



**NORTHLAND
POWER**

Long Lake Solar Project

Natural Heritage Environmental Impact Study

October 18, 2012



Northland Power Inc.
on behalf of
Northland Power Solar
Long Lake L.P.
Toronto, Ontario

Natural Heritage
Environmental Impact Study

Long Lake Solar Project

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Project Report

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**Northland Power Inc.
Long Lake Solar Project**

Natural Heritage Environmental Impact Study

Table of Contents

1. Introduction	5
1.1 Renewable Energy Approval Legislative Requirements	5
1.1.1 Records Review Report	5
1.1.2 Site Investigation Report	6
1.1.3 Evaluation of Significance Report	6
1.1.4 Environmental Impact Study Report.....	9
1.2 Background Information on Natural Heritage Features	10
1.3 Environmental Impact Study Format.....	10
2. Methodology	10
3. Project Components and Activities	11
3.1 Construction	11
3.2 Operation	12
3.3 Decommissioning.....	12
4. Potential Negative Environmental Effects and Proposed Mitigation Measures	13
4.1 Wetlands Supporting Amphibian Breeding Habitat	13
4.1.1 Construction.....	13
4.1.2 Operation.....	15
4.1.3 Decommissioning	15
4.2 Animal Movement Corridor	15
4.2.1 Construction.....	15
4.2.2 Operation.....	16
4.2.3 Decommissioning	16
4.3 Wetlands.....	16
4.3.1 Construction.....	16
4.3.2 Operation.....	17
4.3.3 Decommissioning	17
5. Environmental Effects Monitoring Plan – Design and Operations Report	17
6. Construction Plan Report	17
7. Summary and Conclusions	18

8. References..... 18

Appendix A Site Layout

List of Tables

Table 3.1	General Description of Construction Activities (From Hatch, 2011h).....	11
Table 5.1	Summary of Environmental Effects Monitoring Requirements with Respect to Significant Natural Features	21

List of Figures

Figure 1.1	Project Location and Significant Natural Heritage Features	7
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1. Introduction

Northland Power Inc. (hereinafter referred to as “Northland”) is proposing to develop a Class 3 10-megawatt (MW) ground-mounted solar facility in the unorganized township of Calder. This Project, known as the Long Lake Solar Project, is hereafter referred to as “Long Lake” or the “Project.”

The Project location is approximately 123 hectares (ha) in size and located on Lots 2 and 3, in the unorganized Township of Calder, with a transmission line associated with the Project that traverses across the northern portion of Lot 1. The Project location is situated on Clute Concession Road 7A9 (shown in Figure 1.1).

As stated in Sections 37 and 38 of Ontario Regulation (O. Reg.) 359/09 *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the “REA Regulation”), an Environmental Impact Study (EIS) is required for all significant natural heritage features determined to be within a specified setback in order to obtain a Renewable Energy Approval (REA). The EIS identifies the potential negative environmental effects, documents the proposed mitigation measures, and describes the environmental effects monitoring plan for the natural heritage features.

1.1 Renewable Energy Approval Legislative Requirements

Per Section 4 of the REA Regulation, ground-mounted solar facilities with a nameplate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA.

The REA process requires the preparation of several reports with respect to natural heritage features on and adjacent to the Project location, including the Records Review Report, Site Investigation Report, Evaluation of Significance, and if necessary, the EIS. The legislative requirements for these reports are summarized in the following sections.

1.1.1 Records Review Report

Section 35 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage records review to identify “whether the Project is

1. in a natural feature
2. within 50 m of an area of natural and scientific interest (earth science)
3. within 120 m of a natural feature that is not an area of natural or scientific interest (earth science).” (O. Reg. 359/09, s. 25, Table).

Natural features are defined in Section 1 (1) of the REA Regulation to be all or part of

- a) an area of natural and scientific interest (ANSI) (earth science)
- b) an ANSI (life science)
- c) a coastal wetland
- d) a northern wetland
- e) a southern wetland

- f) a valleyland
- g) a wildlife habitat
- h) a woodland.

With respect to woodlands and valleylands, Section 1(1) of O. Reg. 359/09 requires that these features be located south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under Section 3 of the *Planning Act*. This Figure shows that the proposed Project location is located on the Canadian Shield, and therefore valleylands and woodlands as defined by O. Reg. 359/09 cannot be located on the Project location.

Subsection 2 of Section 30 of the REA Regulation requires the proponent to prepare a report “setting out a summary of the records searched and the results of the analysis” (O. Reg. 359/09). The Natural Heritage Records Review Report (Hatch Ltd., 2012a) was prepared to meet these requirements.

