A
	Raw Data from Measurements	<input type="checkbox"/> Yes	N/A
	Drawings (Facility / Equipment)	<input checked="" type="checkbox"/> Yes	Figure 3, Appendix C

1 INTRODUCTION

1.1 Context

The Hamilton (Port Hope 4) Solar Farm will be located at 2700 Payne Road in the Township of Hamilton, Ontario. A scaled location map of the surrounding area is included as Figure 1. The purpose of this assessment is to evaluate the sound emissions of the facility under a predictable worst case operating scenario, which is defined as an hour when typical full operation of the stationary sources under consideration could coincide with an hour of low background sound.

This report has been prepared in accordance with the Ontario Ministry of The Environment (“MOE”) guideline documents NPC-233 “Information to be Submitted for Approval of Stationary Sources of Sound”, dated October 1995 [1], and “Supporting Information for the Preparation of an Acoustic Assessment Report”, dated November 2003 [2].

A zoning map identifying the land uses surrounding the subject facility, obtained from the Township of Hamilton, is included as Appendix B. The lands surrounding the Hamilton Solar Farm are generally zoned for agricultural use, with the nearest residentially zoned land located on the east side of Payne Road, approximately 60 metres from the facility property line. Sixty-five points of reception have been considered in this assessment in order to represent the existing residential dwellings and vacant lots, which permit noise-sensitive use, within 1000 metres of the proposed equipment at the solar facility, labeled as locations R01 through R65 in Figure 2. One residential dwelling on the solar farm property (marked as O1 in Figure 2) is owned by the proponent and was excluded from this assessment pursuant to Ontario Regulation 359/09 [3].

HGC Engineering visited the site and surrounding area on March 14, 2011. The proposed site is rural in nature, both acoustically and in general character, with agricultural land uses widely in evidence, including scattered dwellings near the major roadways. Therefore, the area is best characterized as a “Class 3” rural area, under MOE noise assessment guidelines.

1.2 Summary of Updates Addressed In This Assessment

The updates addressed in this report include:

- Updated site layout of the Hamilton Solar Farm,
- Updated number of inverters and transformers on-site; there will be a total of twenty inverters at the facility, installed in ten inverter houses, ten 1 MVA transformers and one large 10 MVA transformer.
- Updated source sound levels for inverters and transformers, reflecting the final equipment selection,
- Removal of inverter house ventilation fans,
- Addition of receptor locations R56 through R65 to include additional lots or residential dwellings within 1000 metres of the proposed equipment at the subject facility.

2 FACILITY DESCRIPTION

The Hamilton (Port Hope 4) Solar Farm is a proposed 10 MW solar electrical generation project. The facility will consist of numerous fixed array mounted solar panels, ten collection houses, and one primary transformer. The sound sources associated with the facility will be the collection houses, each of which typically includes two inverter units and a secondary 1 MVA transformer. Additionally, there will be one primary 10 MVA transformer at the site. The inverters are power semiconductor devices which synthesize alternating current (“A/C”) from the direct current produced by the solar panels. The solar panels themselves are passive, direct current devices and do not produce sound. They are thus not considered as sources in this assessment.

The inverter units will typically operate during hours when daylight is available. However, the transformers will be energized throughout the 24 hour period. Since daylight can occur during some hours of the nighttime period (19:00 – 7:00), the facility was assumed to operate fully during both daytime (7:00 – 19:00) and nighttime hours (19:00 – 7:00). The facility will operate 7 days per week.



3 SOUND SOURCE SUMMARY

A Sound Source Summary is included as Table A1 in Appendix A, which lists the sources associated with the facility, in the standard format required by the MOE. Each noise source has been assigned an identification number of the form NS-## (e.g. NS-01).

Figure 3 shows the location of each source. The non-negligible sources of sound at the facility are described below.

3.1 Inverters

The site plan for the proposed development includes ten inverter collection houses which will be distributed throughout the site (NS-01 through NS-10). Each inverter collection house will include two 500 kW inverters. Sound emissions from the inverter collection houses were based on sound measurements of a single inverter unit provided by the proponent, included in Appendix C.

3.2 Transformers

Each inverter station will be accompanied by a small, 1 MVA transformer (NS-11 through NS-20), which step up the voltage of the generated power. The plant will also have one larger, 10 MVA, transformer (NS-21). Sound levels from all transformers were predicted based on NEMA sound ratings for transformers and unit dimensions. A typical shape of the frequency spectrum was utilized according to [4]. These calculations, as well as respective sound data and transformer dimensions are included in Appendix C.

The sound power levels for the sources outlined above were used to develop the sound source inventory included as Table A1 in Appendix A, and was input to a predictive computer model (see Appendix D) to quantify the sound emissions of the facility during a predictable worst case hour of operation. For the purposes of this assessment, all sources were assumed to operate 24 hours per day, seven days per week.

4 POINT OF RECEPTION SUMMARY

The sixty-five key receptors chosen to represent the residential dwellings surrounding the site are

shown as locations R01 through R65 in Figure 2.

Each dwelling was assumed to be a two-storey structure, with the respective points of reception representing an upper storey window. In general, upper storey windows are the most potentially impacted point on the properties since they are most exposed to elevated sources at the subject site and benefit least from ground absorption. Where vacant lots were identified, the future location of the assumed dwelling was taken to be a location that would reasonably be expected to contain the dwelling based on the typical building pattern. The selected points of reception are described briefly in Table A3, the Acoustic Assessment Summary Table.

5 ASSESSMENT CRITERIA

The area surrounding the subject facility is a “Rural” (Class 3) acoustical environment. Accordingly, the relevant document for defining the applicable sound level limits is MOE guidelines NPC-232 [5]. The details by which the applicable sound level limits were established for the assessment of this facility are provided in Appendix E. For the purposes of this assessment, the applicable sound level criterion at all locations is 40 dBA. This limit is included in Table A3 of Appendix A.

Some types of sound have a special quality which may tend to increase their audibility and potential for disturbance or annoyance. For tonal sound, MOE guidelines [6] stipulate that a penalty of 5 dBA is to be added to the measured source level. A tonal sound is defined as one which has a “pronounced audible tonal quality such as a whine, screech, buzz or hum”. A/C transformers and inverters typically exhibit a humming character at twice the line frequency (120 Hz) and harmonics thereof, as a result of magnetostrictive forces in the windings and semiconductors. In the subsequent analysis, a tonal penalty has been applied to the sound of all sources.

6 IMPACT ASSESSMENT

The predictive analysis indicates that the sound levels will be in the range of 23 to 38 dBA at all identified points of reception. These levels are within the applicable sound level limit.

The results of the analysis are summarized in Table A3 and are shown graphically in Figure 4.

Details of the prediction methods are summarized in Appendix D, and sample calculation results are included as Appendices F and G.

7 CONCLUSIONS

The acoustical analysis indicates that the predicted sound levels of the Hamilton Solar Farm will be within the applicable sound level limits specified in MOE guideline NPC-205, during all hours of the day and night, under typical “predictable worst case” operating conditions at all identified off-site receptor locations.



REFERENCES

1. Ontario Ministry of Environment Publication NPC-233, *Information to be Submitted for Approval of Stationary Sources of Sound*, October, 1995.
2. Ontario Ministry of Environment Guide, *Supporting Information for the Preparation of an Acoustic Assessment Report*, November, 2003.
3. Environmental Protection Act, *ONTARIO REGULATION 359/09*, October 1, 2009.
4. Crocker, Malcolm, J., *Sound Power Level Predictions for Industrial Machinery*, In *Encyclopedia of Acoustics* (Vol. 2, pp. 1049 - 1057), John Wiley & Sons, Inc., 1997.
5. Ontario Ministry of the Environment Publication NPC-232, *Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)*, October, 1995.
6. Ontario Ministry of the Environment Publication NPC-104, *Sound Level Adjustments*, August, 1978.
7. International Organization for Standardization, *Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation*, ISO-9613-2, Switzerland, 1996.
8. Google Maps Aerial Imagery, Internet application: maps.google.com





Figure 1: Location Map

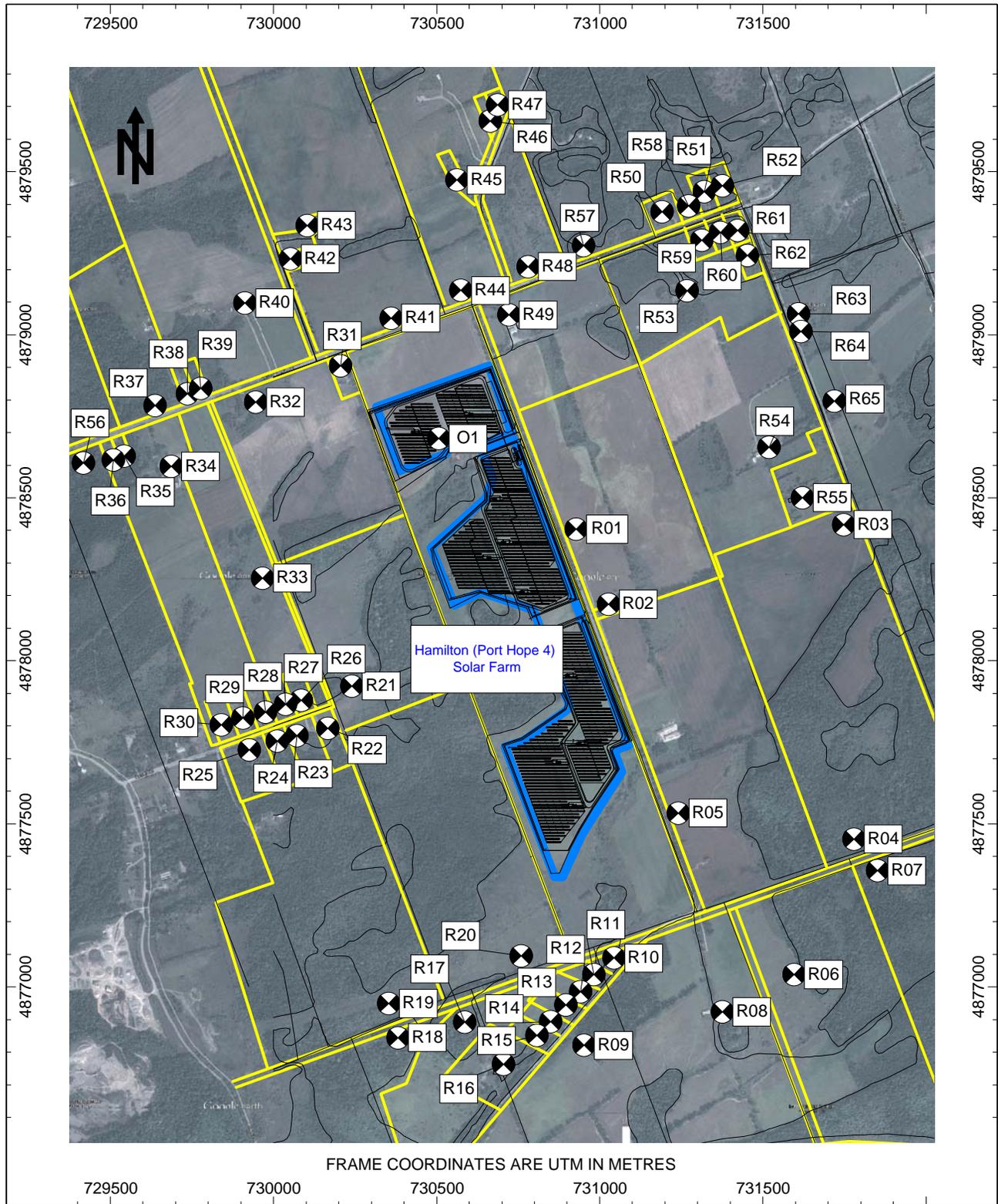


Figure 2: Locations of Points of Reception
Hamilton (Port Hope 4) Solar Farm

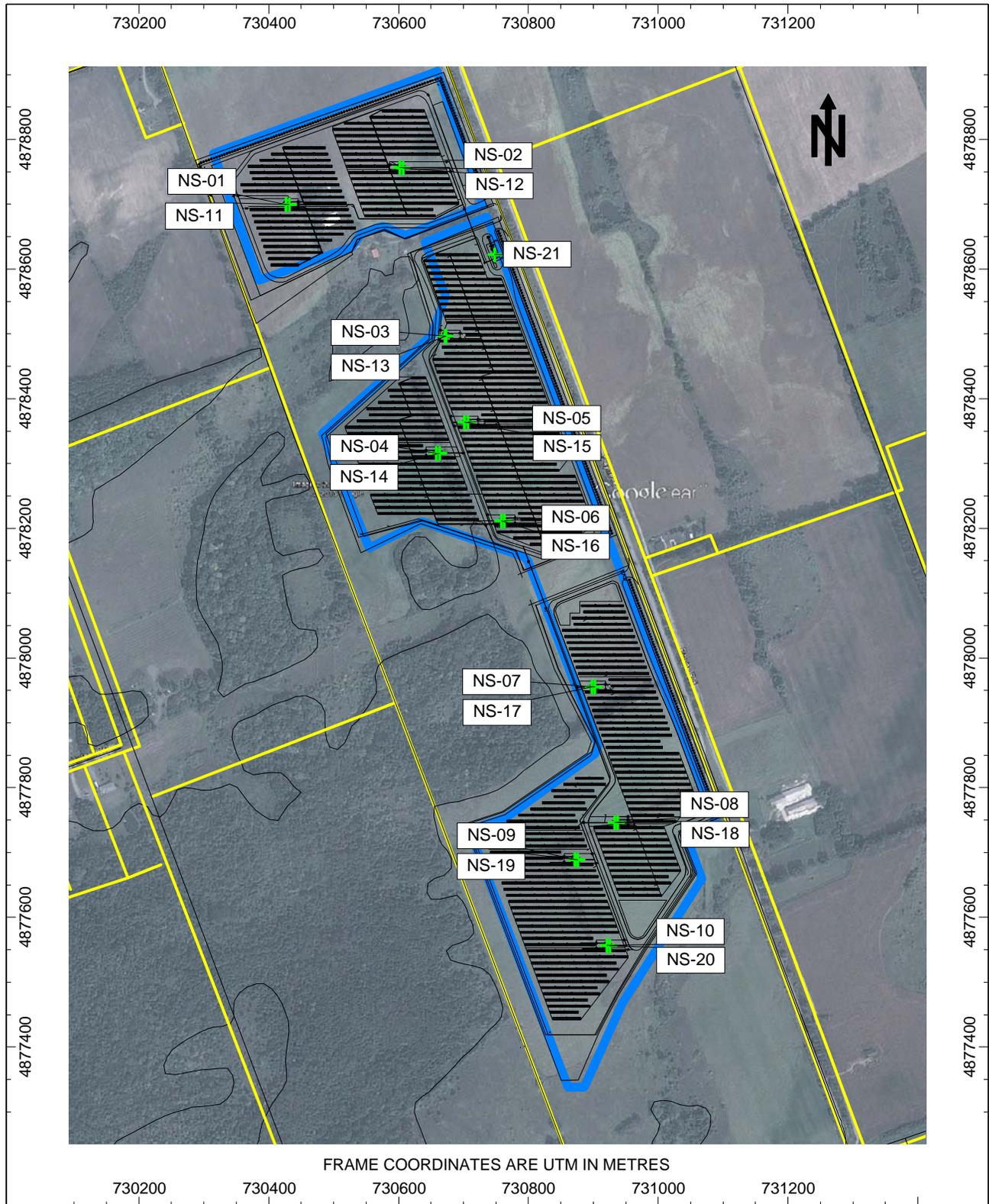


Figure 3: Locations of Sound Sources
Hamilton (Port Hope 4) Solar Farm

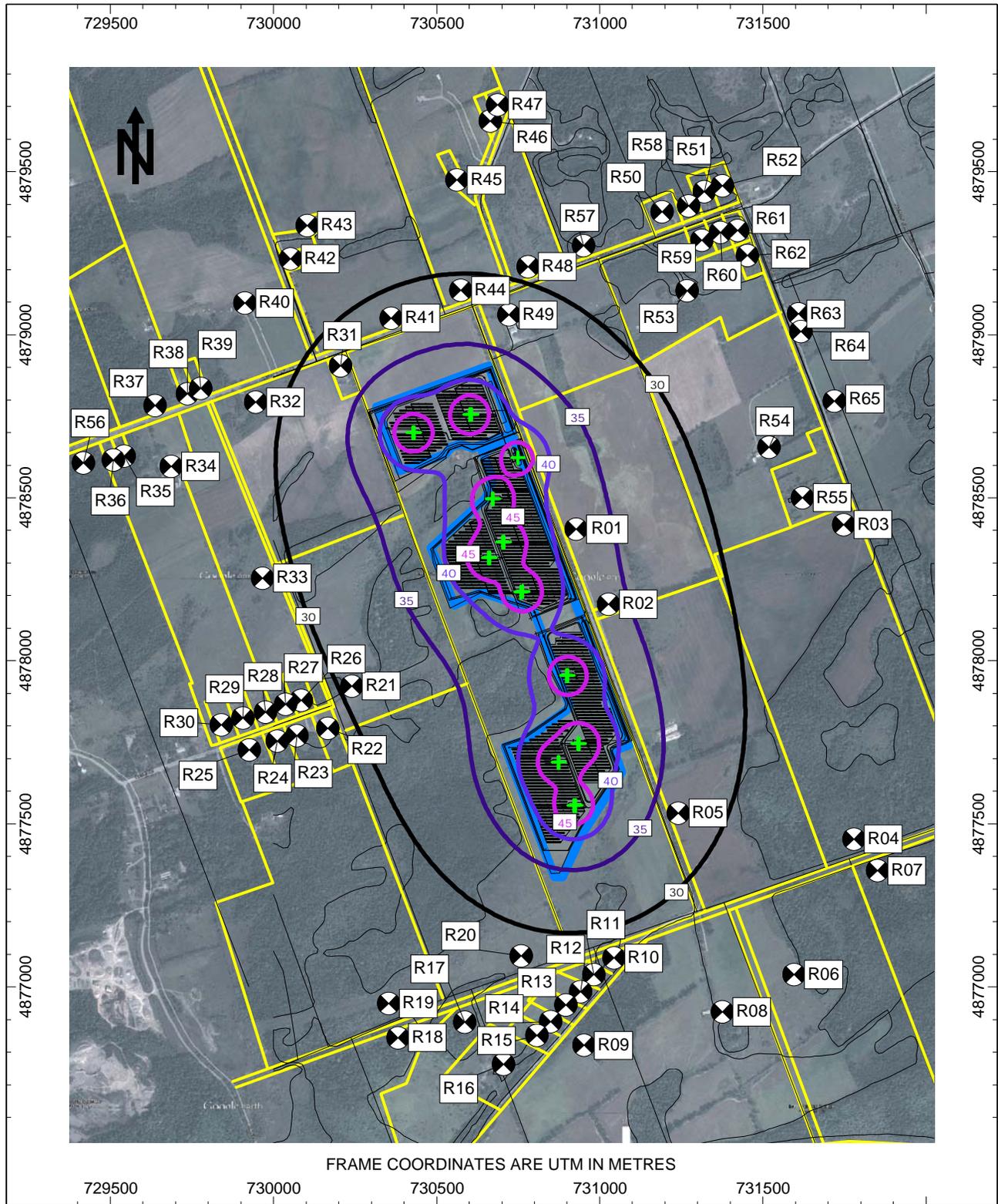


Figure 4: Sound Level Contours Leq (dBA)
 Predicted at 4.5 m Above Grade
 Hamilton (Port Hope 4) Solar Farm