1.1.2 Site Investigation Report

Section 26 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage site investigation for the purpose of determining

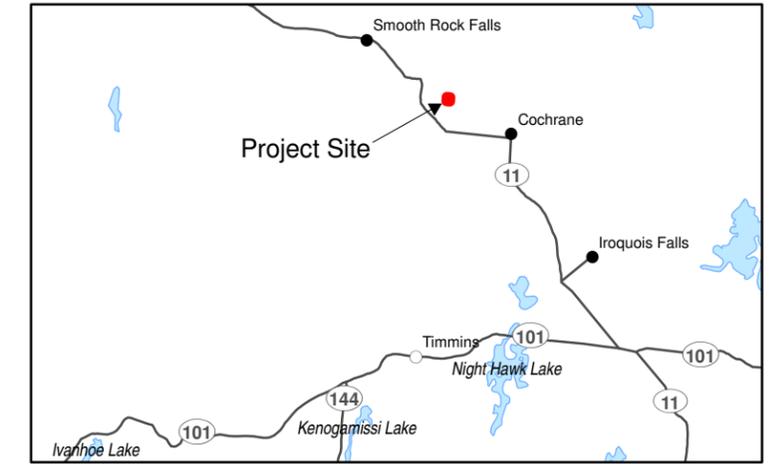
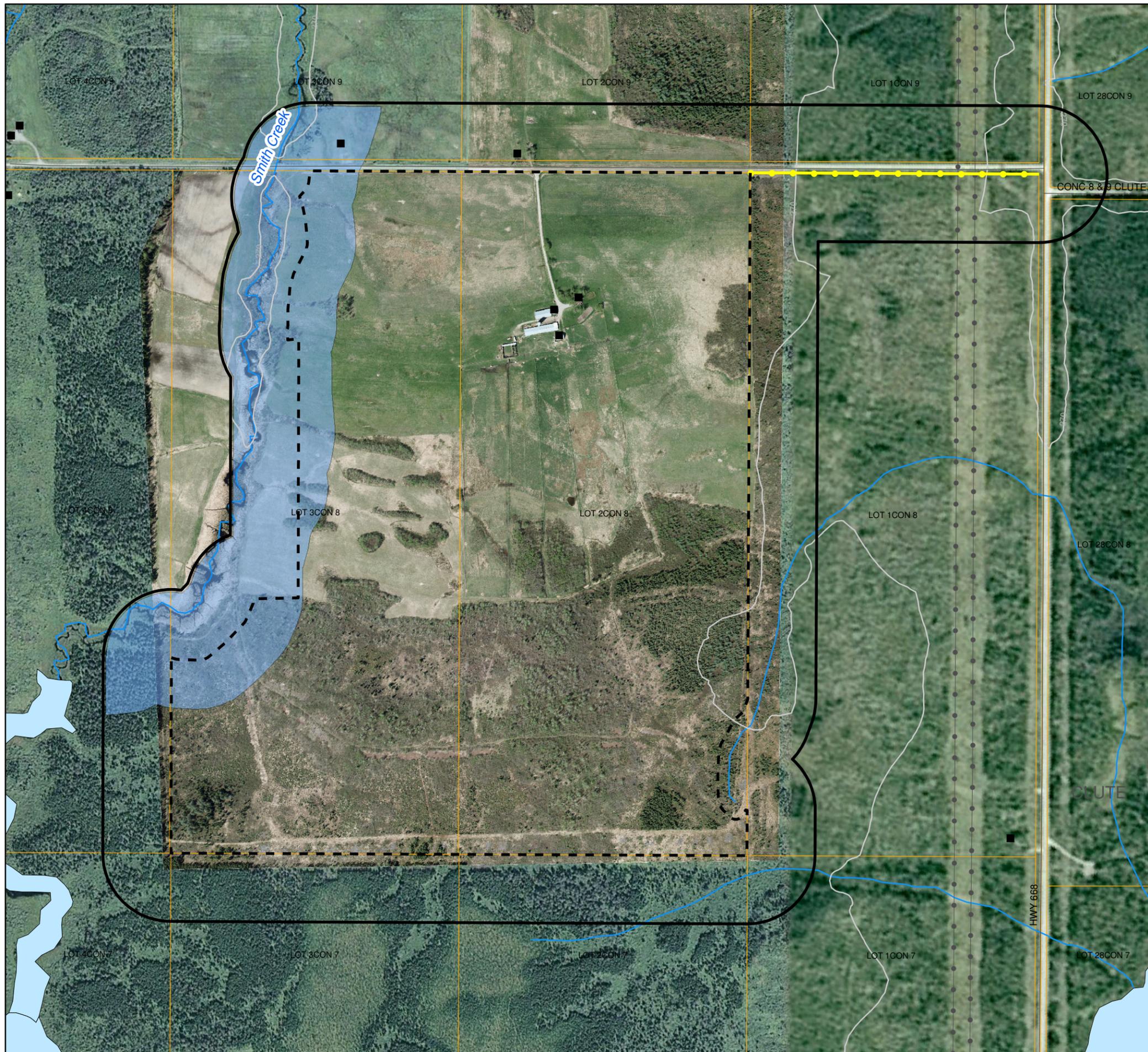
- whether the results of the analysis summarized in the Natural Heritage Records Review Report prepared under Subsection 25(3) are correct or require correction, and identifying any required corrections
- whether any additional natural features exist, other than those that were identified in the Natural Heritage Records Review Report prepared under Subsection 30(2)
- the boundaries, located within 120 m of the Project location, of any natural feature that was identified in the records review or the site investigation
- the distance from the Project location to the boundaries determined under Clause (c).

The Natural Heritage Site Investigation Report (Hatch Ltd., 2012b) was prepared to meet these requirements.

1.1.3 Evaluation of Significance Report

Section 27(1) of the REA Regulation requires proponents of Class 3 solar projects to undertake an evaluation of significance for natural heritage features identified during the records review and site investigation that sets out

- a determination of whether the natural feature is
 - ◆ provincially significant
 - ◆ significant
 - ◆ not significant
 - ◆ not provincially significant



LEGEND

- Building
- Roads
- Transmission Line
- Watercourse
- ▭ Parcel
- ▭ Waterbody

Significant Natural Heritage Features

- ▭ Animal Movement Corridor
- ▭ Wetland Supporting Amphibian Breeding Habitat

Project Components

- Proposed Transmission Line
- ▭ Project Location
- ▭ 120 m from Project Site

Notes:
 1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
 2. Spatial referencing UTM NAD 83.
 3. Satellite imagery obtained from Google Earth Pro, captured 2004.
 4. Airphoto obtained from Northland Power Inc., flown May 2011.

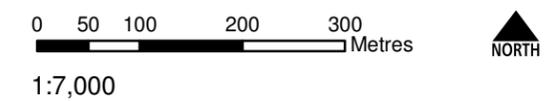


Figure 1.1
 Northland Power Inc.
Long Lake Solar Project
Project Location and Significant Natural Heritage Features

Back

- a summary of the evaluation criteria or procedures used to make the determinations
- the name and qualifications of any person who applied the evaluation criteria or procedures.

The Evaluation of Significance Report (Hatch Ltd., 2012c) for the natural features identified on and within 120 m of the Project location was prepared to meet these requirements.

1.1.4 Environmental Impact Study Report

Section 38(1) of the REA Regulation prohibits the construction, installation or expansion of any component of a solar project within the following locations:

- provincially significant northern wetland or within 120 m of a provincially significant northern wetland
- within 120 m of a provincially significant southern wetland
- within 120 m of a provincially significant coastal wetland
- a provincially significant area of natural and scientific interest (ANSI) (earth science) or within 50 m of a provincially significant ANSI (earth science)
- a provincially significant ANSI (life science) or within 120 m of a provincially significant ANSI (life science)
- a significant valleyland or within 120 m of a significant valleyland
- a significant woodland or within 120 m of a significant woodland
- a significant wildlife habitat or within 120 m of a significant wildlife habitat
- within 120 m of a provincial park
- within 120 m of a conservation reserve.

However, Section 38(2) allows proponents to construct within the locations noted above, subject to the completion of an EIS to assess negative effects and evaluate appropriate mitigation and monitoring measures.

Section 38(2) of the REA Regulation indicate that the EIS report must

- identify and assess any negative environmental effects of the projects on natural features, provincial parks or conservation reserves referred to in Section 38(1)
- identify mitigation measures in respect of any negative environmental effects
- describe how the environmental effects monitoring plan in the Design and Operations Report (Hatch Ltd., 2012e) addresses any negative environmental effects
- describe how the Construction Plan Report (Hatch Ltd., 2012d) addresses any negative environmental effects.

This EIS has been prepared to address these requirements for the construction of Project components within 120 m of significant natural heritage features noted in Section 1.1.

1.2 Background Information on Natural Heritage Features

The Natural Heritage Records Review (Hatch Ltd., 2012a) and Natural Heritage Site Investigation Report (Hatch Ltd., 2012b) confirmed that the Project will be constructed within 120 m of several natural features. Of these natural features, two were identified as significant natural heritage features during the evaluation of significance (Hatch Ltd., 2012c).

The natural heritage features that were classified as significant are

- wetlands supporting amphibian breeding habitats
- animal movement corridor associated with Smith Creek and associated riparian habitat
- significant wetlands.

These significant natural heritage features and their locations in relation to the Project development area are shown in Figure 1.1.

1.3 Environmental Impact Study Format

Section 1 of this EIS has identified the legislative requirements for an EIS under the REA Regulation and identified the reasons why an EIS is required for the Project. Section 2 provides the methodology of the EIS. Section 3 summarizes the activities associated with Project construction, operation and decommissioning, as described in the Project Description Report (Hatch Ltd., 2011h). Section 4 identifies and assesses negative environmental effects and the proposed mitigation measures to prevent/minimize the potential effects. Section 5 describes the environmental effects monitoring plan from the Design and Operations Report (Hatch Ltd., 2012e), and Section 6 describes how the Construction Plan Report (Hatch, 2012d) addresses the potential negative environmental effects. Section 7 summarizes the results of the EIS. References are included in Section 8.