APPENDIX A

Acoustic Assessment Summary Tables



ACOUSTICS



NOISE



VIBRATION

ACOUSTIC ASSESSMENT SUMMARY TABLES VERSION CONTROL

Penn Energy – Hamilton_Port Hope-4 Solar Farm, 2700 Payne Road,
Township of Hamilton, Northumberland County, Ontario

Ver.	Date	Issued as Part of AAR?	Version Description	Prepared By
1.0	July 7, 2011	Y	Original version of tables as part of Ver. 1 of Acoustic Assessment Report	P. Chocensky
2.0	December 7, 2011	Y	Updated version of tables as part of Ver. 2 of Acoustic Assessment Report	P. Chocensky
3.0	August 28, 2013	Y	Updated version of tables as part of Ver. 3 of Acoustic Assessment Report	P. Chocensky



ACOUSTICS



NOISE



VIBRATION

Table A1: Noise Source Summary Table

Source ID	Source Description	UTM Coordinates [m]		Sound Power Level [dBA re 10 ⁻¹² W]	Source Location	Sound Characteristic	Noise Control Measure
		Easting	Northing				
NS-01	Inverter	730427	4878699	91	O	S,T	U
NS-02	Inverter	730602	4878756	91	O	S,T	U
NS-03	Inverter	730671	4878496	91	O	S,T	U
NS-04	Inverter	730658	4878316	91	O	S,T	U
NS-05	Inverter	730706	4878364	91	O	S,T	U
NS-06	Inverter	730763	4878212	91	O	S,T	U
NS-07	Inverter	730903	4877955	91	O	S,T	U
NS-08	Inverter	730937	4877746	91	O	S,T	U
NS-09	Inverter	730871	4877689	91	O	S,T	U
NS-10	Inverter	730921	4877557	91	O	S,T	U
NS-11	Transformer 1 MV	730432	4878699	69	O	S,T	U
NS-12	Transformer 1 MV	730607	4878756	69	O	S,T	U
NS-13	Transformer 1 MV	730673	4878496	69	O	S,T	U
NS-14	Transformer 1 MV	730663	4878316	69	O	S,T	U
NS-15	Transformer 1 MV	730702	4878364	69	O	S,T	U
NS-16	Transformer 1 MV	730759	4878212	69	O	S,T	U
NS-17	Transformer 1 MV	730898	4877955	69	O	S,T	U
NS-18	Transformer 1 MV	730933	4877747	69	O	S,T	U
NS-19	Transformer 1 MV	730876	4877689	69	O	S,T	U
NS-20	Transformer 1 MV	730926	4877556	69	O	S,T	U
NS-21	Transformer 10 MV	730748	4878623	88	O	S,T	U

Legend**Sound Characteristics**

S: Steady
 Q: Quasi-steady impulsive
 I: Impulsive
 B: Buzzing
 T: Tonal (includes 5 dBA penalty)
 C: Cyclically varying
 O: Occasional

Noise Control Measures

S: Silencer, Acoustic Louvre, Muffler
 A: Acoustic Lining, Plenum
 B: Barrier, Berm, Screening
 L: Lagging (Acoustical Wrapping)
 E: Acoustic Enclosure
 O: Other
 U: Currently Uncontrolled

Source Location

O: Outdoors
 I: Indoors



ACOUSTICS



NOISE



VIBRATION

Table A2: Point of Reception Noise Impact Table

Source ID	Source Name	Point of Reception									
		R01		R02		R03		R04		R05	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	581	22	799	19	1350	13	1839	9	1423	12
NS-02	Inverter	479	24	722	20	1194	14	1756	9	1380	12
NS-03	Inverter	272	30	481	24	1079	15	1521	11	1119	15
NS-04	Inverter	283	29	396	26	1093	15	1414	12	976	16
NS-05	Inverter	224	31	373	27	1042	16	1407	12	988	16
NS-06	Inverter	252	30	267	30	1005	16	1268	13	830	18
NS-07	Inverter	450	25	252	30	963	17	1010	16	541	23
NS-08	Inverter	658	21	436	25	1052	16	891	17	371	27
NS-09	Inverter	717	20	509	23	1139	15	937	17	401	26
NS-10	Inverter	848	18	626	21	1194	14	864	18	321	28
NS-11	Transformer 1 MV	577	2	795	--	1345	--	1835	--	1420	--
NS-12	Transformer 1 MV	475	3	718	--	1189	--	1752	--	1377	--
NS-13	Transformer 1 MV	270	9	480	3	1077	--	1520	--	1118	--
NS-14	Transformer 1 MV	278	8	391	5	1089	--	1410	--	973	--
NS-15	Transformer 1 MV	229	10	377	6	1047	--	1410	--	991	--
NS-16	Transformer 1 MV	255	9	272	9	1010	--	1271	--	833	--
NS-17	Transformer 1 MV	450	4	254	9	967	--	1014	--	544	2
NS-18	Transformer 1 MV	658	0	437	4	1056	--	895	--	375	6
NS-19	Transformer 1 MV	717	--	508	3	1136	--	933	--	397	5
NS-20	Transformer 1 MV	848	--	626	1	1191	--	859	--	316	7
NS-21	Transformer 10 MV	282	28	529	22	1020	15	1558	10	1196	13

Source ID	Source Name	Point of Reception									
		R06		R07		R08		R09		R10	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	2031	7	1958	8	2013	8	1951	8	1725	10
NS-02	Inverter	1985	8	1876	9	1989	8	1967	8	1726	10
NS-03	Inverter	1727	10	1641	10	1723	10	1699	10	1457	12
NS-04	Inverter	1585	11	1531	11	1567	11	1525	11	1287	13
NS-05	Inverter	1596	11	1525	11	1588	11	1563	11	1319	13
NS-06	Inverter	1439	12	1384	12	1427	12	1404	12	1158	14
NS-07	Inverter	1149	14	1122	15	1135	15	1136	15	878	18
NS-08	Inverter	967	16	993	16	932	17	926	17	667	21
NS-09	Inverter	974	16	1034	16	916	17	872	18	625	21
NS-10	Inverter	851	18	951	17	779	19	737	20	484	24
NS-11	Transformer 1 MV	2029	--	1954	--	2011	--	1950	--	1724	--
NS-12	Transformer 1 MV	1982	--	1872	--	1987	--	1966	--	1724	--
NS-13	Transformer 1 MV	1726	--	1639	--	1723	--	1699	--	1456	--
NS-14	Transformer 1 MV	1582	--	1527	--	1564	--	1523	--	1285	--
NS-15	Transformer 1 MV	1599	--	1528	--	1590	--	1564	--	1321	--
NS-16	Transformer 1 MV	1442	--	1388	--	1429	--	1405	--	1159	--
NS-17	Transformer 1 MV	1152	--	1126	--	1137	--	1136	--	879	--
NS-18	Transformer 1 MV	970	--	998	--	934	--	926	--	667	0
NS-19	Transformer 1 MV	970	--	1030	--	914	--	872	--	624	1
NS-20	Transformer 1 MV	847	--	947	--	776	--	736	--	482	3
NS-21	Transformer 10 MV	1797	9	1679	9	1811	9	1813	9	1562	10



ACOUSTICS



NOISE



VIBRATION

Source ID	Source Name	Point of Reception									
		R11		R12		R13		R14		R15	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	1752	9	1789	9	1817	9	1854	9	1886	8
NS-02	Inverter	1760	9	1803	9	1836	9	1879	8	1916	8
NS-03	Inverter	1491	11	1535	11	1569	11	1612	10	1650	10
NS-04	Inverter	1319	13	1360	13	1393	12	1435	12	1472	12
NS-05	Inverter	1354	13	1398	12	1433	12	1477	12	1515	11
NS-06	Inverter	1194	14	1239	14	1275	13	1321	13	1361	12
NS-07	Inverter	920	17	970	16	1011	16	1062	15	1107	15
NS-08	Inverter	710	20	761	19	804	19	857	18	904	17
NS-09	Inverter	660	21	707	20	745	19	795	19	839	18
NS-10	Inverter	522	23	571	22	613	22	666	21	714	20
NS-11	Transformer 1 MV	1750	--	1788	--	1816	--	1853	--	1885	--
NS-12	Transformer 1 MV	1758	--	1801	--	1835	--	1878	--	1915	--
NS-13	Transformer 1 MV	1491	--	1534	--	1568	--	1612	--	1650	--
NS-14	Transformer 1 MV	1317	--	1359	--	1392	--	1434	--	1471	--
NS-15	Transformer 1 MV	1355	--	1399	--	1433	--	1477	--	1516	--
NS-16	Transformer 1 MV	1195	--	1240	--	1275	--	1321	--	1361	--
NS-17	Transformer 1 MV	921	--	970	--	1011	--	1062	--	1107	--
NS-18	Transformer 1 MV	710	--	761	--	803	--	857	--	903	--
NS-19	Transformer 1 MV	660	0	706	--	745	--	795	--	840	--
NS-20	Transformer 1 MV	521	3	570	2	613	1	666	0	714	--
NS-21	Transformer 10 MV	1602	10	1648	10	1685	9	1731	9	1772	9

Source ID	Source Name	Point of Reception									
		R16		R17		R18		R19		R20	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	1957	8	1814	9	1856	9	1752	9	1639	10
NS-02	Inverter	1997	8	1864	9	1925	8	1825	9	1669	10
NS-03	Inverter	1735	10	1606	10	1677	10	1580	11	1404	12
NS-04	Inverter	1555	11	1426	12	1498	11	1401	12	1226	14
NS-05	Inverter	1602	11	1476	12	1554	11	1458	12	1270	13
NS-06	Inverter	1451	12	1331	13	1420	12	1328	13	1117	15
NS-07	Inverter	1209	14	1109	15	1227	14	1146	15	872	18
NS-08	Inverter	1012	16	924	17	1059	15	988	16	676	20
NS-09	Inverter	942	17	846	18	976	16	903	17	605	22
NS-10	Inverter	823	18	744	19	893	17	831	18	489	24
NS-11	Transformer 1 MV	1957	--	1814	--	1856	--	1752	--	1638	--
NS-12	Transformer 1 MV	1996	--	1864	--	1925	--	1825	--	1668	--
NS-13	Transformer 1 MV	1735	--	1606	--	1678	--	1580	--	1404	--
NS-14	Transformer 1 MV	1555	--	1426	--	1498	--	1402	--	1225	--
NS-15	Transformer 1 MV	1602	--	1476	--	1553	--	1457	--	1270	--
NS-16	Transformer 1 MV	1451	--	1331	--	1419	--	1326	--	1117	--
NS-17	Transformer 1 MV	1208	--	1107	--	1225	--	1144	--	871	--
NS-18	Transformer 1 MV	1010	--	922	--	1057	--	986	--	674	--
NS-19	Transformer 1 MV	943	--	848	--	979	--	906	--	605	1
NS-20	Transformer 1 MV	824	--	745	--	896	--	834	--	490	3
NS-21	Transformer 10 MV	1861	8	1738	9	1815	9	1719	9	1528	11



ACOUSTICS



NOISE



VIBRATION

Source ID	Source Name	Point of Reception									
		R21		R22		R23		R24		R25	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	799	19	943	17	995	16	1033	16	1095	15
NS-02	Inverter	909	17	1057	15	1120	15	1164	14	1233	14
NS-03	Inverter	718	20	866	18	941	17	993	16	1072	15
NS-04	Inverter	575	22	718	20	801	19	857	18	941	17
NS-05	Inverter	642	21	786	19	869	18	925	17	1008	16
NS-06	Inverter	598	22	729	20	820	18	880	18	968	16
NS-07	Inverter	664	21	754	19	850	18	913	17	1003	16
NS-08	Inverter	719	20	772	19	865	18	926	17	1012	16
NS-09	Inverter	674	21	713	20	803	19	862	18	946	17
NS-10	Inverter	774	19	791	19	875	18	930	17	1009	16
NS-11	Transformer 1 MV	800	--	944	--	996	--	1035	--	1097	--
NS-12	Transformer 1 MV	911	--	1059	--	1122	--	1166	--	1235	--
NS-13	Transformer 1 MV	719	--	867	--	943	--	995	--	1073	--
NS-14	Transformer 1 MV	578	2	721	--	805	--	861	--	944	--
NS-15	Transformer 1 MV	639	1	783	--	865	--	921	--	1005	--
NS-16	Transformer 1 MV	594	1	725	--	816	--	876	--	964	--
NS-17	Transformer 1 MV	659	0	749	--	846	--	909	--	998	--
NS-18	Transformer 1 MV	715	--	768	--	861	--	921	--	1007	--
NS-19	Transformer 1 MV	678	--	717	--	808	--	867	--	951	--
NS-20	Transformer 1 MV	778	--	795	--	880	--	935	--	1014	--
NS-21	Transformer 10 MV	865	17	1013	15	1088	14	1139	14	1217	13

Source ID	Source Name	Point of Reception									
		R26		R27		R28		R29		R30	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	889	17	920	17	967	16	1018	16	1071	15
NS-02	Inverter	1019	16	1054	16	1107	15	1163	14	1220	14
NS-03	Inverter	851	18	894	17	954	17	1018	16	1082	15
NS-04	Inverter	721	20	767	19	830	18	898	17	966	17
NS-05	Inverter	788	19	834	18	897	17	964	17	1032	16
NS-06	Inverter	756	19	804	19	869	18	940	17	1009	16
NS-07	Inverter	821	18	870	18	933	17	1004	16	1073	15
NS-08	Inverter	863	18	908	17	966	17	1033	16	1099	15
NS-09	Inverter	809	19	853	18	908	17	974	16	1038	16
NS-10	Inverter	896	17	937	17	987	16	1049	16	1109	15
NS-11	Transformer 1 MV	891	--	922	--	970	--	1020	--	1074	--
NS-12	Transformer 1 MV	1021	--	1057	--	1110	--	1165	--	1223	--
NS-13	Transformer 1 MV	853	--	895	--	955	--	1019	--	1084	--
NS-14	Transformer 1 MV	725	--	771	--	834	--	902	--	970	--
NS-15	Transformer 1 MV	785	--	830	--	893	--	961	--	1028	--
NS-16	Transformer 1 MV	751	--	800	--	865	--	935	--	1005	--
NS-17	Transformer 1 MV	816	--	865	--	928	--	999	--	1068	--
NS-18	Transformer 1 MV	858	--	904	--	961	--	1029	--	1094	--
NS-19	Transformer 1 MV	813	--	858	--	913	--	978	--	1042	--
NS-20	Transformer 1 MV	901	--	941	--	992	--	1053	--	1113	--
NS-21	Transformer 10 MV	996	15	1038	15	1097	14	1159	14	1223	13



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Source ID	Source Name	Point of Reception									
		R31		R32		R33		R34		R35	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	302	29	490	24	640	21	748	19	887	17
NS-02	Inverter	423	25	657	21	810	18	930	17	1068	15
NS-03	Inverter	619	21	784	19	745	19	990	16	1137	15
NS-04	Inverter	742	19	858	18	694	20	1012	16	1159	14
NS-05	Inverter	737	20	874	18	748	19	1046	16	1194	14
NS-06	Inverter	889	17	1003	16	797	19	1143	15	1290	13
NS-07	Inverter	1178	14	1272	13	982	16	1375	12	1518	11
NS-08	Inverter	1370	12	1442	12	1095	15	1512	11	1650	10
NS-09	Inverter	1386	12	1441	12	1066	15	1492	11	1628	10
NS-10	Inverter	1526	11	1575	11	1181	14	1614	10	1746	9
NS-11	Transformer 1 MV	305	8	495	3	644	0	752	--	892	--
NS-12	Transformer 1 MV	428	4	663	0	814	--	935	--	1073	--
NS-13	Transformer 1 MV	621	1	786	--	747	--	992	--	1139	--
NS-14	Transformer 1 MV	746	--	862	--	699	--	1016	--	1164	--
NS-15	Transformer 1 MV	734	--	870	--	743	--	1042	--	1189	--
NS-16	Transformer 1 MV	886	--	999	--	793	--	1139	--	1286	--
NS-17	Transformer 1 MV	1175	--	1269	--	977	--	1371	--	1514	--
NS-18	Transformer 1 MV	1367	--	1439	--	1091	--	1508	--	1647	--
NS-19	Transformer 1 MV	1388	--	1444	--	1070	--	1496	--	1631	--
NS-20	Transformer 1 MV	1529	--	1578	--	1185	--	1618	--	1750	--
NS-21	Transformer 10 MV	611	20	821	17	864	17	1062	15	1206	13

Source ID	Source Name	Point of Reception									
		R36		R37		R38		R39		R40	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	921	17	795	19	700	20	664	21	650	21
NS-02	Inverter	1102	15	966	17	867	18	829	18	769	19
NS-03	Inverter	1168	14	1074	15	988	16	957	17	968	16
NS-04	Inverter	1188	14	1123	15	1049	16	1023	16	1080	15
NS-05	Inverter	1224	14	1149	15	1071	15	1042	16	1081	15
NS-06	Inverter	1318	13	1263	13	1192	14	1167	14	1228	14
NS-07	Inverter	1542	11	1513	11	1451	12	1429	12	1512	11
NS-08	Inverter	1672	10	1663	10	1609	10	1591	11	1696	10
NS-09	Inverter	1648	10	1650	10	1601	11	1585	11	1704	10
NS-10	Inverter	1765	9	1776	9	1730	10	1716	10	1842	9
NS-11	Transformer 1 MV	926	--	800	--	705	--	669	0	654	0
NS-12	Transformer 1 MV	1107	--	971	--	873	--	834	--	774	--
NS-13	Transformer 1 MV	1170	--	1076	--	990	--	958	--	969	--
NS-14	Transformer 1 MV	1193	--	1128	--	1054	--	1028	--	1084	--
NS-15	Transformer 1 MV	1219	--	1145	--	1067	--	1038	--	1077	--
NS-16	Transformer 1 MV	1313	--	1259	--	1188	--	1163	--	1225	--
NS-17	Transformer 1 MV	1538	--	1509	--	1447	--	1426	--	1508	--
NS-18	Transformer 1 MV	1668	--	1660	--	1606	--	1588	--	1693	--
NS-19	Transformer 1 MV	1652	--	1653	--	1604	--	1588	--	1706	--
NS-20	Transformer 1 MV	1769	--	1780	--	1734	--	1720	--	1844	--
NS-21	Transformer 10 MV	1239	13	1123	14	1030	15	995	15	961	16



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Source ID	Source Name	Point of Reception									
		R41		R42		R43		R44		R45	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	358	27	651	21	714	20	460	25	787	19
NS-02	Inverter	381	26	727	20	764	19	380	26	719	20
NS-03	Inverter	636	21	962	17	1013	16	646	21	984	16
NS-04	Inverter	793	19	1098	15	1160	14	823	18	1162	14
NS-05	Inverter	769	19	1087	15	1144	15	783	19	1120	15
NS-06	Inverter	931	17	1244	14	1303	13	943	17	1278	13
NS-07	Inverter	1223	14	1535	11	1595	11	1225	14	1557	11
NS-08	Inverter	1426	12	1730	10	1795	9	1436	12	1768	9
NS-09	Inverter	1455	12	1748	9	1817	9	1477	12	1812	9
NS-10	Inverter	1596	11	1888	8	1958	8	1617	10	1951	8
NS-11	Transformer 1 MV	359	6	654	0	716	--	459	4	786	--
NS-12	Transformer 1 MV	385	5	731	--	768	--	381	6	720	--
NS-13	Transformer 1 MV	637	1	963	--	1014	--	647	0	984	--
NS-14	Transformer 1 MV	795	--	1102	--	1163	--	824	--	1163	--
NS-15	Transformer 1 MV	767	--	1085	--	1141	--	782	--	1119	--
NS-16	Transformer 1 MV	929	--	1241	--	1301	--	942	--	1278	--
NS-17	Transformer 1 MV	1221	--	1532	--	1593	--	1224	--	1556	--
NS-18	Transformer 1 MV	1424	--	1727	--	1793	--	1434	--	1767	--
NS-19	Transformer 1 MV	1456	--	1750	--	1819	--	1478	--	1813	--
NS-20	Transformer 1 MV	1598	--	1890	--	1960	--	1618	--	1953	--
NS-21	Transformer 10 MV	578	21	925	16	962	16	542	22	872	17