2. Methodology

The following steps outline the methodology that was used to prepare this EIS:

1. Documentation of Project components and activities during all project phases, including construction, operations and decommissioning, including identification of temporal and spatial boundaries.
2. Background data collection on the natural features within 120 m of the Project location through the Records Review and Site Investigation processes.
3. Identification of the effects that is likely to occur on the environmental components as result of implementing the Project.
4. Development of mitigation measures to eliminate, alleviate or avoid the identified negative effects.
5. Design of an environmental effects monitoring program to confirm the predicted effects and the effectiveness of mitigation measures.

3. Project Components and Activities

The following sections briefly describe the construction, operation and decommissioning phases of the Project. The information is taken from the Project Description Report (Hatch Ltd., 2011h). More detailed information can be found in the Construction Plan Report (Hatch Ltd., 2012d), Design and Operations Report (Hatch Ltd., 2012e) and Decommissioning Plan Report (Hatch Ltd., 2012f). The Site Layout from the Construction Plan Report (Hatch Ltd., 2012d) is provided in Appendix A to show the detailed components of the facility including solar panel, inverter, transformer and access road locations.

3.1 Construction

Construction is anticipated to occur over an approximately 6-month period, likely commencing in April 2013 with commissioning scheduled for late October 2013. The activities associated with construction are summarized in Table 3.1.

Table 3.1 General Description of Construction Activities (From Hatch, 2011h)

Activity	Description
Access Road Construction	Activities associated with construction of internal access roads will include <ul style="list-style-type: none"> • removal of topsoil and subsoil • placement of granular base (at least 30 cm) • installation of ditches and culverts • installation of sediment and erosion control features as necessary • replacement of topsoil on the temporary access roads if the roads are to be removed.
Site Preparation	Activities associated with the site preparation will include <ul style="list-style-type: none"> • consultation with the landowner to determine the locations of topsoil and subsoil stockpiles where topsoil is stripped. Note that the piles will not be within 30 m of waterbodies and drainage routes. • accumulation of uncut or shredded crops on the soil surface where topsoil is not stripped • removal of trees and shrubs as required [to occur, wherever possible, outside of breeding bird period (May through July)] • installation of sediment and erosion control features as necessary.
Installation of Support Structures	Activities associated with the installation of support structures will include <ul style="list-style-type: none"> • creation of drilled holes for the purposes of stabilizing the support structures of the solar arrays • construction of foundations and/or support structures beneath transformers, inverters and solar panels • installation of solar panels on fixed racking structures • inspection of foundation construction and of support structures prior to the installation of solar modules, and wiring.
Underground Cable Installation	Activities associated with underground cable installation will include <ul style="list-style-type: none"> • installation of Direct Current (DC) wiring along the structural supports of the solar arrays. A network of underground DC cabling will be required at the termination point of the solar arrays to

Activity	Description
	centrally located inverters which will then convert the electricity to alternating current (AC). <ul style="list-style-type: none"> • utilization of a simple trenching device to install the cables; whereby a slot will be opened, the cable will be laid, and the soil replaced.
Transmission Line Erection	Activities associated with transmission line erection will include <ul style="list-style-type: none"> • construction of an underground distribution line which transports the electricity from the inverters to the transformer • erection of a overhead transmission connection from the transformer to transport the generated power from the Project to the connection point • utilization of new or existing wooden poles.
Site Security	Activities associated with site security will include <ul style="list-style-type: none"> • installation of gate and fence. • installation of additional security measures (e.g., security cameras, motion sensor flood lighting) if deemed necessary.

3.2 Operation

The expected commercial operation date (COD) is October 2013. The facility will operate 365 d/yr when sufficient solar radiation exists to generate electricity. The facility will be remotely monitored with no regular on-site employees. Maintenance is anticipated to occur quarterly. Maintenance activities will involve checking the structures and interconnections and cleaning the photovoltaic panels, as necessary. Maintenance activities associated with maintaining the fence, if required, will be conducted from the Project side (i.e., within the fence). All maintenance materials such as hydraulic fluids, will be brought on site as required and no on-site storage will be made available. Rain and snowfall are anticipated to be sufficient for the cleaning of the panels. Should extra water be required it will be brought on site. The system does not produce waste of any type. All debris as a result of maintenance or cleaning will be removed from the site immediately by the contracted party. The Project will also be inspected whenever the power output is lower than anticipated as this would be indicative of a mechanical problem. The Project is expected to have a minimum lifespan of 20 years, the length of the Feed-in-Tariff (FIT) contract that has been obtained.

3.3 Decommissioning

Decommissioning would occur when the decision has been made that it is no longer economically feasible to continue operation or refurbish generating equipment. It is anticipated that decommissioning would not occur for at least 35 years unless a power purchase agreement cannot be secured after the 20-yr duration of the FIT contract that has been obtained.

All decommissioning and site restoration activities would adhere to the requirements of appropriate regulatory authorities and would be conducted in accordance with all applicable federal, provincial and municipal permits and other requirements. The decommissioning and restoration process comprises the following activities:

- removal of the fencing, scrap metal and cabling. Where possible, these materials will be recycled, with non-recyclables taken to an approved disposal site.

- removal of support structures and foundations unless the landowner requests otherwise. These materials will be recycled where possible.
- site cleanup and regrading to original contours, and any damage to tile drainage system to be repaired/replaced.
- planting of leguminous crops to provide a rapid return of nutrients and soil structure.

Once the Project, other materials, and road network are removed from the site, and leguminous crops have been planted as identified above, the lands on the Project location will be used at the discretion of the landowner.

4. Potential Negative Environmental Effects and Proposed Mitigation Measures

This section describes the anticipated negative environmental effects on the identified significant natural features that could occur as a result of construction, operation and decommissioning phases of the Project (as described in Section 3).

Mitigation measures are proposed to minimize, eliminate or alleviate any negative effects. Potential negative effects are discussed by significant natural feature.

4.1 Wetlands Supporting Amphibian Breeding Habitat

The wetlands surrounding Smith Creek within 120 m west of the Project location are identified as significant wildlife habitat for wetland supporting amphibian breeding habitat. Potential impacts to this feature habitat as a result of construction, operations, and decommissioning are addressed below by project phase.

4.1.1 Construction

Wetlands supporting amphibian breeding habitat are located entirely off of the Project location within the wetland habitat surrounding Smith Creek west of the Project location. The minimum distance between the Project location and this habitat is 30 m. Therefore, there will be no direct encroachment into the habitat, and therefore no direct impact on the form of the habitat.

In order to ensure that there is no accidental impact to the wetland supporting amphibian breeding habitat, work areas will be well marked and workers will be advised to remain within the bounds of the demarcated work areas. Further, workers will be advised not to enter natural areas beyond the boundaries of the work area. This will ensure that disturbance of the wetland is minimized.

Further to the direct impacts of encroachment, indirect impacts may occur on the wetland supporting amphibian breeding habitat.

Dust may be mobilized due to vehicular traffic and heavy machinery use, drilling (if necessary for solar panel installation) and soil moving activities (e.g., excavation, trenching).

However, it is anticipated that the potential impacts can be substantially mitigated through the use of standard construction site best management practices and mitigation measures. In this regard, the document entitled "Best Practices for the Reduction of Air Emissions from Construction and

Demolition Activities” (Cheminfo Services Inc., 2005) will be used as a guideline for contractors. Mitigation measures to be used, as required, to control dust include

- use of approved dust suppression (i.e., water or non-chloride based materials) on exposed areas including access roads, stockpiles and works/laydown areas as necessary
- hard surfacing (addition of coarse granular A material, free of fine soil particles) of access roads or other high-traffic working areas
- phased construction, where possible, to limit the amount of time soils are exposed
- avoid earth moving works during excessively windy weather. Stockpiles to be worked (e.g., loaded/unloaded) from the downwind side to minimize wind erosion
- stockpiles and other disturbed areas to be stabilized as necessary (e.g., tarped, mulched, graded, revegetated or watered to create a hard surface crust) to reduce/prevent erosion and escape of fugitive dust.

Visual monitoring of dust generation will occur during the construction period and if dust is observed to be of concern, additional mitigation will be implemented. Given the mitigation and monitoring proposed, it is anticipated that dust generation will be relatively low in magnitude and limited in duration and geographical area, such that no negative effects on vegetation communities will occur as a result of dust.

In addition to dust generation, wetland habitats may also be impacted by alterations to surface water runoff. Activities that could occur during the construction phase that would have the potential to affect surface water runoff patterns and rates include

- land grading and ditching associated with access roads
- soil compaction due to heavy equipment or stockpiling
- vegetation removal.

The potential negative effects and proposed mitigation measures associated with these activities are discussed in the Waterbodies Environmental Impact Study (Hatch Ltd., 2012g). In general, it was concluded that through the use of effective mitigation measures, there will be no measurable change in surface water runoff as a result of soil compaction and vegetation removal. Further, land will be graded such that surface water runoff flows in the same general direction as present, therefore no alterations in moisture regime are anticipated. Grading and grubbing of the Project location will be minimized to the greatest extent possible. In addition, as is specified within the Waterbodies Environmental Impact Study (Hatch Ltd., 2012g), best management practices with respect to sediment and erosion control will be used to prevent disturbed soils from entering waterbodies. This will ensure that there is no impact on the wetlands function or contribution to local and regional water quality.

Amphibian species are expected to be less sensitive to disturbance effects than other wildlife species (such as birds), and given the setback from the provided habitat, it is not expected that there will be a retreat of amphibians from the immediate vicinity of work areas near the wetlands supporting the breeding habitat.

Therefore, construction will not have an impact on the form or function of wetland supporting amphibian breeding habitat.

4.1.2 Operation

As the wetland supporting amphibian breeding habitat will be located off the Project location, and outside of the fence, there is no potential for direct encroachment onto this feature during operations. Therefore, there is no potential for impact to the form of the wetland during operations.

In respect of function, as the wetland supporting amphibian breeding habitat is not on the Project location, and there is limited disturbance from an operating solar facility, the potential for impact to function is low. Further, as regular maintenance is anticipated to occur infrequently during the year, this would be consistent with existing disturbances on the Project location from agricultural operations.