Source ID	Source Name	Point of Reception									
		R46		R47		R48		R49		R50	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	984	16	1039	16	620	21	466	24	1021	16
NS-02	Inverter	900	17	952	17	486	24	326	28	855	18
NS-03	Inverter	1158	14	1209	14	721	20	566	22	1023	16
NS-04	Inverter	1338	13	1389	12	901	17	747	19	1187	14
NS-05	Inverter	1291	13	1341	13	848	18	697	20	1123	15
NS-06	Inverter	1446	12	1495	11	997	16	850	18	1241	14
NS-07	Inverter	1716	10	1763	9	1260	13	1120	15	1451	12
NS-08	Inverter	1927	8	1974	8	1471	12	1332	13	1651	10
NS-09	Inverter	1976	8	2024	8	1523	11	1380	12	1718	10
NS-10	Inverter	2114	7	2161	7	1659	10	1517	11	1841	9
NS-11	Transformer 1 MV	983	--	1038	--	617	1	463	4	1018	--
NS-12	Transformer 1 MV	900	--	952	--	485	3	325	7	852	--
NS-13	Transformer 1 MV	1158	--	1209	--	720	--	566	2	1022	--
NS-14	Transformer 1 MV	1339	--	1389	--	901	--	747	--	1185	--
NS-15	Transformer 1 MV	1291	--	1341	--	849	--	697	--	1125	--
NS-16	Transformer 1 MV	1446	--	1495	--	997	--	849	--	1243	--
NS-17	Transformer 1 MV	1715	--	1763	--	1260	--	1120	--	1452	--
NS-18	Transformer 1 MV	1927	--	1974	--	1470	--	1331	--	1651	--
NS-19	Transformer 1 MV	1977	--	2025	--	1523	--	1380	--	1718	--
NS-20	Transformer 1 MV	2115	--	2162	--	1659	--	1518	--	1841	--
NS-21	Transformer 10 MV	1035	15	1084	14	587	21	439	24	875	17



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Source ID	Source Name	Point of Reception									
		R51		R52		R53		R54		R55	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	1159	14	1215	14	947	17	1093	15	1211	14
NS-02	Inverter	990	16	1044	16	766	19	922	17	1051	16
NS-03	Inverter	1144	15	1192	14	874	18	863	18	950	17
NS-04	Inverter	1302	13	1348	13	1020	16	925	17	980	16
NS-05	Inverter	1237	14	1282	13	953	17	863	18	925	17
NS-06	Inverter	1347	13	1388	12	1052	16	876	18	906	17
NS-07	Inverter	1541	11	1575	11	1235	14	933	17	902	17
NS-08	Inverter	1734	10	1766	9	1427	12	1079	15	1018	16
NS-09	Inverter	1806	9	1839	9	1499	11	1163	14	1105	15
NS-10	Inverter	1923	8	1954	8	1616	10	1251	13	1176	14
NS-11	Transformer 1 MV	1155	--	1211	--	943	--	1088	--	1206	--
NS-12	Transformer 1 MV	986	--	1041	--	761	--	917	--	1046	--
NS-13	Transformer 1 MV	1142	--	1191	--	872	--	861	--	948	--
NS-14	Transformer 1 MV	1300	--	1346	--	1017	--	921	--	976	--
NS-15	Transformer 1 MV	1239	--	1285	--	956	--	868	--	930	--
NS-16	Transformer 1 MV	1349	--	1390	--	1054	--	880	--	910	--
NS-17	Transformer 1 MV	1542	--	1576	--	1236	--	936	--	906	--
NS-18	Transformer 1 MV	1735	--	1767	--	1428	--	1082	--	1021	--
NS-19	Transformer 1 MV	1805	--	1838	--	1498	--	1161	--	1102	--
NS-20	Transformer 1 MV	1923	--	1954	--	1615	--	1249	--	1173	--
NS-21	Transformer 10 MV	996	15	1045	15	729	19	771	18	882	17

Source ID	Source Name	Point of Reception									
		R56		R57		R58		R59		R60	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	1013	16	776	19	1094	15	1064	15	1126	15
NS-02	Inverter	1194	14	623	21	925	17	888	17	949	17
NS-03	Inverter	1258	13	825	18	1080	15	1020	16	1075	15
NS-04	Inverter	1274	13	1000	16	1240	14	1173	14	1225	14
NS-05	Inverter	1311	13	941	17	1175	14	1106	15	1158	14
NS-06	Inverter	1402	12	1077	15	1287	13	1210	14	1258	13
NS-07	Inverter	1621	10	1319	13	1486	11	1396	12	1437	12
NS-08	Inverter	1746	9	1527	11	1682	10	1588	11	1626	10
NS-09	Inverter	1719	10	1586	11	1752	9	1660	10	1699	10
NS-10	Inverter	1834	9	1717	10	1871	9	1777	9	1813	9
NS-11	Transformer 1 MV	1018	--	773	--	1090	--	1060	--	1121	--
NS-12	Transformer 1 MV	1199	--	620	1	921	--	884	--	945	--
NS-13	Transformer 1 MV	1260	--	824	--	1079	--	1019	--	1074	--
NS-14	Transformer 1 MV	1279	--	999	--	1238	--	1170	--	1222	--
NS-15	Transformer 1 MV	1307	--	942	--	1178	--	1109	--	1161	--
NS-16	Transformer 1 MV	1398	--	1078	--	1289	--	1212	--	1260	--
NS-17	Transformer 1 MV	1617	--	1319	--	1487	--	1398	--	1438	--
NS-18	Transformer 1 MV	1742	--	1527	--	1683	--	1589	--	1627	--
NS-19	Transformer 1 MV	1723	--	1586	--	1751	--	1659	--	1698	--
NS-20	Transformer 1 MV	1838	--	1717	--	1871	--	1776	--	1813	--
NS-21	Transformer 10 MV	1330	12	681	19	933	16	874	17	930	16



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Source ID	Source Name	Point of Reception									
		R61		R62		R63		R64		R65	
		Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]	Dist [m]	LEQ [dBA]
NS-01	Inverter	1174	14	1162	14	1237	14	1230	14	1297	13
NS-02	Inverter	996	16	981	16	1053	16	1046	16	1118	15
NS-03	Inverter	1115	15	1081	15	1096	15	1076	15	1091	15
NS-04	Inverter	1262	13	1221	14	1209	14	1183	14	1165	14
NS-05	Inverter	1195	14	1154	14	1142	15	1116	15	1102	15
NS-06	Inverter	1290	13	1241	14	1200	14	1169	14	1121	15
NS-07	Inverter	1461	12	1401	12	1314	13	1274	13	1173	14
NS-08	Inverter	1647	10	1583	11	1478	11	1435	12	1309	13
NS-09	Inverter	1722	10	1660	10	1560	11	1517	11	1395	12
NS-10	Inverter	1834	9	1769	9	1657	10	1612	10	1475	12
NS-11	Transformer 1 MV	1170	--	1157	--	1232	--	1225	--	1292	--
NS-12	Transformer 1 MV	992	--	976	--	1048	--	1041	--	1113	--
NS-13	Transformer 1 MV	1114	--	1080	--	1094	--	1074	--	1089	--
NS-14	Transformer 1 MV	1259	--	1218	--	1205	--	1179	--	1160	--
NS-15	Transformer 1 MV	1198	--	1157	--	1146	--	1120	--	1106	--
NS-16	Transformer 1 MV	1292	--	1244	--	1203	--	1172	--	1125	--
NS-17	Transformer 1 MV	1463	--	1403	--	1317	--	1277	--	1176	--
NS-18	Transformer 1 MV	1648	--	1585	--	1480	--	1437	--	1312	--
NS-19	Transformer 1 MV	1720	--	1658	--	1558	--	1515	--	1392	--
NS-20	Transformer 1 MV	1833	--	1768	--	1655	--	1610	--	1473	--
NS-21	Transformer 10 MV	971	16	939	16	967	16	951	16	987	15

Note: Reported sound levels include all adjustment factors (time weighting, tonal penalty), as applicable.



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Table A3: Acoustic Assessment Summary Table

Point of Reception	Point of Reception Description	UTM Coordinates [m]		Sound Level at Point of Reception, LEQ [dBA]	Verified by Acoustic Audit	Performance Limit, LEQ [dBA]	Compliance with Performance Limit
		Eastings	Northing				
R01	Vacant Lot	730927	4878404	38	No	40	Yes
R02	Residential Dwelling	731028	4878173	36	No	40	Yes
R03	Vacant Lot	731747	4878418	26	No	40	Yes
R04	Vacant Lot	731779	4877454	25	No	40	Yes
R05	Vacant Lot	731241	4877533	33	No	40	Yes
R06	Vacant Lot	731596	4877038	24	No	40	Yes
R07	Vacant Lot	731851	4877356	24	No	40	Yes
R08	Residential Dwelling	731375	4876923	24	No	40	Yes
R09	Vacant Lot	730952	4876821	25	No	40	Yes
R10	Vacant Lot	731044	4877088	28	No	40	Yes
R11	Vacant Lot	730981	4877038	28	No	40	Yes
R12	Vacant Lot	730942	4876986	27	No	40	Yes
R13	Vacant Lot	730896	4876944	26	No	40	Yes
R14	Vacant Lot	730850	4876894	26	No	40	Yes
R15	Vacant Lot	730808	4876852	25	No	40	Yes
R16	Vacant Lot	730705	4876762	24	No	40	Yes
R17	Residential Dwelling	730586	4876893	25	No	40	Yes
R18	Vacant Lot	730382	4876844	24	No	40	Yes
R19	Vacant Lot	730354	4876949	24	No	40	Yes
R20	Vacant Lot	730759	4877095	28	No	40	Yes
R21	Residential Dwelling	730240	4877923	31	No	40	Yes
R22	Residential Dwelling	730167	4877793	29	No	40	Yes
R23	Residential Dwelling	730072	4877770	28	No	40	Yes
R24	Residential Dwelling	730012	4877753	27	No	40	Yes
R25	Residential Dwelling	729926	4877726	26	No	40	Yes
R26	Residential Dwelling	730085	4877879	28	No	40	Yes
R27	Residential Dwelling	730037	4877866	28	No	40	Yes
R28	Residential Dwelling	729976	4877843	27	No	40	Yes
R29	Residential Dwelling	729907	4877824	26	No	40	Yes
R30	Residential Dwelling	729840	4877804	26	No	40	Yes
R31	Residential Dwelling	730206	4878904	32	No	40	Yes
R32	Residential Dwelling	729946	4878793	29	No	40	Yes
R33	Residential Dwelling	729967	4878254	29	No	40	Yes
R34	Residential Dwelling	729686	4878596	26	No	40	Yes
R35	Residential Dwelling	729542	4878628	24	No	40	Yes
R36	Residential Dwelling	729509	4878616	24	No	40	Yes
R37	Residential Dwelling	729637	4878783	25	No	40	Yes
R38	Residential Dwelling	729737	4878819	26	No	40	Yes
R39	Residential Dwelling	729777	4878835	26	No	40	Yes
R40	Residential Dwelling	729913	4879097	26	No	40	Yes
R41	Vacant Lot	730361	4879051	32	No	40	Yes
R42	Residential Dwelling	730053	4879233	26	No	40	Yes
R43	Residential Dwelling	730103	4879335	26	No	40	Yes
R44	Vacant Lot	730575	4879136	31	No	40	Yes
R45	Residential Dwelling	730562	4879475	26	No	40	Yes
R46	Residential Dwelling	730665	4879655	24	No	40	Yes
R47	Residential Dwelling	730688	4879705	23	No	40	Yes
R48	Vacant Lot	730780	4879209	29	No	40	Yes
R49	Residential Dwelling	730721	4879060	32	No	40	Yes
R50	Residential Dwelling	731190	4879378	25	No	40	Yes
R51	Residential Dwelling	731320	4879438	24	No	40	Yes
R52	Residential Dwelling	731377	4879457	23	No	40	Yes
R53	Residential Dwelling	731268	4879135	26	No	40	Yes
R54	Residential Dwelling	731519	4878655	27	No	40	Yes
R55	Residential Dwelling	731622	4878501	27	No	40	Yes
R56	Vacant Lot	729418	4878607	23	No	40	Yes
R57	Vacant Lot	730950	4879273	27	No	40	Yes



ACOUSTICS



NOISE



VIBRATION

Point of Reception	Point of Reception Description	UTM Coordinates [m]		Sound Level at Point of Reception, LEQ [dBA]	Verified by Acoustic Audit	Performance Limit, LEQ [dBA]	Compliance with Performance Limit
		Easting	Northing				
R58	Vacant Lot	731272	4879394	24	No	40	Yes
R59	Residential Dwelling	731313	4879289	25	No	40	Yes
R60	Residential Dwelling	731370	4879314	24	No	40	Yes
R61	Residential Dwelling	731423	4879320	24	No	40	Yes
R62	Residential Dwelling	731453	4879244	24	No	40	Yes
R63	Residential Dwelling	731609	4879064	24	No	40	Yes
R64	Residential Dwelling	731616	4879011	24	No	40	Yes
R65	Residential Dwelling	731720	4878796	25	No	40	Yes



ACOUSTICS



NOISE



VIBRATION

APPENDIX B

Zoning Maps



ACOUSTICS



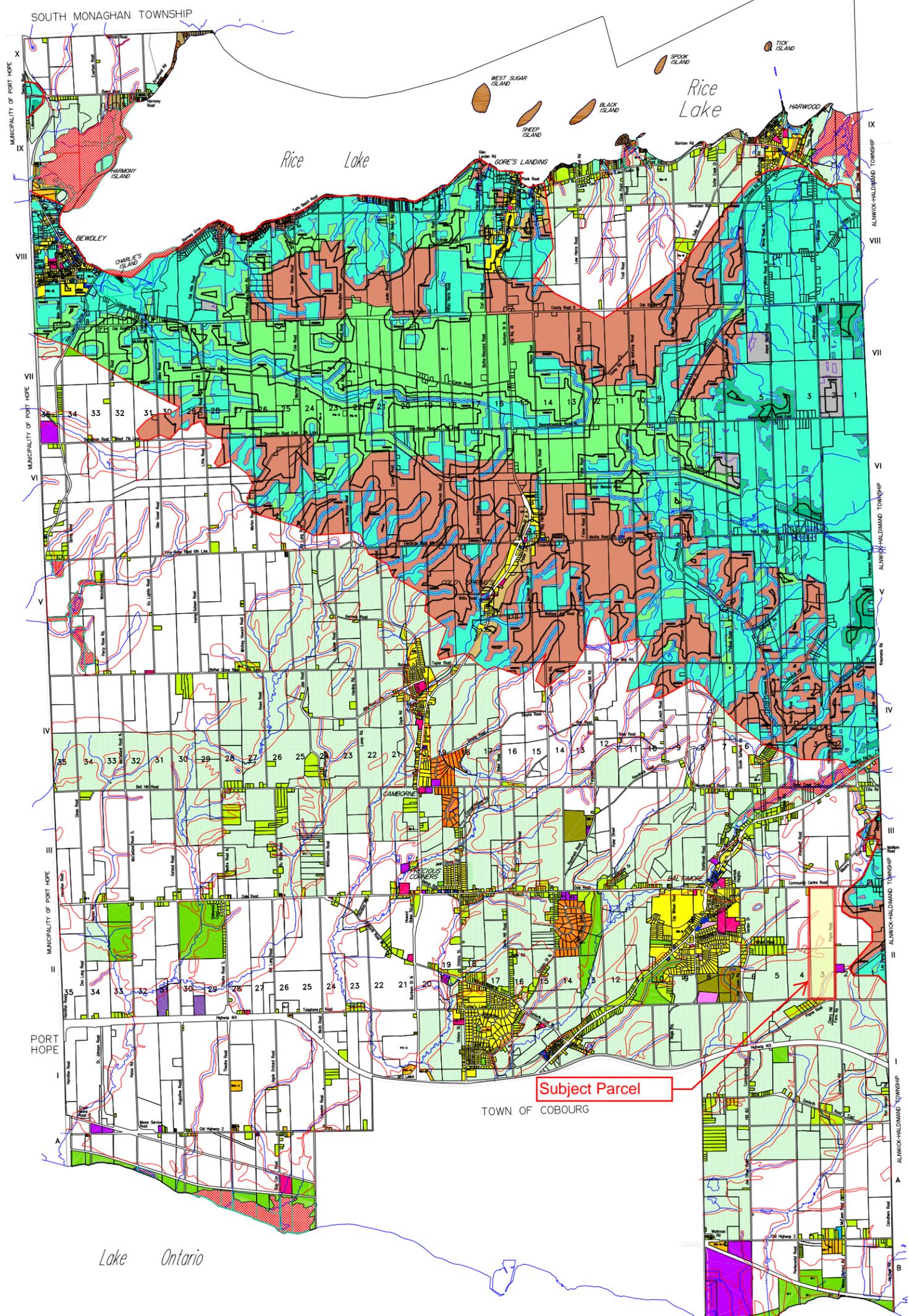
NOISE



VIBRATION

TOWNSHIP OF HAMILTON

Schedule A to Zoning By-law No. 2001-58 as amended



Lands Rezoned per By-Law 2004-22

■	LAND TO BE ZONED OAK RIDGES MORaine CORE
■	LAND TO BE ZONED OAK RIDGES MORaine LINKAGE
■	LAND TO BE ZONED OAK RIDGES MORaine COUNTRYSIDE
■	LAND TO BE ZONED OAK RIDGES MORaine RURAL SETTLEMENT
■	LAND TO BE ZONED OAK RIDGES MORaine MINERAL EXTRACTIVE
■	LAND TO BE ZONED OAK RIDGES MORaine ENVIRONMENTAL
—	OAK RIDGES MORaine BOUNDARY (AS PER OAK RIDGES MORaine CONSERVATION PLAN)
—	OAK RIDGES MORaine ENVIRONMENTAL PLAN REVIEW (ORMEPR)

Lands Zoned per By-Law 2001-58

■	PERMANENT AGRICULTURAL ZONE (PA)	■	RURAL HIGHWAY COMMERCIAL ZONE (RHC)
■	MARGINAL AGRICULTURAL ZONE (MA)	■	WATERFRONT/RESORT COMMERCIAL ZONE (WRC)
■	ESTATE RESIDENTIAL ZONE (ER)	■	HAMLET COMMERCIAL ZONE (HC)
■	RURAL RESIDENTIAL ZONE (RR)	■	RURAL INDUSTRIAL ZONE (RI)
■	LIMITED SERVICE RESIDENTIAL ZONE (LSR)	■	HAMLET INDUSTRIAL ZONE (HI)
■	WATERFRONT RESIDENTIAL ZONE (WR)	■	MINERAL EXTRACTIVE "B" ZONE (MEXB)
■	LAND TO BE ZONED OAK RIDGES MORaine ENVIRONMENTAL	■	WASTE DISPOSAL ZONE (WD)
■	MOBILE HOME RESIDENTIAL ZONE (MHR)	■	COMMUNITY FACILITY ZONE (CF)
■	URBAN RESIDENTIAL FIRST DENSITY ZONE (UR1)	■	OPEN SPACE ZONE (OS)
■	URBAN RESIDENTIAL SECOND DENSITY ZONE (UR2)	■	ENVIRONMENTAL PROTECTION-WETLAND ZONE (EP-W)
■	URBAN MULTIPLE RESIDENTIAL ZONE (UMR)	■	ENVIRONMENTALLY SENSITIVE AREAS
■	RURAL COMMERCIAL ZONE (RC)	■	AREAS OF NATURAL AND SCIENTIFIC INTEREST



SCALE: SEE SCALE BAR PLOT: N/A JOB NO.: 06508-1
 DESIGN: B.D.B./H.R. CHECKED: B.D.B.
 DRAWN: M.W./C.S. DATE: MAR/07 DWG. HAMILTON ZB - A-1

Hamilton\ZB\07\HamiltonZB-A-1_Mar12_07.dwg
 Plotted: Mar_07



APPENDIX C

Equipment Sound Data



ACOUSTICS



NOISE



VIBRATION

Table 1: AEI Solaron 500 Sound Power Measurements – Calculated Sound Power Levels in dB, re: 1x10⁻¹² W

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

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

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

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

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



SMALL POWER TRANSFORMERS
SOUTH BOSTON, VA.

FULL LOAD KVA

10000	KNAN
8000	KNAN
7000	KNAN
5000	KNAN

NUMBER OF RADIATOR
BANKS IN SERVICE

4.0
3.0
2.0
1.0

RISE OVER AMBIENT LIMITED TO 65 DEGREE C.

CALCULATED SOUND LEVEL 63.0 DB

CALCULATED EFFICIENCY AND LOSSES

% LOAD	% EFFICENCY	NO-LOAD LOSS	LOAD LOSS	TOTAL LOSS
25	99.51	9731	2459	12190
50	99.61	9731	9849	19580
75	99.58	9731	22149	31880
100	99.51	9731	39379	49110
125	99.43	9731	61529	71260

INSTRUCTION BOOK PC-1002 MFR ID 1LUS SERIAL BS41456 - #### MANUFACTURE DATE ##/##

UNIT 001
UNIT 002
UNIT 003

PROJECT NAME GLENGARRY 1 PV SOLAR
PROJECT NAME HAMILTON SOLAR SITE
PROJECT NAME EDWARDSBURGH SOLAR 1

MFR. ID	SHOP ORDER
1LUS	BS41456
MFR. ID	DRAWING #
1LUS	BS41456N1

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.

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							
N.P.DRAFT. DRAFT. ENGINEER	DATE	N.P.DRAFT. DRAFT. ENGINEER	DATE	N.P.DRAFT. DRAFT. ENGINEER	DATE	N.P.DRAFT. DRAFT. ENGINEER	DATE
	03/20/13						

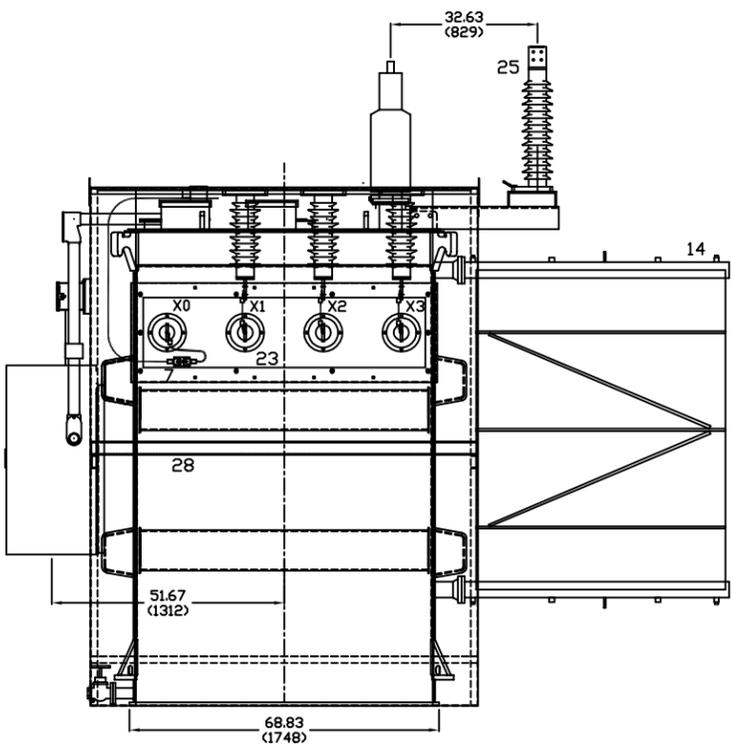
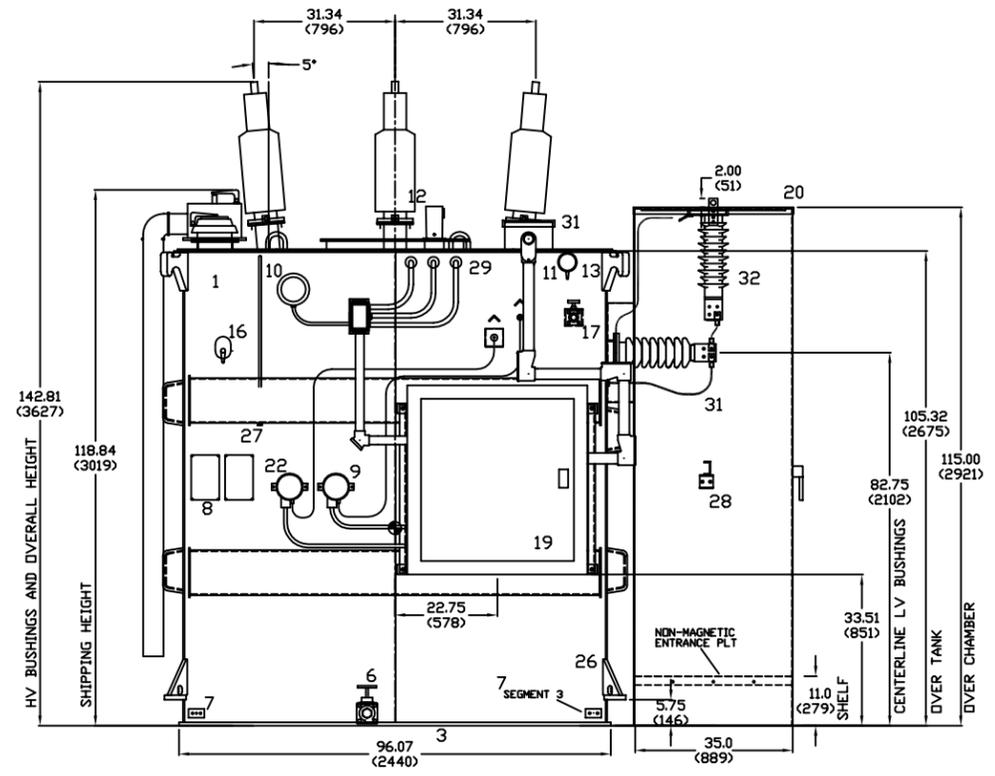
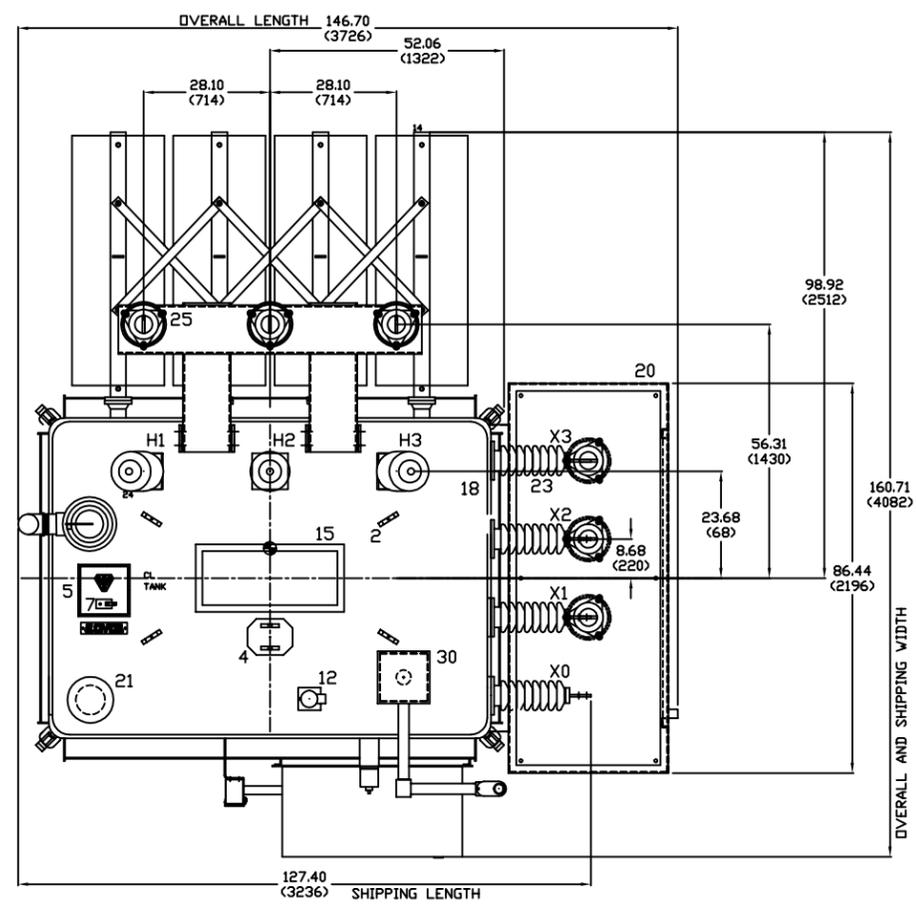
IT	CHANGE
2	REVISED PER CUSTOMER COMMENTS ADDED CT FEEDTHRU R. HAILLEY 2/11/13 M. CLARK 2/11/13
3	ADDED LV ARRESTERS REVISED PER CUSTOMER COMMENTS R. HAILLEY 3/18/13 M. CLARK 3/18/13

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

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: BS4145601-24-1.
FOR GASKETS ONLY PLACE A 'G' IN FRONT OF OUTLINE NUMBER
EXAMPLE: GBS4145601-24-1. (ONE GASKET)
EXAMPLE: GBS4145601 (ALL GASKETS)

APPROXIMATE NET WEIGHTS

CORE AND COILS -----	33222 LBS. (15069 KGS.)
TANK AND FITTINGS -----	13981 LBS. (6342 KGS.)
LIQUID - NATURAL ESTER FLUID - 2366 GAL. (8956 LITRES)	17979 LBS. (8155 KGS.)
TOTAL WEIGHT -----	65182 LBS. (29566 KGS.)
APPROXIMATE TRANSFORMER SHIPPING WEIGHT -----	65182 LBS. (29566 KGS.)
COOLER LIQUID TOTAL -- 218 GAL. (825 LITRES) -	1657 LBS. (752 KGS.)
MAXIMUM COOLER ASSEMBLY WEIGHT EACH -----	1441 LBS. (654 KGS.)
(COOLER WEIGHTS ARE INCLUDED IN TANK AND FITTINGS WEIGHT)	
(COOLER LIQUID WEIGHT IS INCLUDED IN LIQUID WEIGHT)	
LV CHAMBER WEIGHT -----	745 LBS. (338 KGS.)



- ITEM
- 1 SEALED TANK - BRACED FOR 15 PSI (103 KP) - 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 EXTERNAL CORE GROUND
 - 6 2.0 (51) DRAIN VALVE/LOWER FILTER PRESS WITH .38 (7) SAMPLER.
 - 7 GROUND PADS METRIC STAINLESS STEEL - 2 HOLE NEMA DRILLING - 04 TOTAL.
 - 8 STAINLESS STEEL NAMEPLATES 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 SEALED AIR VALVE.
 - 12 RAPID PRESSURE RISE RELAY.
 - 13 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 20.5 INCH (521) REMOVABLE GALVANIZED PANEL COOLERS - 04 TOTAL.
 - 15 BOLTED MANHOLE - 12.00 (305) X 30.00 (762) OPENING, WITH CORTITE GASKET.
 - 16 DE-ENERGIZED TAP CHANGER - WITH .38 HOLE FOR PADLOCKING.
 - 17 1.0 (25) VALVE WITH .38 (10) SAMPLER FOR UPPER FILTER PRESS CONNECTION.
 - 18 RELIEF DEVICE WITH 4 INCH (102) DIRECTIONAL SHIELD AND SEMAPHORE OVER A 7.00 INCH (178) HANDHOLE.
 - 19 CONTROL CABINET.
 - ** 20 LV FREE STANDING BOTTOM ENTRANCE AIR TERMINAL CHAMBER WITH PADLOCKABLE DOOR, AND NON-MAGNETIC ENTRANCE PLATE.
 - 21 PROCESSING PORT FOR MANUFACTURING.
 - 22 REMOTE HOT SPOT WINDING TEMPERATURE INDICATOR WITH ALARMS.
 - 23 LV BUSHING WARCO STYLE NUMBER 41A5681-LV 17.38 (441) CL TO CL - SEE DETAIL 23
 - ** 24 HV BUSHING STYLE 5028C99H05 31.34 (796) CL TO CL - SEE DETAIL 24
 - ** 25 48 KV HV ARRESTERS - 3 TOTAL - STYLE NO. Q048SA039A.
 - 26 JACKING PROVISIONS ON TANK FOR JACKING COMPLETE UNIT
 - 27 AUXILIARY GAS SPACE IN BRACES-REMOVE DRAIN PLUG, DRAIN FRONT & REAR, THEN REPLACE DRAIN PLUG BEFORE ENERGIZING UNIT.
 - 28 LV CABLE SUPPORTS
 - 29 LV CT FEEDTHRU - 03 TOTAL
 - 30 HV CT FEEDTHRU BOX
 - 31 X0 BUSHING GROUND CABLE
 - ** 32 24 KV LV ARRESTERS - 3 TOTAL - STYLE NO. Q024SA019A.

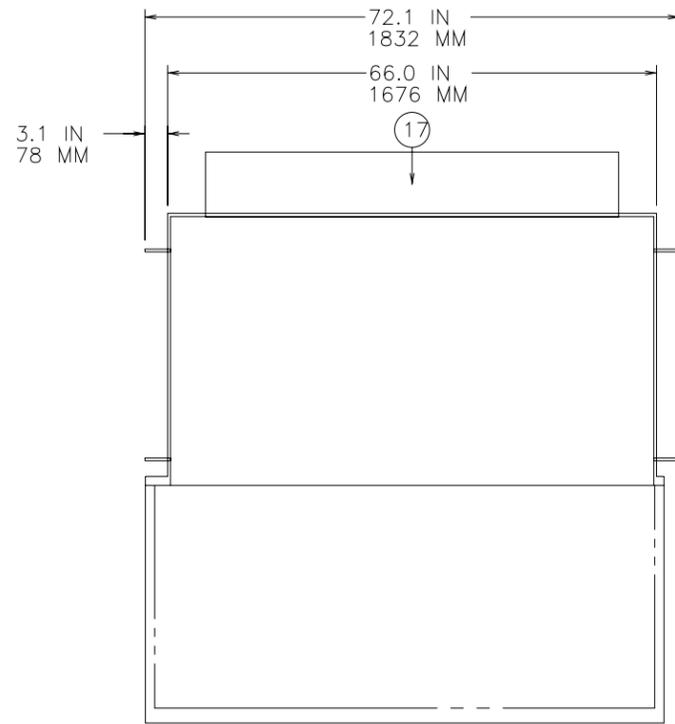
** ITEMS ARE REMOVED FOR SHIPMENT

NOTES:
CONDUIT IS GALVANIZED STEEL RIGID WITH SHORT RUNS OF FLEX
NON-SKID PAINT ON COVER
TANK BASE PLUS 2 INCHES UP THE SIDE OF UNIT IS UNDERCOATED
ALL HARDWARE IS STAINLESS STEEL WITH SILICONE BRONZE NUTS
BUSHING IDENTIFICATION STENCILED ON UNIT

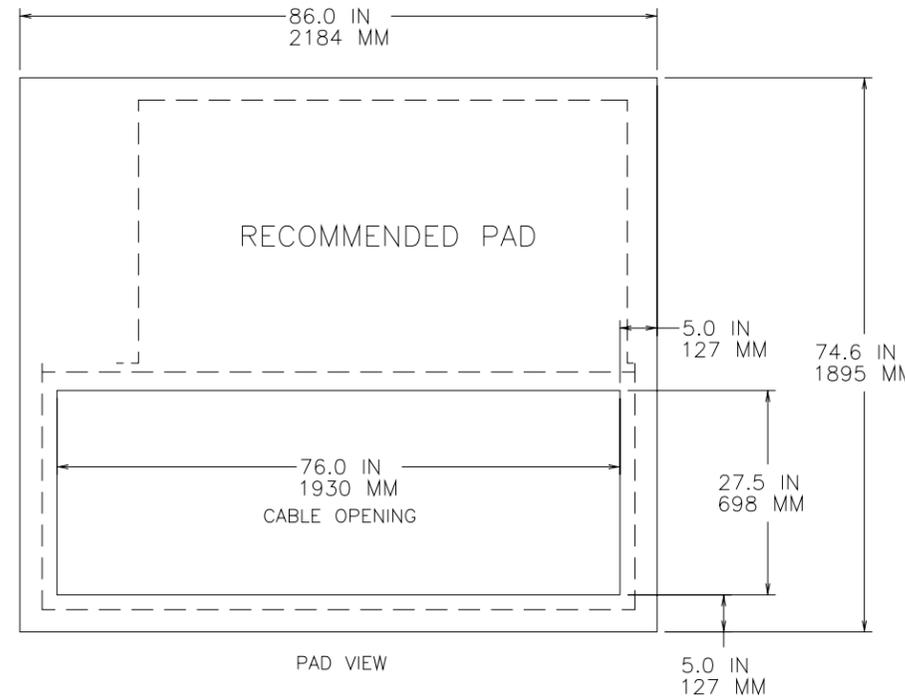
● DESIGNATES CENTER OF GRAVITY COMPLETE FROM GROUND IN FRONT VIEW 43.835(1113) LEFT OF CENTERLINE TOP VIEW .018(0) ABOVE CENTERLINE TOP VIEW 6.618(168)	TEMP RISE	KNAN KVA -
	65° C	10000
DESIGN IMPEDANCE 7.500 %		
PROJECT NAME: GLENGARRY 1 PV SOLAR	HV 250 KV BIL LV 200 KV BIL	CLASS KNAN OUTDOOR
PROJECT NAME: HAMILTON SOLAR SITE	APPARATUS SUBSTATION TRANSFORMER	60 HERTZ 10000 KVA HV 44000-DELTA LV 27600Y/15935 3 PH
PROJECT NAME: EDWARDSBURGH SOLAR 1	DFTM Mark Clark 02/06/13 CHKD R.Hailley 02/06/13 APPD	DRAWING NUMBER ILUSBS4145601 PC-1002
	SMALL POWER TRANSFORMER	DIMENSIONS IN INCHES-SCALE NTS



THIS OUTLINE IS FOR ERECTION OR MOUNTING PURPOSES. IT IS NOT TO SCALE AND SHOULD NOT BE REGARDED AS INDICATING THE EXACT DETAILS OF CONSTRUCTION.