No impact to form or function of the wetland supporting amphibian breeding habitat is anticipated as a result of operations activities.

4.1.3 Decommissioning

Disturbances present in the area will be similar to those that may occur during the construction phase as described in Section 4.3.1, and mitigation measures employed during construction will be used during decommissioning.

As a result, there will be no impact on the form or function of the wetland supporting amphibian breeding habitat during decommissioning.

4.2 Animal Movement Corridor

Smith Creek and associated riparian habitats within 120 m of the Project location are identified as a significant animal movement corridor. Potential impacts to this significant wildlife habitat as a result of construction, operations, and decommissioning are addressed below by project phase.

4.2.1 Construction

Potential impacts to the form of the animal movement corridor as a result of Project construction have been addressed with respect to the wetland supporting amphibian breeding habitats in Section 4.1.1 above.

The function of the animal movement corridor may be slightly impaired during portions of the construction phase of the Project where works may be occurring near Smith Creek. However, there would be limited time periods where this would be occurring. Further, many of the wildlife species, such as amphibians and mammals, that would use the corridor would be more likely to move across these relatively open areas at night, a period of time during which there will be no disturbance from construction. Given the separation of the Project from the animal movement corridor, it is expected that there will be a minor, temporary impact on the wildlife use of this corridor, resulting in some limited occurrence of retreat from this corridor. Given the amount of suitable habitat available within the area, it is not expected that this will have an impact on wildlife movement beyond the immediate vicinity of the Project location.

4.2.2 Operation

Potential impacts to the form of the animal movement corridor have been addressed within Section 4.1.2.

No impact to the function of the animal movement corridor is anticipated as a result of operation activities. There will be limited disturbance associated with Project operations as requirements for maintenance are low and there is very little noise emitted from the facility.

4.2.3 Decommissioning

Disturbances present in the area will be similar to those that may occur during the construction phase as described in Section 4.2.1, and mitigation measures employed during construction will be used during decommissioning.

As a result, there will be no impact on the form or function of the animal movement corridor during decommissioning.

4.3 Wetlands

A provincially significant wetland complex has been identified on and within 120 m of the Project location, which extends for several hundred metres from the Project location. Potential impacts to provincially significant wetland as a result of construction, operations, and decommissioning are addressed below by project phase.

4.3.1 Construction

Portions of the provincially significant wetland, consisting of both swamp and thicket swamp communities, will be cleared to permit construction of the Project. This will result in an overall removal of 52.2 ha, or 3.3% of the provincially significant wetland complex. Swamp and thicket swamp community types represent 90% of the wetland complex, so these habitat types will remain abundantly represented within the overall wetland community. It is not possible to mitigate the effects of wetland removal. Therefore, though there will be reduction in the amount of wetland, this will not have an impact on the overall form of the wetland community as there will be several hectares of undisturbed wetlands present within the complex.

Potential impacts to the form of the wetland within 120 m of the Project location as a result of Project construction have been addressed with respect to the wetland supporting amphibian breeding habitats in Section 4.1.1 above.

Given the size of the wetland community, the characteristics of the wetland communities being removed (i.e., swamp communities as opposed to open water communities), and the remaining abundance of these wetland communities found within the complex, the removal of some of the swamp and thicket swamp communities is not expected to impact the functions of the wetland community as

- the wetlands being removed are all at least 30 m away from the watercourses, and therefore there is no impact to primary production, watershed protection, or fish habitat

- the wetland types being removed are abundant in the wetland complex and therefore there would be no discernible impact on the wetland's contribution to preservation of biodiversity or support of natural cycles.

4.3.2 Operation

As the remaining wetlands will be located off the Project location, and outside of the fence, there is no potential for direct encroachment onto this feature during operations. Therefore, there is no potential for impact to the form of the wetland during operations.

No impact to the function of the remaining wetlands is anticipated as a result of operation activities. There will be limited disturbance associated with Project operations as requirements for maintenance are low and there is very little noise emitted from the facility.

4.3.3 Decommissioning

Disturbances present in the area will be similar to those that may occur during the construction phase as described in Section 4.3.1, and mitigation measures employed during construction will be used during decommissioning.

As a result, there will be no impact on the form or function of the wetland during decommissioning.

5. Environmental Effects Monitoring Plan – Design and Operations Report

As discussed in the Design and Operations Report (Hatch Ltd., 2012e), environmental effects monitoring is proposed in respect of any negative environmental effects that may result from engaging in the Project. As per the REA Regulation, the monitoring plan identifies

- performance objectives in respect of the negative environmental effects
- mitigation measures to assist in achieving the performance objectives
- a program for monitoring negative environmental effects for the duration of the time the Project is engaged in, including a contingency plan to be implemented if any mitigation measures fail.

For the purposes of this EIS report, the effects monitoring measures with respect to negative effects on the significant natural features have been reproduced here, in Table 5.1.

The monitoring proposed in Table 5.1 will confirm that mitigation measures are functioning as designed to meet performance objectives. If monitoring shows that performance objectives are not being met, the contingency measures documented in Table 5.1 will be used to ensure that remedial action is undertaken as necessary to meet the performance objectives.

6. Construction Plan Report

The REA Regulation requires proponents of Class 3 solar projects to prepare a Construction Plan Report (CPR). Hatch completed the CPR for this Project (Hatch Ltd., 2012d). The CPR details the construction and installation activities, location and timing of construction and installation activities,

any negative environmental effects that result from construction activities within 300 m of the Project and proposed mitigation measures for the identified negative environmental effects. The CPR addresses all potential effects of construction on natural features within 300 m of the Project location in a general manner. The mitigation proposed in the CPR with respect to preventing/minimizing negative effects on natural features is the same as that discussed in this EIS. Additional mitigation is proposed to address negative effects during construction not related to natural features. Therefore, the CPR and this EIS should be read in conjunction with each other, although all negative effects and mitigation requirements with respect to significant natural features are contained within this EIS and duplicated in the CPR.

7. Summary and Conclusions

As discussed in the Natural Heritage Records Review (Hatch Ltd., 2012a), the Natural Heritage Site Investigation (Hatch Ltd., 2012b) and the Evaluation of Significance (Hatch Ltd., 2012c), there are significant wildlife habitats and provincially significant wetland found on and within 120 m of the Project location.

The EIS has been prepared to identify potential negative environmental effects that all phases of the Project may have on these significant natural features. Mitigation measures have been proposed to prevent these effects from occurring or minimize the magnitude, extent, duration and frequency in the event that they do occur to an acceptable level.

8. References

- Cheminfo Services Inc. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared for Environment Canada. March 2005. 49 pp.
- DeJong-Hughes, J., J. F. Moncreif, W. B. Vorhees, and J. B. Swan. 2001. Soil Compaction Causes, Effects and Control. Regents of the University of Minnesota. Available on-line at <http://www.extension.umn.edu/distribution/cropsystems/DC3115.html>. Accessed November 28, 2007.
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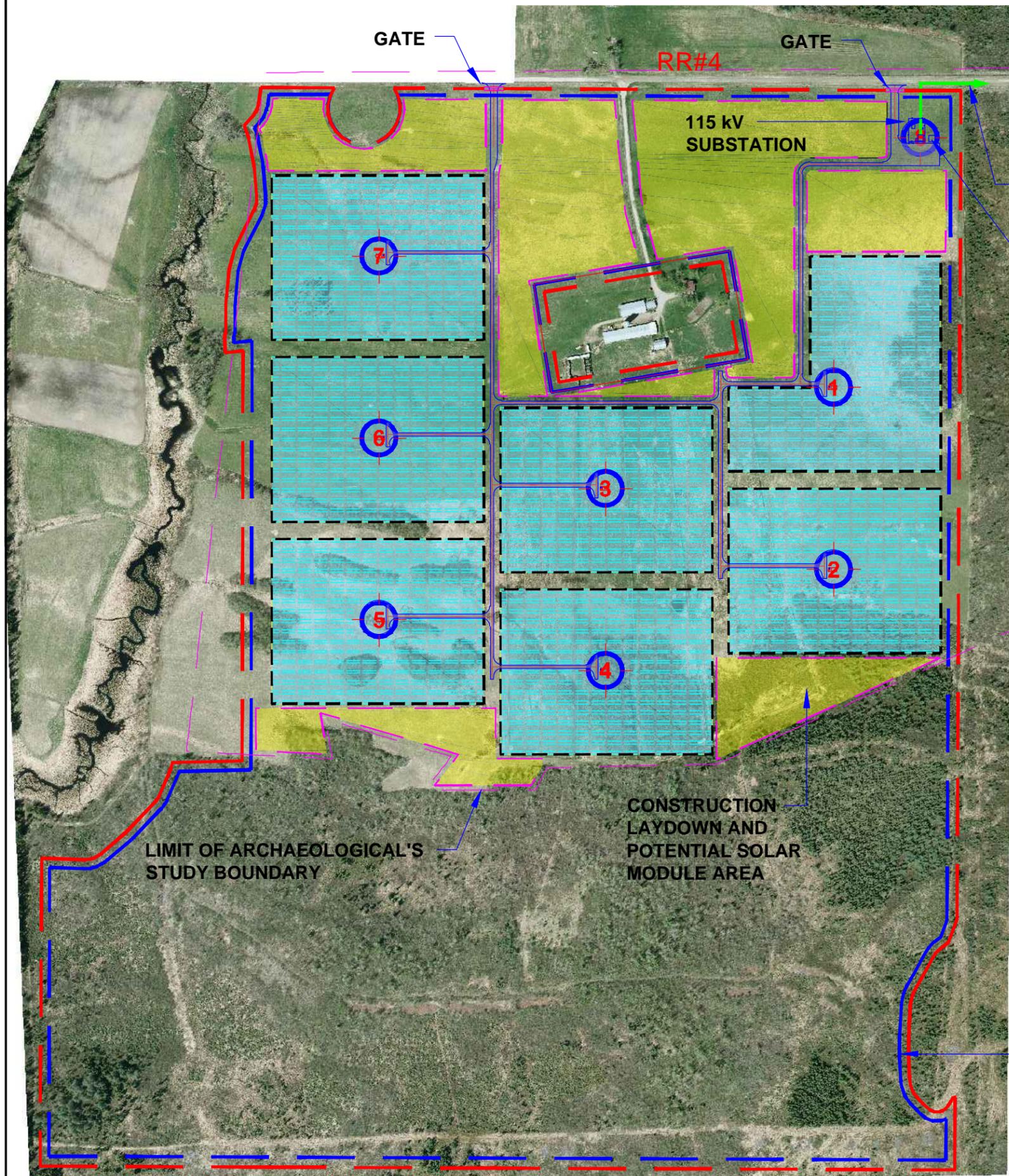
Table 5.1 Summary of Environmental Effects Monitoring Requirements with Respect to Significant Natural Features

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan				Contingency Measures	
			Methodology	Monitoring Locations	Frequency	Rationale		Reporting Requirements
Construction Phase								
Encroachment on wetland community	30 m setback from wetland.	Prevent encroachment into wetland community.	Visual monitoring of work areas.	Along western edge of Project location.	Periodically during all construction activities.	Visual monitoring will enable detection of any encroachment into the 30 m setback from the wetland community.	Reported in monthly environmental monitoring report during construction.	Remediation measures will be undertaken should any encroachment beyond the established work areas be identified.
Dust generation and off-site transport	Standard construction site best management practices to prevent fugitive dust.	Minimize fugitive dust from the construction site.	Visual monitoring of visible dust plumes during construction.	Throughout construction site.	Periodically during all construction activities.	Visual dust monitoring would identify if dust plumes are an issue and where their source may be.	Reported in monthly environmental monitoring report during construction.	Dust control measures implemented as necessary to prevent/minimize dust generation.
Operations Phase								
None identified								
Decommissioning Phase								
Dust generation and off-site transport	Standard site best management practices to prevent fugitive dust.	Minimize fugitive dust from the Project location.	Visual monitoring of visible dust plumes during decommissioning.	Throughout Project location.	Periodically during all decommissioning activities.	Visual dust monitoring would identify if dust plumes are an issue and where their source may be.	Reported in monthly environmental monitoring report during decommissioning.	Dust control measures implemented as necessary to prevent/minimize dust generation.

Blank back

Appendix A

Site Layout



TO 115 kV CONNECTION POINT
 APROX. 875 METERS
 (49.145303, -81.274923)

115 kV
 O.H. LINE

MAINTENANCE
 BUILDING

LEGEND:

-  GRAVEL ACCESS ROAD
-  OVERHEAD 115 kV LINE
-  PROPERTY BOUNDARY / FENCE LINE
-  AVAILABLE AREA BOUNDARY
-  CONSTRUCTION LAYDOWN AND POTENTIAL SOLAR MODULES AREA
-  INVERTER'S TRANSFORMER & SUBSTATION'S TRANSFORMER

INVERTER'S TRANSFORMER (UTM Co-ordinate)		
17 U	X (m E)	Y (m N)
P1	479487.24	5443342.60
P2	479487.24	5443141.00
P3	479233.84	5443230.60
P4	479233.84	5443029.00
P5	478982.46	5443085.00
P6	478982.46	5443286.60
P7	478982.46	5443488.20

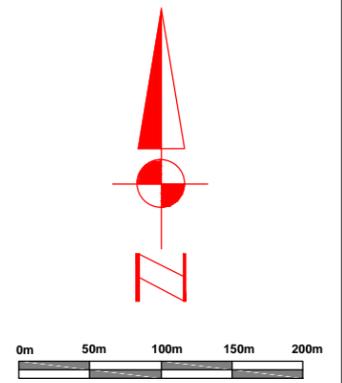
115 kV SUBSTATIONS TRANSFORMER (UTM Co-ordinate)		
17 U	X (m E)	Y (m N)
P8	479583.51	5443619.44

LIMIT OF ARCHAEOLOGICAL'S
 STUDY BOUNDARY

CONSTRUCTION
 LAYDOWN AND
 POTENTIAL SOLAR
 MODULE AREA

AVAILABLE AREA
 BOUNDARY

REVISIONS			
NO	DATE	SYMBOL	REMARKS
P0	MAY 2012		ISSUED FOR NOISE MODELING



STAMP	

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PROJECT
**NORTHLAND POWER SOLAR
 LONG LAKE**

DRAWN BY	TIEN PHAM	VERIFIED BY	
SCALE	N.T.S.	VERIFIED BY	
DATE	MAY 2012	APPROVED BY	
ISSUED FOR TENDER			

TITLE
**SOLAR FARM PROJECT
 SITE PLAN**
 DRAWING No. **SP-01 (LONG LAKE)** Rev.P0

**PRELIMINARY LAYOUT
 NOT FOR CONSTRUCTION**