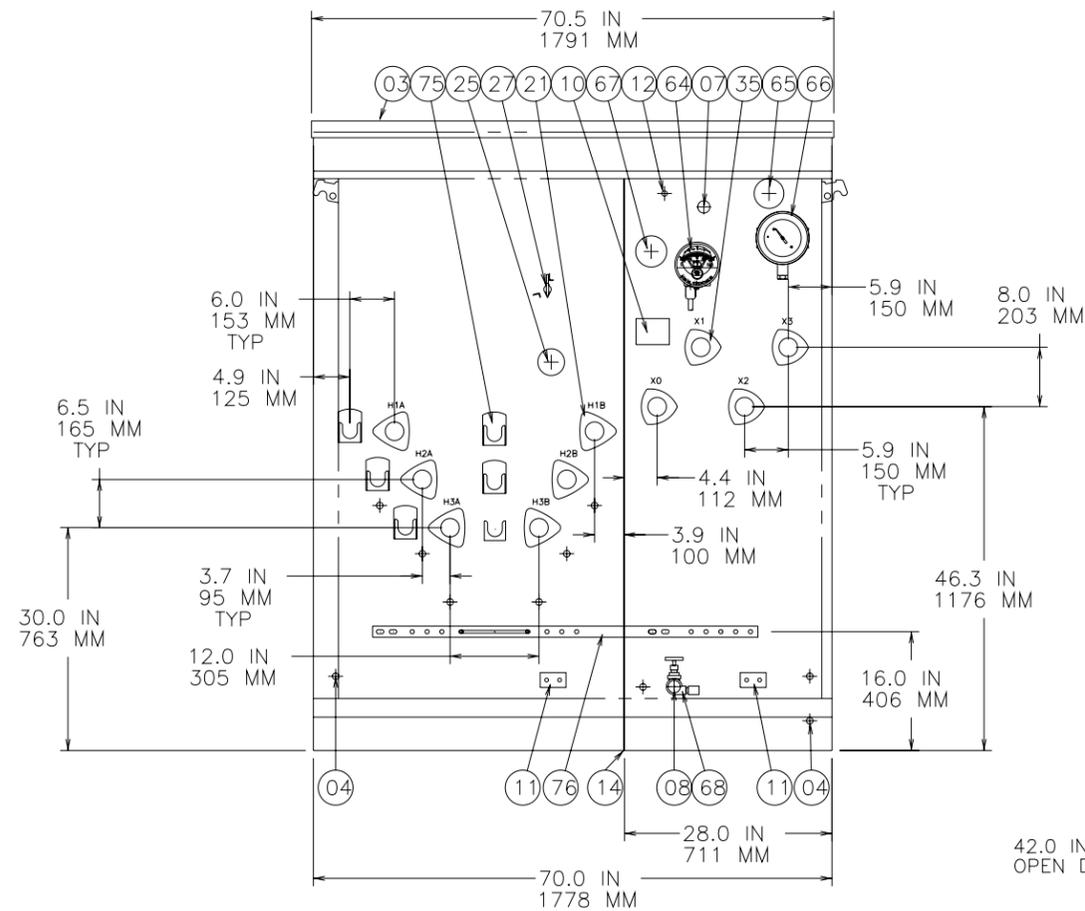


TOP VIEW

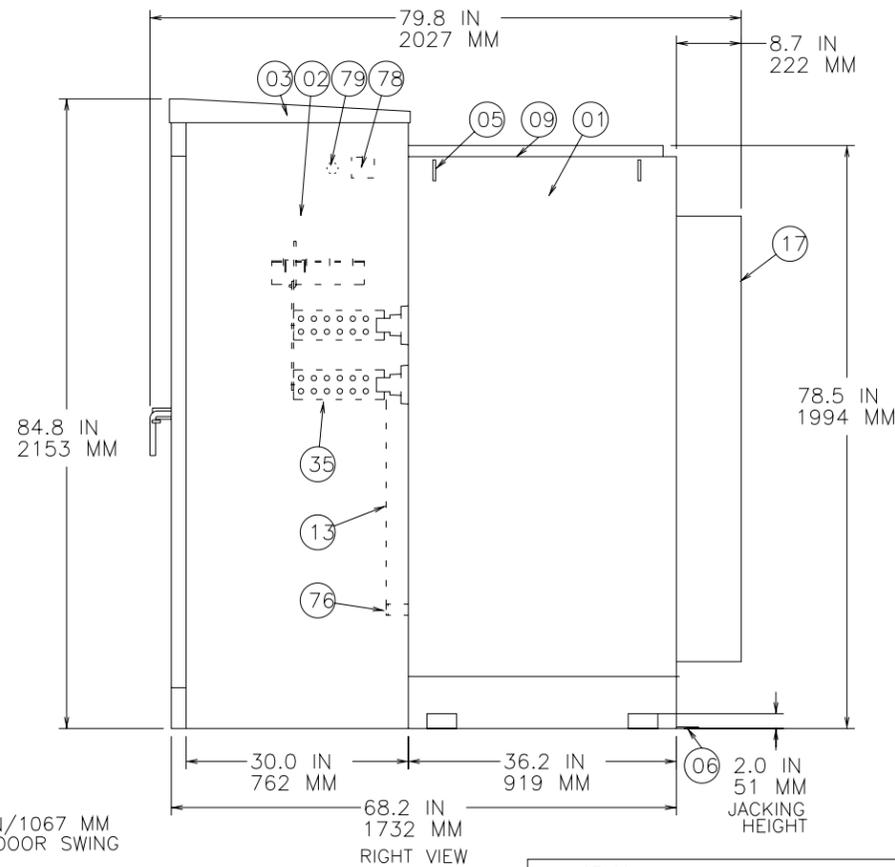


PAD VIEW

- 01 TANK
- 02 CABINET BOLTED-ON, REMOVABLE SILLS, OPEN BOTTOM 1.25 INCH FLANGE, HINGED LIFT-OFF DOOR, PROVISION FOR PADLOCK, STOP IN OPEN POSITION.
- 03 HINGED WEATHER COVER
- 04 TANK TO CABINET GROUND
- 05 LIFTING HOOKS, 4 TOTAL
- 06 SHIPPING BRACKETS
- 07 1 INCH SST FILL VALVE W/PLUG
- 08 1 INCH DRAIN PLUG
- 09 HANDHOLE, 15 INCH X 24 INCH, BOLTED-ON COVER
- 10 NAMEPLATE MOUNTED ON TANK WALL
- 11 GROUND PAD
- 12 PRESSURE RELIEF DEVICE
- 13 LV NEUTRAL GROUNDING STRAP
- 14 STEEL HIGH-LOW BARRIER WITH INSULATING BARRIER ON HIGH & LOW VOLTAGE SIDES
- 17 REAR COOLER
- 21 HIGH VOLTAGE INTEGRAL NON-LOADBREAK BUSHING - 35 KV 150 BIL COOPER PS CATALOG # 2637459C01
- 25 TAP CHANGER
- 27 LBOR TRANSFORMER SWITCH WITH PADLOCKING PROVISION FOR OPEN & CLOSED POSITIONS
- 35 LOW VOLTAGE BUSHING WITH 12 HOLE SPADES (SUPPORTED)
- 64 WINDING TEMPERATURE INDICATOR WITH THREE SETS OF CONTACTS
- 65 PRESSURE VACUUM GAUGE WITH TWO SETS OF CONTACTS
- 66 OIL LEVEL GAUGE WITH TWO SETS OF CONTACTS
- 67 THERMOMETER WITH TWO SETS OF CONTACTS
- 68 DRAIN VALVE WITH SAMPLER
- 75 PARKING STAND
- 76 GROUND BUS- COPPER BAR WITH ELEVEN .56 DIA HOLES
- 78 EXTERNAL ID TAG (LEFT SIDE)
- 79 PCB FREE DECAL (LEFT SIDE)



FRONT VIEW SHOWN WITHOUT DOORS



RIGHT VIEW

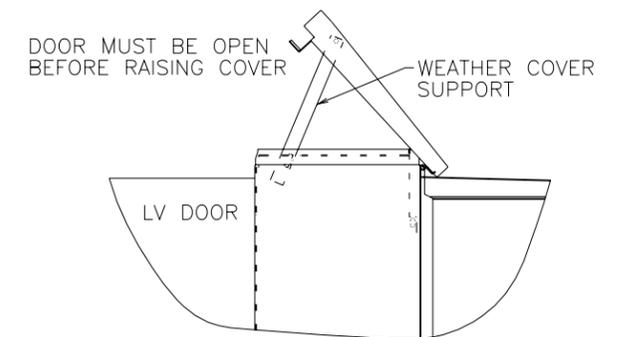


ABB INC.			REV NO
TITLE	OL3PPADMNT	DEF XXX FIN XX U7M XX NOTE XX	02
DES	3PH OUTLINE		USER GUESTA
DIMENSIONS IN INCHES-SCALE		.1	CADAM 686080511NNMNBZSL02,1
S.GUERRANT	121112	APPD XXXXX	MDDYY
D SPEC	N9307	APPD	J801BZSL
ENG. REF	XXXXXX	686089400511NNMNN01,1	
ENGINEERING DEPT.	JEFFERSON CITY, MO.		USA

REV DATA	KVA	1000	H.V.	27600
			L.V.	480Y/277
	02	ARRESTERS WERE ELASTIMOLD 375ESA-27 FIG. 7 INTERFACE SWG 12-12-12		

42.0 IN/1067 MM OPEN DOOR SWING

2.0 IN 51 MM JACKING HEIGHT

Transformer 10 MV

NEMA (Nr)									63	MV:	10			
										10*logS:	19.6	a	b	H
Correction	3	5	0	0	-6	-11	-16	-23	A	S:	91.0	4.326	4.682	3.927
Lw	85.6	87.6	82.6	82.6	76.6	71.6	66.6	59.6	83.0					

Transformer 1 MV

NEMA (Nr)									48.5	MV:	1			
										10*logS:	15.1	a	b	H
Correction	3	5	0	0	-6	-11	-16	-23	A	S:	32.4	2.432	2.784	2.453
Lw	66.6	68.6	63.6	63.6	57.6	52.6	47.6	40.6	64.0					



ACOUSTICS



NOISE



VIBRATION

APPENDIX D

Details of Predictive Acoustical Modelling



ACOUSTICS



NOISE



VIBRATION

The predictive model used for this Assessment (*Cadna-A version 4.3.143*) is based on the methods from ISO Standard 9613-2.2 “Acoustics - Attenuation of Sound During Propagation Outdoors” [7], which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures (or by topography and foliage where applicable). This modeling technique is acceptable to the MOE.

Although the subject site and surrounding area include significant terrain features, the area was modelled as flat ground, for conservatism. Ground attenuation was assumed to be spectral for all sources, with the ground factor (G) assumed to be 0.7 in all areas. The temperature and relative humidity were assumed to be 10° C and 70%, respectively.

The predictive modelling considered one order of reflection, with both on-site and off-site shielding/reflections afforded by buildings, walls, etc., with spectral absorptive characteristics applied to structures as appropriate, typically with values representative of corrugated metal or concrete block. No credit has been assumed in the model for self-shielding of the sources on site by the arrays of solar panels themselves. In this regard the predictions are conservative (i.e., may tend to overpredict the sound levels slightly).

All mechanical sources were modeled as point sources of sound and are shown as crosses in Figures 3 and 4.

APPENDIX E

Acoustic Assessment Criteria



ACOUSTICS



NOISE



VIBRATION

The MOE noise assessment guidelines draw a distinction between sound produced by traffic sources and that produced by industrial or commercial activities, which are classified as *stationary sources of sound*. In essence, the sound from the stationary sources is evaluated against (i.e. compared to) the typical background sound at any potentially impacted, sound-sensitive points of reception (e.g., residences). Background sound is considered to include road traffic sound and other typical sounds, but excludes the sound of the facility under assessment. MOE Publication NPC-232, “Sound Level Limits for Stationary Sources in Class 3 Areas (Rural),” is a guideline for developing applicable sound level limits. In general, the acceptability limits for stationary sources are site dependent, and are based on the existing ambient background sound levels in the area of the subject site.

MOE Publication NPC-232 states that the sound level limit for a stationary source that operates during daytime and nighttime hours in a Class 3 (rural) environment is the lower of the minimum one-hour L_{EQ} ambient (background) sound level or the minimum one-hour ninetieth percentile L_{90} sound level plus 10 dB (i.e. $L_{90} + 10$ dB) at any potentially impacted residential point of reception. In addition, NPC-232 also states exclusionary minimum limits of 45 dBA during daytime hours (07:00 – 19:00) and 40 dBA during nighttime hours (19:00 – 07:00).

Based on the rural nature of the area surrounding the subject site, background sound levels are expected to fall below the exclusionary minimum limits stipulated in NPC-232 during the quietest hours of the day and night. Given that the equipment at the subject facility will be energized during the day and night with steady sound emissions when daylight conditions allow, the most stringent nighttime criterion of 40 dBA is the applicable sound level limit at all points of reception.



ACOUSTICS



NOISE



VIBRATION

APPENDIX F

Sample Calculation Results - Condensed, Overall dBA Format

In the following tables of calculation results, the column headings for the various sound attenuation mechanisms follow the terminology of ISO Standard 9613-2. L_x is the A-weighted, one-hour energy-equivalent (or logarithmic-mean impulse) source sound power level, which includes the effects of any source-abatement measures included in the model, and any time-averaging effects for intermittent sources. L_r is the A-weighted, one-hour energy-equivalent (or logarithmic-mean impulse) sound level at the point of reception. The results are presented in terms of overall A-weighted results, at the most impacted off-site point of reception.



ACOUSTICS



NOISE



VIBRATION

R01 Vacant Lot		730927	4878404	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	66.3	0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	22	
NS-02	Inverter	730602	4878757	201.5	91	64.6	0	0.0	0.9	0.0	1.7	0.0	0.0	0.0	0.0	24	
NS-03	Inverter	730671	4878497	201.5	91	59.7	0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	30	
NS-04	Inverter	730658	4878317	201.5	91	60.0	0	0.0	0.8	0.0	1.2	0.0	0.0	0.0	0.0	29	
NS-05	Inverter	730707	4878364	201.5	91	58.0	0	0.0	0.9	0.0	1.0	0.0	0.0	0.0	0.0	31	
NS-06	Inverter	730763	4878212	201.5	91	59.0	0	0.0	0.9	0.0	1.1	0.0	0.0	0.0	0.0	30	
NS-07	Inverter	730903	4877955	201.5	91	64.1	0	0.0	0.9	0.0	1.7	0.0	0.0	0.0	0.0	25	
NS-08	Inverter	730937	4877747	201.5	91	67.4	0	0.0	1.0	0.0	2.2	0.0	0.0	0.0	0.0	21	
NS-09	Inverter	730871	4877689	201.5	91	68.1	0	0.0	1.1	0.0	2.3	0.0	0.0	0.0	0.0	20	
NS-10	Inverter	730921	4877557	201.5	91	69.6	0	0.0	1.2	0.0	2.6	0.0	0.0	0.0	0.0	18	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	66.2	0	0.0	-0.4	0.0	1.6	0.0	0.0	0.0	0.0	2	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	64.6	0	0.0	-0.4	0.0	1.4	0.0	0.0	0.0	0.0	3	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	59.6	0	0.0	-0.2	0.0	0.9	0.0	0.0	0.0	0.0	9	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	59.9	0	0.0	-0.2	0.0	0.9	0.0	0.0	0.0	0.0	8	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	58.2	0	0.0	-0.1	0.0	0.8	0.0	0.0	0.0	0.0	10	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	59.2	0	0.0	-0.1	0.0	0.8	0.0	0.0	0.0	0.0	9	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	64.1	0	0.0	-0.4	0.0	1.3	0.0	0.0	0.0	0.0	4	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	67.4	0	0.0	-0.4	0.0	1.8	0.0	0.0	0.0	0.0	0	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	68.1	0	0.0	-0.4	0.0	1.9	0.0	0.0	0.0	0.0	--	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	69.6	0	0.0	-0.4	0.0	2.2	0.0	0.0	0.0	0.0	--	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	60.0	0	0.0	-0.5	0.0	0.9	0.0	0.0	0.0	0.0	28	

R02 Residential Dwelling		731028	4878174	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	69.1	0	0.0	1.1	0.0	2.5	0.0	0.0	0.0	0.0	19	
NS-02	Inverter	730602	4878757	201.5	91	68.2	0	0.0	1.1	0.0	2.3	0.0	0.0	0.0	0.0	20	
NS-03	Inverter	730671	4878497	201.5	91	64.6	0	0.0	0.9	0.0	1.7	0.0	0.0	0.0	0.0	24	
NS-04	Inverter	730658	4878317	201.5	91	63.0	0	0.0	0.8	0.0	1.5	0.0	0.0	0.0	0.0	26	
NS-05	Inverter	730707	4878364	201.5	91	62.5	0	0.0	0.8	0.0	1.4	0.0	0.0	0.0	0.0	27	
NS-06	Inverter	730763	4878212	201.5	91	59.5	0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	30	
NS-07	Inverter	730903	4877955	201.5	91	59.0	0	0.0	0.9	0.0	1.1	0.0	0.0	0.0	0.0	30	
NS-08	Inverter	730937	4877747	201.5	91	63.8	0	0.0	0.9	0.0	1.6	0.0	0.0	0.0	0.0	25	
NS-09	Inverter	730871	4877689	201.5	91	65.1	0	0.0	0.9	0.0	1.8	0.0	0.0	0.0	0.0	23	
NS-10	Inverter	730921	4877557	201.5	91	66.9	0	0.0	1.0	0.0	2.1	0.0	0.0	0.0	0.0	21	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	69.0	0	0.0	-0.4	0.0	2.1	0.0	0.0	0.0	0.0	--	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	68.1	0	0.0	-0.4	0.0	2.0	0.0	0.0	0.0	0.0	--	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	64.6	0	0.0	-0.4	0.0	1.4	0.0	0.0	0.0	0.0	3	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	62.9	0	0.0	-0.3	0.0	1.2	0.0	0.0	0.0	0.0	5	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	62.5	0	0.0	-0.3	0.0	1.2	0.0	0.0	0.0	0.0	6	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	59.7	0	0.0	-0.2	0.0	0.9	0.0	0.0	0.0	0.0	9	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	59.1	0	0.0	-0.1	0.0	0.8	0.0	0.0	0.0	0.0	9	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	63.8	0	0.0	-0.4	0.0	1.3	0.0	0.0	0.0	0.0	4	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	65.1	0	0.0	-0.4	0.0	1.5	0.0	0.0	0.0	0.0	3	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	66.9	0	0.0	-0.4	0.0	1.7	0.0	0.0	0.0	0.0	1	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	65.5	0	0.0	-0.8	0.0	1.5	0.0	0.0	0.0	0.0	22	

R03 Vacant Lot		731747	4878418	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	73.6	0	0.0	1.5	0.0	3.6	0.0	0.0	0.0	0.0	13	
NS-02	Inverter	730602	4878757	201.5	91	72.5	0	0.0	1.4	0.0	3.3	0.0	0.0	0.0	0.0	14	
NS-03	Inverter	730671	4878497	201.5	91	71.7	0	0.0	1.3	0.0	3.1	0.0	0.0	0.0	0.0	15	
NS-04	Inverter	730658	4878317	201.5	91	71.8	0	0.0	1.3	0.0	3.1	0.0	0.0	0.0	0.0	15	
NS-05	Inverter	730707	4878364	201.5	91	71.4	0	0.0	1.3	0.0	3.0	0.0	0.0	0.0	0.0	16	
NS-06	Inverter	730763	4878212	201.5	91	71.1	0	0.0	1.3	0.0	2.9	0.0	0.0	0.0	0.0	16	
NS-07	Inverter	730903	4877955	201.5	91	70.7	0	0.0	1.2	0.0	2.9	0.0	0.0	0.0	0.0	17	
NS-08	Inverter	730937	4877747	201.5	91	71.4	0	0.0	1.3	0.0	3.0	0.0	0.0	0.0	0.0	16	
NS-09	Inverter	730871	4877689	201.5	91	72.1	0	0.0	1.4	0.0	3.2	0.0	0.0	0.0	0.0	15	
NS-10	Inverter	730921	4877557	201.5	91	72.5	0	0.0	1.4	0.0	3.3	0.0	0.0	0.0	0.0	14	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	73.6	0	0.0	-0.3	0.0	3.2	0.0	0.0	0.0	0.0	--	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	72.5	0	0.0	-0.3	0.0	2.9	0.0	0.0	0.0	0.0	--	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	71.6	0	0.0	-0.4	0.0	2.7	0.0	0.0	0.0	0.0	--	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	71.7	0	0.0	-0.4	0.0	2.7	0.0	0.0	0.0	0.0	--	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	71.4	0	0.0	-0.4	0.0	2.6	0.0	0.0	0.0	0.0	--	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	71.1	0	0.0	-0.4	0.0	2.6	0.0	0.0	0.0	0.0	--	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	70.7	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	71.5	0	0.0	-0.4	0.0	2.7	0.0	0.0	0.0	0.0	--	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	72.1	0	0.0	-0.4	0.0	2.8	0.0	0.0	0.0	0.0	--	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	72.5	0	0.0	-0.3	0.0	2.9	0.0	0.0	0.0	0.0	--	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	71.2	0	0.0	-0.9	0.0	2.6	0.0	0.0	0.0	0.0	15	

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl

R04 Vacant Lot		731779	4877454	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	76.3	0	0.0	1.7	0.0	4.5	0.0	0.0	0.0	0.0	9	
NS-02	Inverter	730602	4878757	201.5	91	75.9	0	0.0	1.7	0.0	4.4	0.0	0.0	0.0	0.0	9	
NS-03	Inverter	730671	4878497	201.5	91	74.6	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11	
NS-04	Inverter	730658	4878317	201.5	91	74.0	0	0.0	1.5	0.0	3.8	0.0	0.0	0.0	0.0	12	
NS-05	Inverter	730707	4878364	201.5	91	74.0	0	0.0	1.5	0.0	3.7	0.0	0.0	0.0	0.0	12	
NS-06	Inverter	730763	4878212	201.5	91	73.1	0	0.0	1.4	0.0	3.5	0.0	0.0	0.0	0.0	13	
NS-07	Inverter	730903	4877955	201.5	91	71.1	0	0.0	1.3	0.0	3.0	0.0	0.0	0.0	0.0	16	
NS-08	Inverter	730937	4877747	201.5	91	70.0	0	0.0	1.2	0.0	2.7	0.0	0.0	0.0	0.0	17	
NS-09	Inverter	730871	4877689	201.5	91	70.4	0	0.0	1.2	0.0	2.8	0.0	0.0	0.0	0.0	17	
NS-10	Inverter	730921	4877557	201.5	91	69.7	0	0.0	1.2	0.0	2.6	0.0	0.0	0.0	0.0	18	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	76.3	0	0.0	-0.2	0.0	4.1	0.0	0.0	0.0	0.0	--	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	75.9	0	0.0	-0.2	0.0	4.0	0.0	0.0	0.0	0.0	--	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	74.6	0	0.0	-0.3	0.0	3.5	0.0	0.0	0.0	0.0	--	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	74.0	0	0.0	-0.3	0.0	3.4	0.0	0.0	0.0	0.0	--	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	74.0	0	0.0	-0.3	0.0	3.3	0.0	0.0	0.0	0.0	--	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	73.1	0	0.0	-0.3	0.0	3.1	0.0	0.0	0.0	0.0	--	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	71.1	0	0.0	-0.4	0.0	2.6	0.0	0.0	0.0	0.0	--	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	70.0	0	0.0	-0.4	0.0	2.3	0.0	0.0	0.0	0.0	--	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	70.4	0	0.0	-0.4	0.0	2.4	0.0	0.0	0.0	0.0	--	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	69.7	0	0.0	-0.4	0.0	2.3	0.0	0.0	0.0	0.0	--	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	74.9	0	0.0	-0.8	0.0	3.6	0.0	0.0	0.0	0.0	10	

R05 Vacant Lot		731241	4877533	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	74.1	0	0.0	1.5	0.0	3.8	0.0	0.0	0.0	0.0	12	
NS-02	Inverter	730602	4878757	201.5	91	73.8	0	0.0	1.5	0.0	3.7	0.0	0.0	0.0	0.0	12	
NS-03	Inverter	730671	4878497	201.5	91	72.0	0	0.0	1.3	0.0	3.2	0.0	0.0	0.0	0.0	15	
NS-04	Inverter	730658	4878317	201.5	91	70.8	0	0.0	1.2	0.0	2.9	0.0	0.0	0.0	0.0	16	
NS-05	Inverter	730707	4878364	201.5	91	70.9	0	0.0	1.3	0.0	2.9	0.0	0.0	0.0	0.0	16	
NS-06	Inverter	730763	4878212	201.5	91	69.4	0	0.0	1.1	0.0	2.6	0.0	0.0	0.0	0.0	18	
NS-07	Inverter	730903	4877955	201.5	91	65.7	0	0.0	0.9	0.0	1.9	0.0	0.0	0.0	0.0	23	
NS-08	Inverter	730937	4877747	201.5	91	62.4	0	0.0	0.8	0.0	1.4	0.0	0.0	0.0	0.0	27	
NS-09	Inverter	730871	4877689	201.5	91	63.1	0	0.0	0.8	0.0	1.5	0.0	0.0	0.0	0.0	26	
NS-10	Inverter	730921	4877557	201.5	91	61.1	0	0.0	0.8	0.0	1.3	0.0	0.0	0.0	0.0	28	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	74.0	0	0.0	-0.3	0.0	3.4	0.0	0.0	0.0	0.0	--	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	73.8	0	0.0	-0.3	0.0	3.3	0.0	0.0	0.0	0.0	--	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	72.0	0	0.0	-0.4	0.0	2.8	0.0	0.0	0.0	0.0	--	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	70.8	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	70.9	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	69.4	0	0.0	-0.4	0.0	2.2	0.0	0.0	0.0	0.0	--	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	65.7	0	0.0	-0.4	0.0	1.6	0.0	0.0	0.0	0.0	2	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	62.5	0	0.0	-0.3	0.0	1.2	0.0	0.0	0.0	0.0	6	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	63.0	0	0.0	-0.3	0.0	1.2	0.0	0.0	0.0	0.0	5	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	61.0	0	0.0	-0.3	0.0	1.0	0.0	0.0	0.0	0.0	7	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	72.6	0	0.0	-0.9	0.0	2.9	0.0	0.0	0.0	0.0	13	

R06 Vacant Lot		731596	4877038	204.5													
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr	
NS-01	Inverter	730427	4878700	201.5	91	77.2	0	0.0	1.8	0.0	4.8	0.0	0.0	0.0	0.0	7	
NS-02	Inverter	730602	4878757	201.5	91	77.0	0	0.0	1.8	0.0	4.8	0.0	0.0	0.0	0.0	8	
NS-03	Inverter	730671	4878497	201.5	91	75.7	0	0.0	1.7	0.0	4.3	0.0	0.0	0.0	0.0	10	
NS-04	Inverter	730658	4878317	201.5	91	75.0	0	0.0	1.6	0.0	4.1	0.0	0.0	0.0	0.0	11	
NS-05	Inverter	730707	4878364	201.5	91	75.1	0	0.0	1.6	0.0	4.1	0.0	0.0	0.0	0.0	11	
NS-06	Inverter	730763	4878212	201.5	91	74.2	0	0.0	1.5	0.0	3.8	0.0	0.0	0.0	0.0	12	
NS-07	Inverter	730903	4877955	201.5	91	72.2	0	0.0	1.4	0.0	3.2	0.0	0.0	0.0	0.0	14	
NS-08	Inverter	730937	4877747	201.5	91	70.7	0	0.0	1.2	0.0	2.9	0.0	0.0	0.0	0.0	16	
NS-09	Inverter	730871	4877689	201.5	91	70.8	0	0.0	1.2	0.0	2.9	0.0	0.0	0.0	0.0	16	
NS-10	Inverter	730921	4877557	201.5	91	69.6	0	0.0	1.2	0.0	2.6	0.0	0.0	0.0	0.0	18	
NS-11	Transformer 1 MV	730432	4878700	202.5	69	77.1	0	0.0	-0.2	0.0	4.5	0.0	0.0	0.0	0.0	--	
NS-12	Transformer 1 MV	730607	4878756	202.5	69	76.9	0	0.0	-0.2	0.0	4.4	0.0	0.0	0.0	0.0	--	
NS-13	Transformer 1 MV	730673	4878497	202.5	69	75.7	0	0.0	-0.2	0.0	3.9	0.0	0.0	0.0	0.0	--	
NS-14	Transformer 1 MV	730663	4878316	202.5	69	75.0	0	0.0	-0.3	0.0	3.7	0.0	0.0	0.0	0.0	--	
NS-15	Transformer 1 MV	730702	4878364	202.5	69	75.1	0	0.0	-0.3	0.0	3.7	0.0	0.0	0.0	0.0	--	
NS-16	Transformer 1 MV	730759	4878212	202.5	69	74.2	0	0.0	-0.3	0.0	3.4	0.0	0.0	0.0	0.0	--	
NS-17	Transformer 1 MV	730898	4877955	202.5	69	72.2	0	0.0	-0.3	0.0	2.9	0.0	0.0	0.0	0.0	--	
NS-18	Transformer 1 MV	730933	4877747	202.5	69	70.7	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--	
NS-19	Transformer 1 MV	730876	4877689	202.5	69	70.7	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--	
NS-20	Transformer 1 MV	730926	4877556	202.5	69	69.6	0	0.0	-0.4	0.0	2.2	0.0	0.0	0.0	0.0	--	
NS-21	Transformer 10 MV	730748	4878623	204.0	88	76.1	0	0.0	-0.8	0.0	4.0	0.0	0.0	0.0	0.0	9	

R07 Vacant Lot		731851	4877356	204.5													
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Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl



Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr
NS-01	Inverter	730427	4878700	201.5	91	76.8	0	0.0	1.8	0.0	4.7	0.0	0.0	0.0	0.0	8
NS-02	Inverter	730602	4878757	201.5	91	76.5	0	0.0	1.8	0.0	4.6	0.0	0.0	0.0	0.0	9
NS-03	Inverter	730671	4878497	201.5	91	75.3	0	0.0	1.6	0.0	4.2	0.0	0.0	0.0	0.0	10
NS-04	Inverter	730658	4878317	201.5	91	74.7	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11
NS-05	Inverter	730707	4878364	201.5	91	74.7	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11
NS-06	Inverter	730763	4878212	201.5	91	73.8	0	0.0	1.5	0.0	3.7	0.0	0.0	0.0	0.0	12
NS-07	Inverter	730903	4877955	201.5	91	72.0	0	0.0	1.3	0.0	3.2	0.0	0.0	0.0	0.0	15
NS-08	Inverter	730937	4877747	201.5	91	70.9	0	0.0	1.3	0.0	2.9	0.0	0.0	0.0	0.0	16
NS-09	Inverter	730871	4877689	201.5	91	71.3	0	0.0	1.3	0.0	3.0	0.0	0.0	0.0	0.0	16
NS-10	Inverter	730921	4877557	201.5	91	70.6	0	0.0	1.2	0.0	2.8	0.0	0.0	0.0	0.0	17
NS-11	Transformer 1 MV	730432	4878700	202.5	69	76.8	0	0.0	-0.2	0.0	4.3	0.0	0.0	0.0	0.0	--
NS-12	Transformer 1 MV	730607	4878756	202.5	69	76.5	0	0.0	-0.2	0.0	4.2	0.0	0.0	0.0	0.0	--
NS-13	Transformer 1 MV	730673	4878497	202.5	69	75.3	0	0.0	-0.3	0.0	3.8	0.0	0.0	0.0	0.0	--
NS-14	Transformer 1 MV	730663	4878316	202.5	69	74.7	0	0.0	-0.3	0.0	3.6	0.0	0.0	0.0	0.0	--
NS-15	Transformer 1 MV	730702	4878364	202.5	69	74.7	0	0.0	-0.3	0.0	3.6	0.0	0.0	0.0	0.0	--
NS-16	Transformer 1 MV	730759	4878212	202.5	69	73.8	0	0.0	-0.3	0.0	3.3	0.0	0.0	0.0	0.0	--
NS-17	Transformer 1 MV	730898	4877955	202.5	69	72.0	0	0.0	-0.4	0.0	2.8	0.0	0.0	0.0	0.0	--
NS-18	Transformer 1 MV	730933	4877747	202.5	69	71.0	0	0.0	-0.4	0.0	2.5	0.0	0.0	0.0	0.0	--
NS-19	Transformer 1 MV	730876	4877689	202.5	69	71.3	0	0.0	-0.4	0.0	2.6	0.0	0.0	0.0	0.0	--
NS-20	Transformer 1 MV	730926	4877556	202.5	69	70.5	0	0.0	-0.4	0.0	2.4	0.0	0.0	0.0	0.0	--
NS-21	Transformer 10 MV	730748	4878623	204.0	88	75.5	0	0.0	-0.8	0.0	3.8	0.0	0.0	0.0	0.0	9

R08 Residential Dwelling 731375 4876924 204.5

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr
NS-01	Inverter	730427	4878700	201.5	91	77.1	0	0.0	1.8	0.0	4.8	0.0	0.0	0.0	0.0	8
NS-02	Inverter	730602	4878757	201.5	91	77.0	0	0.0	1.8	0.0	4.8	0.0	0.0	0.0	0.0	8
NS-03	Inverter	730671	4878497	201.5	91	75.7	0	0.0	1.7	0.0	4.3	0.0	0.0	0.0	0.0	10
NS-04	Inverter	730658	4878317	201.5	91	74.9	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11
NS-05	Inverter	730707	4878364	201.5	91	75.0	0	0.0	1.6	0.0	4.1	0.0	0.0	0.0	0.0	11
NS-06	Inverter	730763	4878212	201.5	91	74.1	0	0.0	1.5	0.0	3.8	0.0	0.0	0.0	0.0	12
NS-07	Inverter	730903	4877955	201.5	91	72.1	0	0.0	1.4	0.0	3.2	0.0	0.0	0.0	0.0	15
NS-08	Inverter	730937	4877747	201.5	91	70.4	0	0.0	1.2	0.0	2.8	0.0	0.0	0.0	0.0	17
NS-09	Inverter	730871	4877689	201.5	91	70.2	0	0.0	1.2	0.0	2.8	0.0	0.0	0.0	0.0	17
NS-10	Inverter	730921	4877557	201.5	91	68.8	0	0.0	1.1	0.0	2.5	0.0	0.0	0.0	0.0	19
NS-11	Transformer 1 MV	730432	4878700	202.5	69	77.1	0	0.0	-0.2	0.0	4.4	0.0	0.0	0.0	0.0	--
NS-12	Transformer 1 MV	730607	4878756	202.5	69	77.0	0	0.0	-0.2	0.0	4.4	0.0	0.0	0.0	0.0	--
NS-13	Transformer 1 MV	730673	4878497	202.5	69	75.7	0	0.0	-0.2	0.0	3.9	0.0	0.0	0.0	0.0	--
NS-14	Transformer 1 MV	730663	4878316	202.5	69	74.9	0	0.0	-0.3	0.0	3.6	0.0	0.0	0.0	0.0	--
NS-15	Transformer 1 MV	730702	4878364	202.5	69	75.0	0	0.0	-0.3	0.0	3.7	0.0	0.0	0.0	0.0	--
NS-16	Transformer 1 MV	730759	4878212	202.5	69	74.1	0	0.0	-0.3	0.0	3.4	0.0	0.0	0.0	0.0	--
NS-17	Transformer 1 MV	730898	4877955	202.5	69	72.1	0	0.0	-0.4	0.0	2.8	0.0	0.0	0.0	0.0	--
NS-18	Transformer 1 MV	730933	4877747	202.5	69	70.4	0	0.0	-0.4	0.0	2.4	0.0	0.0	0.0	0.0	--
NS-19	Transformer 1 MV	730876	4877689	202.5	69	70.2	0	0.0	-0.4	0.0	2.4	0.0	0.0	0.0	0.0	--
NS-20	Transformer 1 MV	730926	4877556	202.5	69	68.8	0	0.0	-0.4	0.0	2.1	0.0	0.0	0.0	0.0	--
NS-21	Transformer 10 MV	730748	4878623	204.0	88	76.2	0	0.0	-0.8	0.0	4.1	0.0	0.0	0.0	0.0	9

R09 Vacant Lot 730952 4876821 204.5

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahaus	Cmet	Refl	Lr
NS-01	Inverter	730427	4878700	201.5	91	76.8	0	0.0	1.8	0.0	4.7	0.0	0.0	0.0	0.0	8
NS-02	Inverter	730602	4878757	201.5	91	76.9	0	0.0	1.8	0.0	4.7	0.0	0.0	0.0	0.0	8
NS-03	Inverter	730671	4878497	201.5	91	75.6	0	0.0	1.7	0.0	4.3	0.0	0.0	0.0	0.0	10
NS-04	Inverter	730658	4878317	201.5	91	74.7	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11
NS-05	Inverter	730707	4878364	201.5	91	74.9	0	0.0	1.6	0.0	4.0	0.0	0.0	0.0	0.0	11
NS-06	Inverter	730763	4878212	201.5	91	74.0	0	0.0	1.5	0.0	3.7	0.0	0.0	0.0	0.0	12
NS-07	Inverter	730903	4877955	201.5	91	72.1	0	0.0	1.4	0.0	3.2	0.0	0.0	0.0	0.0	15
NS-08	Inverter	730937	4877747	201.5	91	70.3	0	0.0	1.2	0.0	2.8	0.0	0.0	0.0	0.0	17
NS-09	Inverter	730871	4877689	201.5	91	69.8	0	0.0	1.2	0.0	2.7	0.0	0.0	0.0	0.0	18
NS-10	Inverter	730921	4877557	201.5	91	68.3	0	0.0	1.1	0.0	2.4	0.0	0.0	0.0	0.0	20
NS-11	Transformer 1 MV	730432	4878700	202.5	69	76.8	0	0.0	-0.2	0.0	4.3	0.0	0.0	0.0	0.0	--
NS-12	Transformer 1 MV	730607	4878756	202.5	69	76.9	0	0.0	-0.2	0.0	4.3	0.0	0.0	0.0	0.0	--
NS-13	Transformer 1 MV	730673	4878497	202.5	69	75.6	0	0.0	-0.2	0.0	3.9	0.0	0.0	0.0	0.0	--
NS-14	Transformer 1 MV	730663	4878316	202.5	69	74.7	0	0.0	-0.3	0.0	3.6	0.0	0.0	0.0	0.0	--
NS-15	Transformer 1 MV	730702	4878364	202.5	69	74.9	0	0.0	-0.3	0.0	3.6	0.0	0.0	0.0	0.0	--
NS-16	Transformer 1 MV	730759	4878212	202.5	69	74.0	0	0.0	-0.3	0.0	3.3	0.0	0.0	0.0	0.0	--
NS-17	Transformer 1 MV	730898	4877955	202.5	69	72.1	0	0.0	-0.4	0.0	2.8	0.0	0.0	0.0	0.0	--
NS-18	Transformer 1 MV	730933	4877747	202.5	69	70.3	0	0.0	-0.4	0.0	2.4	0.0	0.0	0.0	0.0	--
NS-19	Transformer 1 MV	730876	4877689	202.5	69	69.8	0	0.0	-0.4	0.0	2.3	0.0	0.0	0.0	0.0	--
NS-20	Transformer 1 MV	730926	4877556	202.5	69	68.3	0	0.0	-0.4	0.0	2.0	0.0	0.0	0.0	0.0	--
NS-21	Transformer 10 MV	730748	4878623	204.0	88	76.2	0	0.0	-0.8	0.0	4.1	0.0	0.0	0.0	0.0	9

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl



APPENDIX G

Sample Calculation Results - Octave Band Format

In the following tables of calculation results, the column headings for the various sound attenuation mechanisms follow the terminology of ISO Standard 9613-2. L_x is the A-weighted, one-hour energy-equivalent (or logarithmic-mean impulse) source sound power level, which includes the effects of any source-abatement measures included in the model, and any time-averaging effects for intermittent sources. L_r is the A-weighted, one-hour energy-equivalent (or logarithmic-mean impulse) sound level at the point of reception. The results are presented in terms of full octave band sound levels, at the most impacted off-site point of reception.



R01 Vacant Lot		730927	4878404	204.5														
SrcID	Src Name	Band	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr	Band
NS-01	Inverter	32	730427	4878700	201.5	--	66.3	0	0.0	-5.1	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-01	Inverter	63	730427	4878700	201.5	66	66.3	0	0.0	-5.1	0.0	0.1	0.0	0.0	0.0	0.0	5	63
NS-01	Inverter	125	730427	4878700	201.5	82	66.3	0	0.0	3.4	0.0	0.2	0.0	0.0	0.0	0.0	12	125
NS-01	Inverter	250	730427	4878700	201.5	81	66.3	0	0.0	4.4	0.0	0.6	0.0	0.0	0.0	0.0	10	250
NS-01	Inverter	500	730427	4878700	201.5	86	66.3	0	0.0	2.0	0.0	1.1	0.0	0.0	0.0	0.0	16	500
NS-01	Inverter	1000	730427	4878700	201.5	86	66.3	0	0.0	-1.1	0.0	2.1	0.0	0.0	0.0	0.0	19	1000
NS-01	Inverter	2000	730427	4878700	201.5	82	66.3	0	0.0	-1.5	0.0	5.6	0.0	0.0	0.0	0.0	12	2000
NS-01	Inverter	4000	730427	4878700	201.5	78	66.3	0	0.0	-1.5	0.0	19.0	0.0	0.0	0.0	0.0	--	4000
NS-01	Inverter	8000	730427	4878700	201.5	77	66.3	0	0.0	-1.5	0.0	67.9	0.0	0.0	0.0	0.0	--	8000
NS-02	Inverter	32	730602	4878757	201.5	--	64.6	0	0.0	-4.9	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-02	Inverter	63	730602	4878757	201.5	66	64.6	0	0.0	-4.9	0.0	0.1	0.0	0.0	0.0	0.0	6	63
NS-02	Inverter	125	730602	4878757	201.5	82	64.6	0	0.0	2.9	0.0	0.2	0.0	0.0	0.0	0.0	14	125
NS-02	Inverter	250	730602	4878757	201.5	81	64.6	0	0.0	4.4	0.0	0.5	0.0	0.0	0.0	0.0	12	250
NS-02	Inverter	500	730602	4878757	201.5	86	64.6	0	0.0	2.0	0.0	0.9	0.0	0.0	0.0	0.0	18	500
NS-02	Inverter	1000	730602	4878757	201.5	86	64.6	0	0.0	-1.0	0.0	1.8	0.0	0.0	0.0	0.0	21	1000
NS-02	Inverter	2000	730602	4878757	201.5	82	64.6	0	0.0	-1.5	0.0	4.6	0.0	0.0	0.0	0.0	14	2000
NS-02	Inverter	4000	730602	4878757	201.5	78	64.6	0	0.0	-1.5	0.0	15.7	0.0	0.0	0.0	0.0	--	4000
NS-02	Inverter	8000	730602	4878757	201.5	77	64.6	0	0.0	-1.5	0.0	56.0	0.0	0.0	0.0	0.0	--	8000
NS-03	Inverter	32	730671	4878497	201.5	--	59.7	0	0.0	-4.0	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-03	Inverter	63	730671	4878497	201.5	66	59.7	0	0.0	-4.0	0.0	0.0	0.0	0.0	0.0	0.0	10	63
NS-03	Inverter	125	730671	4878497	201.5	82	59.7	0	0.0	2.0	0.0	0.1	0.0	0.0	0.0	0.0	20	125
NS-03	Inverter	250	730671	4878497	201.5	81	59.7	0	0.0	4.7	0.0	0.3	0.0	0.0	0.0	0.0	17	250
NS-03	Inverter	500	730671	4878497	201.5	86	59.7	0	0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.0	23	500
NS-03	Inverter	1000	730671	4878497	201.5	86	59.7	0	0.0	-0.7	0.0	1.0	0.0	0.0	0.0	0.0	26	1000
NS-03	Inverter	2000	730671	4878497	201.5	82	59.7	0	0.0	-1.2	0.0	2.6	0.0	0.0	0.0	0.0	21	2000
NS-03	Inverter	4000	730671	4878497	201.5	78	59.7	0	0.0	-1.2	0.0	8.9	0.0	0.0	0.0	0.0	11	4000
NS-03	Inverter	8000	730671	4878497	201.5	77	59.7	0	0.0	-1.2	0.0	31.8	0.0	0.0	0.0	0.0	--	8000
NS-04	Inverter	32	730658	4878317	201.5	--	60.0	0	0.0	-4.1	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-04	Inverter	63	730658	4878317	201.5	66	60.0	0	0.0	-4.1	0.0	0.0	0.0	0.0	0.0	0.0	10	63
NS-04	Inverter	125	730658	4878317	201.5	82	60.0	0	0.0	2.1	0.0	0.1	0.0	0.0	0.0	0.0	20	125
NS-04	Inverter	250	730658	4878317	201.5	81	60.0	0	0.0	4.7	0.0	0.3	0.0	0.0	0.0	0.0	16	250
NS-04	Inverter	500	730658	4878317	201.5	86	60.0	0	0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.0	23	500
NS-04	Inverter	1000	730658	4878317	201.5	86	60.0	0	0.0	-0.8	0.0	1.0	0.0	0.0	0.0	0.0	26	1000
NS-04	Inverter	2000	730658	4878317	201.5	82	60.0	0	0.0	-1.2	0.0	2.7	0.0	0.0	0.0	0.0	21	2000
NS-04	Inverter	4000	730658	4878317	201.5	78	60.0	0	0.0	-1.2	0.0	9.3	0.0	0.0	0.0	0.0	10	4000
NS-04	Inverter	8000	730658	4878317	201.5	77	60.0	0	0.0	-1.2	0.0	33.0	0.0	0.0	0.0	0.0	--	8000
NS-05	Inverter	32	730707	4878364	201.5	--	58.0	0	0.0	-3.6	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-05	Inverter	63	730707	4878364	201.5	66	58.0	0	0.0	-3.6	0.0	0.0	0.0	0.0	0.0	0.0	11	63
NS-05	Inverter	125	730707	4878364	201.5	82	58.0	0	0.0	1.9	0.0	0.1	0.0	0.0	0.0	0.0	22	125
NS-05	Inverter	250	730707	4878364	201.5	81	58.0	0	0.0	4.8	0.0	0.2	0.0	0.0	0.0	0.0	18	250
NS-05	Inverter	500	730707	4878364	201.5	86	58.0	0	0.0	2.4	0.0	0.4	0.0	0.0	0.0	0.0	25	500
NS-05	Inverter	1000	730707	4878364	201.5	86	58.0	0	0.0	-0.6	0.0	0.8	0.0	0.0	0.0	0.0	28	1000
NS-05	Inverter	2000	730707	4878364	201.5	82	58.0	0	0.0	-1.1	0.0	2.2	0.0	0.0	0.0	0.0	23	2000
NS-05	Inverter	4000	730707	4878364	201.5	78	58.0	0	0.0	-1.1	0.0	7.4	0.0	0.0	0.0	0.0	14	4000
NS-05	Inverter	8000	730707	4878364	201.5	77	58.0	0	0.0	-1.1	0.0	26.2	0.0	0.0	0.0	0.0	--	8000
NS-06	Inverter	32	730763	4878212	201.5	--	59.0	0	0.0	-3.9	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-06	Inverter	63	730763	4878212	201.5	66	59.0	0	0.0	-3.9	0.0	0.0	0.0	0.0	0.0	0.0	11	63
NS-06	Inverter	125	730763	4878212	201.5	82	59.0	0	0.0	2.0	0.0	0.1	0.0	0.0	0.0	0.0	21	125
NS-06	Inverter	250	730763	4878212	201.5	81	59.0	0	0.0	4.7	0.0	0.3	0.0	0.0	0.0	0.0	17	250
NS-06	Inverter	500	730763	4878212	201.5	86	59.0	0	0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.0	24	500
NS-06	Inverter	1000	730763	4878212	201.5	86	59.0	0	0.0	-0.7	0.0	0.9	0.0	0.0	0.0	0.0	27	1000
NS-06	Inverter	2000	730763	4878212	201.5	82	59.0	0	0.0	-1.2	0.0	2.4	0.0	0.0	0.0	0.0	22	2000
NS-06	Inverter	4000	730763	4878212	201.5	78	59.0	0	0.0	-1.2	0.0	8.3	0.0	0.0	0.0	0.0	12	4000
NS-06	Inverter	8000	730763	4878212	201.5	77	59.0	0	0.0	-1.2	0.0	29.5	0.0	0.0	0.0	0.0	--	8000
NS-07	Inverter	32	730903	4877955	201.5	--	64.1	0	0.0	-4.8	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-07	Inverter	63	730903	4877955	201.5	66	64.1	0	0.0	-4.8	0.0	0.1	0.0	0.0	0.0	0.0	6	63
NS-07	Inverter	125	730903	4877955	201.5	82	64.1	0	0.0	2.8	0.0	0.2	0.0	0.0	0.0	0.0	15	125
NS-07	Inverter	250	730903	4877955	201.5	81	64.1	0	0.0	4.5	0.0	0.5	0.0	0.0	0.0	0.0	12	250
NS-07	Inverter	500	730903	4877955	201.5	86	64.1	0	0.0	2.0	0.0	0.9	0.0	0.0	0.0	0.0	19	500
NS-07	Inverter	1000	730903	4877955	201.5	86	64.1	0	0.0	-1.0	0.0	1.7	0.0	0.0	0.0	0.0	21	1000
NS-07	Inverter	2000	730903	4877955	201.5	82	64.1	0	0.0	-1.4	0.0	4.3	0.0	0.0	0.0	0.0	15	2000
NS-07	Inverter	4000	730903	4877955	201.5	78	64.1	0	0.0	-1.4	0.0	14.7	0.0	0.0	0.0	0.0	1	4000
NS-07	Inverter	8000	730903	4877955	201.5	77	64.1	0	0.0	-1.4	0.0	52.5	0.0	0.0	0.0	0.0	--	8000
NS-08	Inverter	32	730937	4877747	201.5	--	67.4	0	0.0	-5.2	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-08	Inverter	63	730937	4877747	201.5	66	67.4	0	0.0	-5.2	0.0	0.1	0.0	0.0	0.0	0.0	4	63
NS-08	Inverter	125	730937	4877747	201.5	82	67.4	0	0.0	3.7	0.0	0.3	0.0	0.0	0.0	0.0	11	125
NS-08	Inverter	250	730937	4877747	201.5	81	67.4	0	0.0	4.3	0.0	0.7	0.0	0.0	0.0	0.0	9	250
NS-08	Inverter	500	730937	4877747	201.5	86	67.4	0	0.0	1.9	0.0	1.3	0.0	0.0	0.0	0.0	15	500
NS-08	Inverter	1000	730937	4877747	201.5	86	67.4	0	0.0	-1.1	0.0	2.4	0.0	0.0	0.0	0.0	17	1000
NS-08	Inverter	2000	730937	4877747	201.5	82	67.4	0	0.0	-1.6	0.0	6.4	0.0	0.0	0.0	0.0	10	2000
NS-08	Inverter	4000	730937	4877747	201.5	78	67.4	0	0.0	-1.6	0.0	21.5	0.0	0.0	0.0	0.0	--	4000
NS-08	Inverter	8000	730937	4877747	201.5	77	67.4	0	0.0	-1.6	0.0	76.8	0.0	0.0	0.0	0.0	--	8000
NS-09	Inverter	32	730871	4877689	201.5	--	68.1	0	0.0	-5.3	0.0	0.0	0.0	0.0	0.0	0.0	--	32

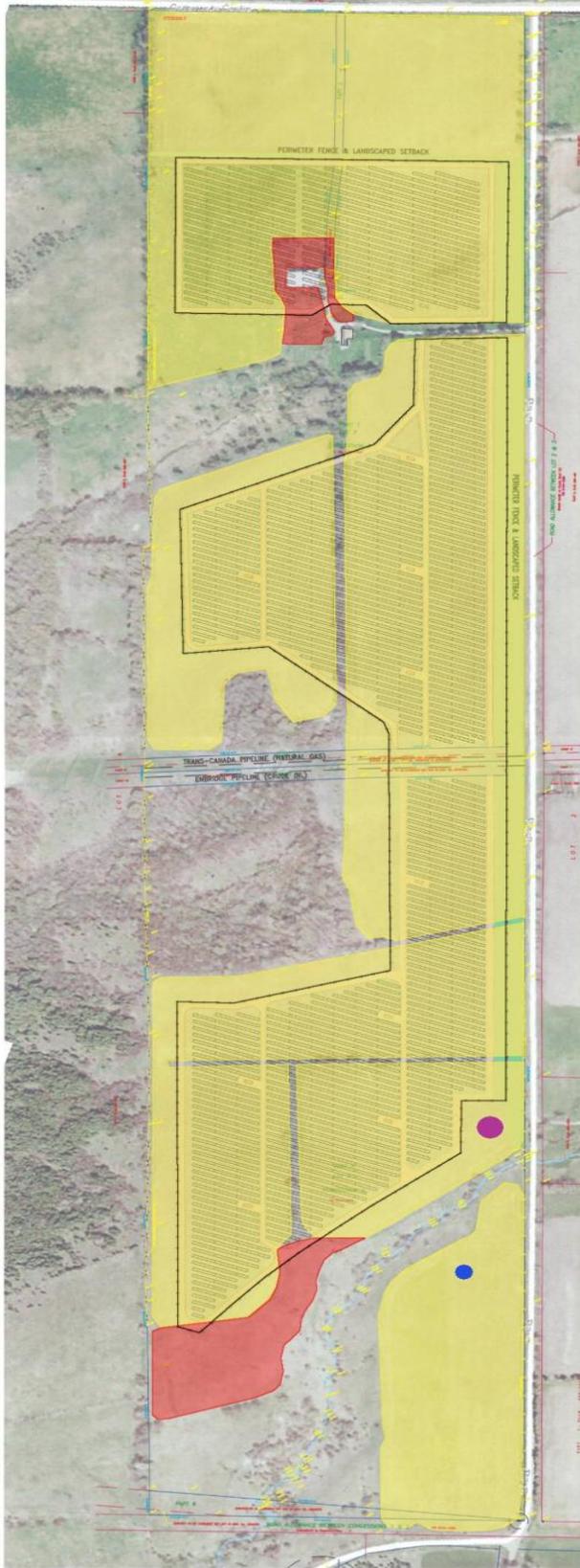
Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl



Src ID	Src Name	Band	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahou	Cmet	Refl	Lr	Band
NS-09	Inverter	63	730871	4877689	201.5	66	68.1	0	0.0	-5.3	0.0	0.1	0.0	0.0	0.0	0.0	3	63
NS-09	Inverter	125	730871	4877689	201.5	82	68.1	0	0.0	3.9	0.0	0.3	0.0	0.0	0.0	0.0	10	125
NS-09	Inverter	250	730871	4877689	201.5	81	68.1	0	0.0	4.3	0.0	0.8	0.0	0.0	0.0	0.0	8	250
NS-09	Inverter	500	730871	4877689	201.5	86	68.1	0	0.0	1.9	0.0	1.4	0.0	0.0	0.0	0.0	14	500
NS-09	Inverter	1000	730871	4877689	201.5	86	68.1	0	0.0	-1.1	0.0	2.6	0.0	0.0	0.0	0.0	16	1000
NS-09	Inverter	2000	730871	4877689	201.5	82	68.1	0	0.0	-1.6	0.0	6.9	0.0	0.0	0.0	0.0	9	2000
NS-09	Inverter	4000	730871	4877689	201.5	78	68.1	0	0.0	-1.6	0.0	23.5	0.0	0.0	0.0	0.0	--	4000
NS-09	Inverter	8000	730871	4877689	201.5	77	68.1	0	0.0	-1.6	0.0	83.8	0.0	0.0	0.0	0.0	--	8000
NS-10	Inverter	32	730921	4877557	201.5	--	69.6	0	0.0	-5.4	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-10	Inverter	63	730921	4877557	201.5	66	69.6	0	0.0	-5.4	0.0	0.1	0.0	0.0	0.0	0.0	2	63
NS-10	Inverter	125	730921	4877557	201.5	82	69.6	0	0.0	4.3	0.0	0.4	0.0	0.0	0.0	0.0	8	125
NS-10	Inverter	250	730921	4877557	201.5	81	69.6	0	0.0	4.3	0.0	0.9	0.0	0.0	0.0	0.0	7	250
NS-10	Inverter	500	730921	4877557	201.5	86	69.6	0	0.0	1.9	0.0	1.6	0.0	0.0	0.0	0.0	13	500
NS-10	Inverter	1000	730921	4877557	201.5	86	69.6	0	0.0	-1.2	0.0	3.1	0.0	0.0	0.0	0.0	14	1000
NS-10	Inverter	2000	730921	4877557	201.5	82	69.6	0	0.0	-1.6	0.0	8.2	0.0	0.0	0.0	0.0	6	2000
NS-10	Inverter	4000	730921	4877557	201.5	78	69.6	0	0.0	-1.6	0.0	27.8	0.0	0.0	0.0	0.0	--	4000
NS-10	Inverter	8000	730921	4877557	201.5	77	69.6	0	0.0	-1.6	0.0	99.0	0.0	0.0	0.0	0.0	--	8000
NS-11	Transformer 1 MV	32	730432	4878700	202.5	--	66.2	0	0.0	-4.9	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-11	Transformer 1 MV	63	730432	4878700	202.5	45	66.2	0	0.0	-4.9	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-11	Transformer 1 MV	125	730432	4878700	202.5	58	66.2	0	0.0	3.3	0.0	0.2	0.0	0.0	0.0	0.0	--	125
NS-11	Transformer 1 MV	250	730432	4878700	202.5	60	66.2	0	0.0	2.9	0.0	0.6	0.0	0.0	0.0	0.0	--	250
NS-11	Transformer 1 MV	500	730432	4878700	202.5	65	66.2	0	0.0	-0.9	0.0	1.1	0.0	0.0	0.0	0.0	--	500
NS-11	Transformer 1 MV	1000	730432	4878700	202.5	63	66.2	0	0.0	-1.5	0.0	2.1	0.0	0.0	0.0	0.0	--	1000
NS-11	Transformer 1 MV	2000	730432	4878700	202.5	59	66.2	0	0.0	-1.5	0.0	5.6	0.0	0.0	0.0	0.0	--	2000
NS-11	Transformer 1 MV	4000	730432	4878700	202.5	54	66.2	0	0.0	-1.5	0.0	18.9	0.0	0.0	0.0	0.0	--	4000
NS-11	Transformer 1 MV	8000	730432	4878700	202.5	45	66.2	0	0.0	-1.5	0.0	67.4	0.0	0.0	0.0	0.0	--	8000
NS-12	Transformer 1 MV	32	730607	4878756	202.5	--	64.6	0	0.0	-4.7	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-12	Transformer 1 MV	63	730607	4878756	202.5	45	64.6	0	0.0	-4.7	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-12	Transformer 1 MV	125	730607	4878756	202.5	58	64.6	0	0.0	3.0	0.0	0.2	0.0	0.0	0.0	0.0	--	125
NS-12	Transformer 1 MV	250	730607	4878756	202.5	60	64.6	0	0.0	3.0	0.0	0.5	0.0	0.0	0.0	0.0	--	250
NS-12	Transformer 1 MV	500	730607	4878756	202.5	65	64.6	0	0.0	-0.9	0.0	0.9	0.0	0.0	0.0	0.0	1	500
NS-12	Transformer 1 MV	1000	730607	4878756	202.5	63	64.6	0	0.0	-1.4	0.0	1.7	0.0	0.0	0.0	0.0	--	1000
NS-12	Transformer 1 MV	2000	730607	4878756	202.5	59	64.6	0	0.0	-1.4	0.0	4.6	0.0	0.0	0.0	0.0	--	2000
NS-12	Transformer 1 MV	4000	730607	4878756	202.5	54	64.6	0	0.0	-1.4	0.0	15.6	0.0	0.0	0.0	0.0	--	4000
NS-12	Transformer 1 MV	8000	730607	4878756	202.5	45	64.6	0	0.0	-1.4	0.0	55.6	0.0	0.0	0.0	0.0	--	8000
NS-13	Transformer 1 MV	32	730673	4878497	202.5	--	59.6	0	0.0	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-13	Transformer 1 MV	63	730673	4878497	202.5	45	59.6	0	0.0	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	--	63
NS-13	Transformer 1 MV	125	730673	4878497	202.5	58	59.6	0	0.0	2.5	0.0	0.1	0.0	0.0	0.0	0.0	--	125
NS-13	Transformer 1 MV	250	730673	4878497	202.5	60	59.6	0	0.0	3.3	0.0	0.3	0.0	0.0	0.0	0.0	--	250
NS-13	Transformer 1 MV	500	730673	4878497	202.5	65	59.6	0	0.0	-0.6	0.0	0.5	0.0	0.0	0.0	0.0	6	500
NS-13	Transformer 1 MV	1000	730673	4878497	202.5	63	59.6	0	0.0	-1.1	0.0	1.0	0.0	0.0	0.0	0.0	3	1000
NS-13	Transformer 1 MV	2000	730673	4878497	202.5	59	59.6	0	0.0	-1.1	0.0	2.6	0.0	0.0	0.0	0.0	--	2000
NS-13	Transformer 1 MV	4000	730673	4878497	202.5	54	59.6	0	0.0	-1.1	0.0	8.9	0.0	0.0	0.0	0.0	--	4000
NS-13	Transformer 1 MV	8000	730673	4878497	202.5	45	59.6	0	0.0	-1.1	0.0	31.6	0.0	0.0	0.0	0.0	--	8000
NS-14	Transformer 1 MV	32	730663	4878316	202.5	--	59.9	0	0.0	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-14	Transformer 1 MV	63	730663	4878316	202.5	45	59.9	0	0.0	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	--	63
NS-14	Transformer 1 MV	125	730663	4878316	202.5	58	59.9	0	0.0	2.5	0.0	0.1	0.0	0.0	0.0	0.0	--	125
NS-14	Transformer 1 MV	250	730663	4878316	202.5	60	59.9	0	0.0	3.3	0.0	0.3	0.0	0.0	0.0	0.0	--	250
NS-14	Transformer 1 MV	500	730663	4878316	202.5	65	59.9	0	0.0	-0.6	0.0	0.5	0.0	0.0	0.0	0.0	6	500
NS-14	Transformer 1 MV	1000	730663	4878316	202.5	63	59.9	0	0.0	-1.1	0.0	1.0	0.0	0.0	0.0	0.0	3	1000
NS-14	Transformer 1 MV	2000	730663	4878316	202.5	59	59.9	0	0.0	-1.1	0.0	2.7	0.0	0.0	0.0	0.0	--	2000
NS-14	Transformer 1 MV	4000	730663	4878316	202.5	54	59.9	0	0.0	-1.1	0.0	9.1	0.0	0.0	0.0	0.0	--	4000
NS-14	Transformer 1 MV	8000	730663	4878316	202.5	45	59.9	0	0.0	-1.1	0.0	32.5	0.0	0.0	0.0	0.0	--	8000
NS-15	Transformer 1 MV	32	730702	4878364	202.5	--	58.2	0	0.0	-3.3	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-15	Transformer 1 MV	63	730702	4878364	202.5	45	58.2	0	0.0	-3.3	0.0	0.0	0.0	0.0	0.0	0.0	--	63
NS-15	Transformer 1 MV	125	730702	4878364	202.5	58	58.2	0	0.0	2.4	0.0	0.1	0.0	0.0	0.0	0.0	--	125
NS-15	Transformer 1 MV	250	730702	4878364	202.5	60	58.2	0	0.0	3.4	0.0	0.2	0.0	0.0	0.0	0.0	--	250
NS-15	Transformer 1 MV	500	730702	4878364	202.5	65	58.2	0	0.0	-0.4	0.0	0.4	0.0	0.0	0.0	0.0	7	500
NS-15	Transformer 1 MV	1000	730702	4878364	202.5	63	58.2	0	0.0	-1.0	0.0	0.8	0.0	0.0	0.0	0.0	5	1000
NS-15	Transformer 1 MV	2000	730702	4878364	202.5	59	58.2	0	0.0	-1.0	0.0	2.2	0.0	0.0	0.0	0.0	--	2000
NS-15	Transformer 1 MV	4000	730702	4878364	202.5	54	58.2	0	0.0	-1.0	0.0	7.5	0.0	0.0	0.0	0.0	--	4000
NS-15	Transformer 1 MV	8000	730702	4878364	202.5	45	58.2	0	0.0	-1.0	0.0	26.7	0.0	0.0	0.0	0.0	--	8000
NS-16	Transformer 1 MV	32	730759	4878212	202.5	--	59.2	0	0.0	-3.5	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-16	Transformer 1 MV	63	730759	4878212	202.5	45	59.2	0	0.0	-3.5	0.0	0.0	0.0	0.0	0.0	0.0	--	63
NS-16	Transformer 1 MV	125	730759	4878212	202.5	58	59.2	0	0.0	2.4	0.0	0.1	0.0	0.0	0.0	0.0	--	125
NS-16	Transformer 1 MV	250	730759	4878212	202.5	60	59.2	0	0.0	3.3	0.0	0.3	0.0	0.0	0.0	0.0	--	250
NS-16	Transformer 1 MV	500	730759	4878212	202.5	65	59.2	0	0.0	-0.5	0.0	0.5	0.0	0.0	0.0	0.0	6	500
NS-16	Transformer 1 MV	1000	730759	4878212	202.5	63	59.2	0	0.0	-1.1	0.0	0.9	0.0	0.0	0.0	0.0	4	1000
NS-16	Transformer 1 MV	2000	730759	4878212	202.5	59	59.2	0	0.0	-1.1	0.0	2.5	0.0	0.0	0.0	0.0	--	2000
NS-16	Transformer 1 MV	4000	730759	4878212	202.5	54	59.2	0	0.0	-1.1	0.0	8.4	0.0	0.0	0.0	0.0	--	4000
NS-16	Transformer 1 MV	8000	730759	4878212	202.5	45	59.2	0	0.0	-1.1	0.0	29.9	0.0	0.0	0.0	0.0	--	8000
NS-17	Transformer 1 MV	32	730898	4877955	202.5	--	64.1	0	0.0	-4.6	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-17	Transformer 1 MV	63	730898	4877955	202.5	45	64.1	0	0.0	-4.6	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-17	Transformer 1 MV	125	730898	4877955	202.5	58	64.1	0	0.0	2.9	0.0	0.2	0.0	0.0	0.0	0.0	--	125
NS-17	Transformer 1 MV	250	730898	4877955	202.5	60	64.1	0										

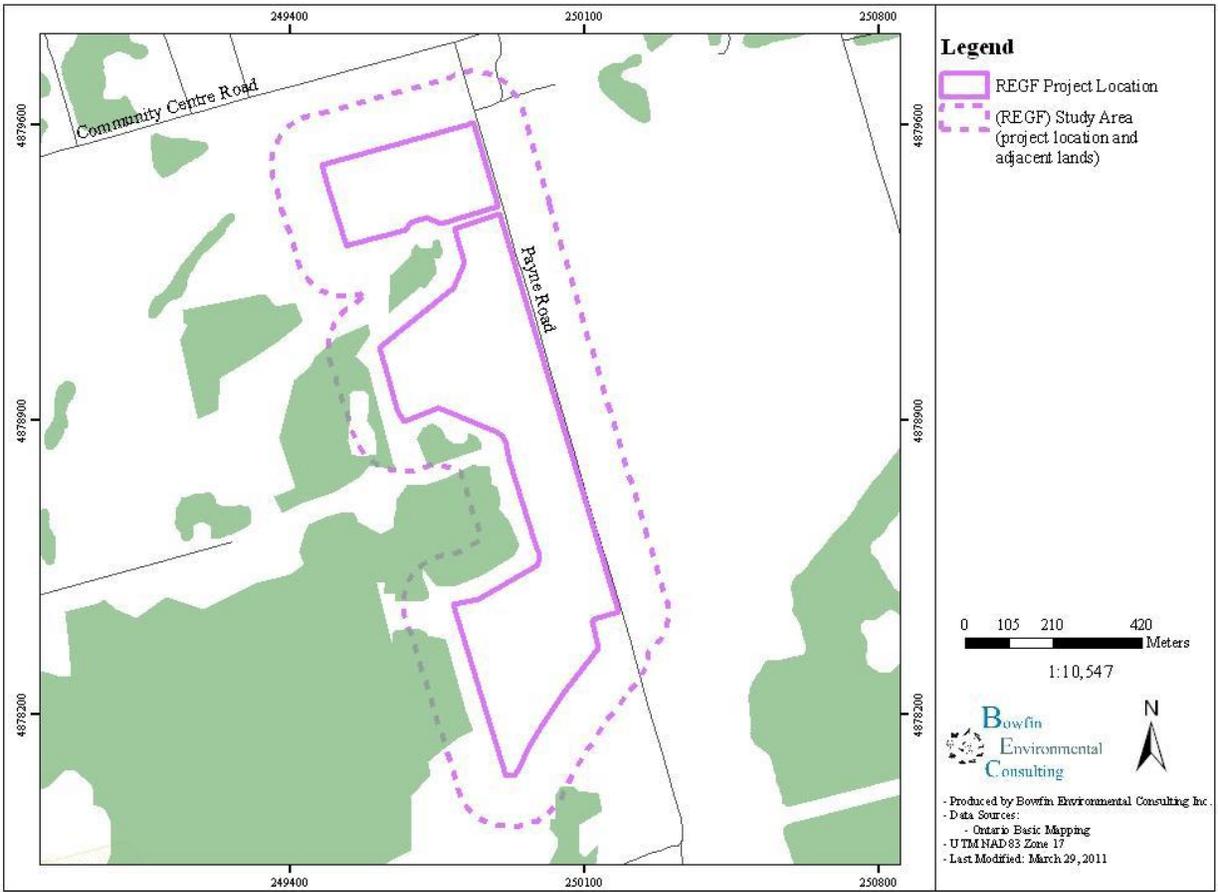
Src ID	Src Name	Band	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr	Band
NS-17	Transformer 1 MV	1000	730898	4877955	202.5	63	64.1	0	0.0	-1.4	0.0	1.6	0.0	0.0	0.0	0.0	--	1000
NS-17	Transformer 1 MV	2000	730898	4877955	202.5	59	64.1	0	0.0	-1.4	0.0	4.3	0.0	0.0	0.0	0.0	--	2000
NS-17	Transformer 1 MV	4000	730898	4877955	202.5	54	64.1	0	0.0	-1.4	0.0	14.7	0.0	0.0	0.0	0.0	--	4000
NS-17	Transformer 1 MV	8000	730898	4877955	202.5	45	64.1	0	0.0	-1.4	0.0	52.5	0.0	0.0	0.0	0.0	--	8000
NS-18	Transformer 1 MV	32	730933	4877747	202.5	--	67.4	0	0.0	-5.0	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-18	Transformer 1 MV	63	730933	4877747	202.5	45	67.4	0	0.0	-5.0	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-18	Transformer 1 MV	125	730933	4877747	202.5	58	67.4	0	0.0	3.6	0.0	0.3	0.0	0.0	0.0	0.0	--	125
NS-18	Transformer 1 MV	250	730933	4877747	202.5	60	67.4	0	0.0	2.9	0.0	0.7	0.0	0.0	0.0	0.0	--	250
NS-18	Transformer 1 MV	500	730933	4877747	202.5	65	67.4	0	0.0	-1.0	0.0	1.3	0.0	0.0	0.0	0.0	--	500
NS-18	Transformer 1 MV	1000	730933	4877747	202.5	63	67.4	0	0.0	-1.5	0.0	2.4	0.0	0.0	0.0	0.0	--	1000
NS-18	Transformer 1 MV	2000	730933	4877747	202.5	59	67.4	0	0.0	-1.5	0.0	6.4	0.0	0.0	0.0	0.0	--	2000
NS-18	Transformer 1 MV	4000	730933	4877747	202.5	54	67.4	0	0.0	-1.5	0.0	21.5	0.0	0.0	0.0	0.0	--	4000
NS-18	Transformer 1 MV	8000	730933	4877747	202.5	45	67.4	0	0.0	-1.5	0.0	76.8	0.0	0.0	0.0	0.0	--	8000
NS-19	Transformer 1 MV	32	730876	4877689	202.5	--	68.1	0	0.0	-5.1	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-19	Transformer 1 MV	63	730876	4877689	202.5	45	68.1	0	0.0	-5.1	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-19	Transformer 1 MV	125	730876	4877689	202.5	58	68.1	0	0.0	3.7	0.0	0.3	0.0	0.0	0.0	0.0	--	125
NS-19	Transformer 1 MV	250	730876	4877689	202.5	60	68.1	0	0.0	2.9	0.0	0.8	0.0	0.0	0.0	0.0	--	250
NS-19	Transformer 1 MV	500	730876	4877689	202.5	65	68.1	0	0.0	-1.0	0.0	1.4	0.0	0.0	0.0	0.0	--	500
NS-19	Transformer 1 MV	1000	730876	4877689	202.5	63	68.1	0	0.0	-1.5	0.0	2.6	0.0	0.0	0.0	0.0	--	1000
NS-19	Transformer 1 MV	2000	730876	4877689	202.5	59	68.1	0	0.0	-1.5	0.0	6.9	0.0	0.0	0.0	0.0	--	2000
NS-19	Transformer 1 MV	4000	730876	4877689	202.5	54	68.1	0	0.0	-1.5	0.0	23.5	0.0	0.0	0.0	0.0	--	4000
NS-19	Transformer 1 MV	8000	730876	4877689	202.5	45	68.1	0	0.0	-1.5	0.0	83.8	0.0	0.0	0.0	0.0	--	8000
NS-20	Transformer 1 MV	32	730926	4877556	202.5	--	69.6	0	0.0	-5.3	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-20	Transformer 1 MV	63	730926	4877556	202.5	45	69.6	0	0.0	-5.3	0.0	0.1	0.0	0.0	0.0	0.0	--	63
NS-20	Transformer 1 MV	125	730926	4877556	202.5	58	69.6	0	0.0	4.0	0.0	0.4	0.0	0.0	0.0	0.0	--	125
NS-20	Transformer 1 MV	250	730926	4877556	202.5	60	69.6	0	0.0	2.8	0.0	0.9	0.0	0.0	0.0	0.0	--	250
NS-20	Transformer 1 MV	500	730926	4877556	202.5	65	69.6	0	0.0	-1.0	0.0	1.6	0.0	0.0	0.0	0.0	--	500
NS-20	Transformer 1 MV	1000	730926	4877556	202.5	63	69.6	0	0.0	-1.6	0.0	3.1	0.0	0.0	0.0	0.0	--	1000
NS-20	Transformer 1 MV	2000	730926	4877556	202.5	59	69.6	0	0.0	-1.6	0.0	8.2	0.0	0.0	0.0	0.0	--	2000
NS-20	Transformer 1 MV	4000	730926	4877556	202.5	54	69.6	0	0.0	-1.6	0.0	27.8	0.0	0.0	0.0	0.0	--	4000
NS-20	Transformer 1 MV	8000	730926	4877556	202.5	45	69.6	0	0.0	-1.6	0.0	99.1	0.0	0.0	0.0	0.0	--	8000
NS-21	Transformer 10 MV	32	730748	4878623	204.0	--	60.0	0	0.0	-3.3	0.0	0.0	0.0	0.0	0.0	0.0	--	32
NS-21	Transformer 10 MV	63	730748	4878623	204.0	64	60.0	0	0.0	-3.3	0.0	0.0	0.0	0.0	0.0	0.0	8	63
NS-21	Transformer 10 MV	125	730748	4878623	204.0	77	60.0	0	0.0	3.2	0.0	0.1	0.0	0.0	0.0	0.0	13	125
NS-21	Transformer 10 MV	250	730748	4878623	204.0	79	60.0	0	0.0	1.4	0.0	0.3	0.0	0.0	0.0	0.0	17	250
NS-21	Transformer 10 MV	500	730748	4878623	204.0	84	60.0	0	0.0	-1.0	0.0	0.6	0.0	0.0	0.0	0.0	25	500
NS-21	Transformer 10 MV	1000	730748	4878623	204.0	82	60.0	0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	22	1000
NS-21	Transformer 10 MV	2000	730748	4878623	204.0	78	60.0	0	0.0	-1.0	0.0	2.7	0.0	0.0	0.0	0.0	16	2000
NS-21	Transformer 10 MV	4000	730748	4878623	204.0	73	60.0	0	0.0	-1.0	0.0	9.3	0.0	0.0	0.0	0.0	4	4000
NS-21	Transformer 10 MV	8000	730748	4878623	204.0	64	60.0	0	0.0	-1.0	0.0	33.0	0.0	0.0	0.0	0.0	--	8000

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl



- Shovel Tested at a High Potential 5 Meter Interval
- Surface Surveyed at a High Potential 5 Meter Interval
- Development Boundary
- Approximate Location of Site BaGm-11
- Approximate Location of Site BaGm-12

Archaeological Study Map



Natural Heritage Study Map

Ministry of Tourism, Culture and Sport

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Programs and Services Branch
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October 4, 2013

Glen Tomkinson
Hamilton Solar Farm Partnership
620 Righters Ferry Road
Bala Cynwyd, PA 19004
USA

Dear Mr. Tomkinson,

RE: Modifications to the Hamilton Solar Farm, F-000687-SPV-130-505, our file HD00575

I am in receipt of the proposed changes to the Hamilton Solar Farm project in the form of a new map, the previous map, and a letter requesting a comment from this ministry.

I have examined these maps and concur that the proposed configuration changes dated September 19, 2013 do not in any way affect the validity of the archaeological assessment by Northeastern Archaeological Associates completed in 2011, nor is any further archaeological assessment required due to these changes. The ministry agrees that no negative impact to archaeological resources will result from the proposed changes.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Paige Campbell
Archaeology Review Officer

Ministry of Natural
Resources

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October 4, 2013

Cyrus Tingley
Hamilton Solar Farm Partnership
1 Yonge Street
Suite 1801
Toronto ON
M5E 1W7

RE: Modifications to Hamilton Solar Farm Partnership Solar Energy Facility

Dear Mr. Tingley,

The Ministry of Natural Resources (MNR) has received the document dated September 23, 2013 that describes modifications to the Hamilton Solar Farm Partnership Energy Facility subsequent to MNR's letter confirming the Natural Heritage Assessment in respect of the project.

Upon review of the modifications, MNR is satisfied that the Natural Heritage Assessment requirements of Ontario Regulation 359/09 have been met. Please add this letter as an addendum to the confirmation letter issued April 20, 2011 for the Hamilton Solar Farm Partnership Energy Facility.

If you wish to discuss this matter further, please contact Whitney Moore at whitney.moore@ontario.ca or 519-826-4961.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kathy Woeller".

Kathy Woeller
Regional Land Use Planning Supervisor
Southern Region MNR

cc Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE
Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE