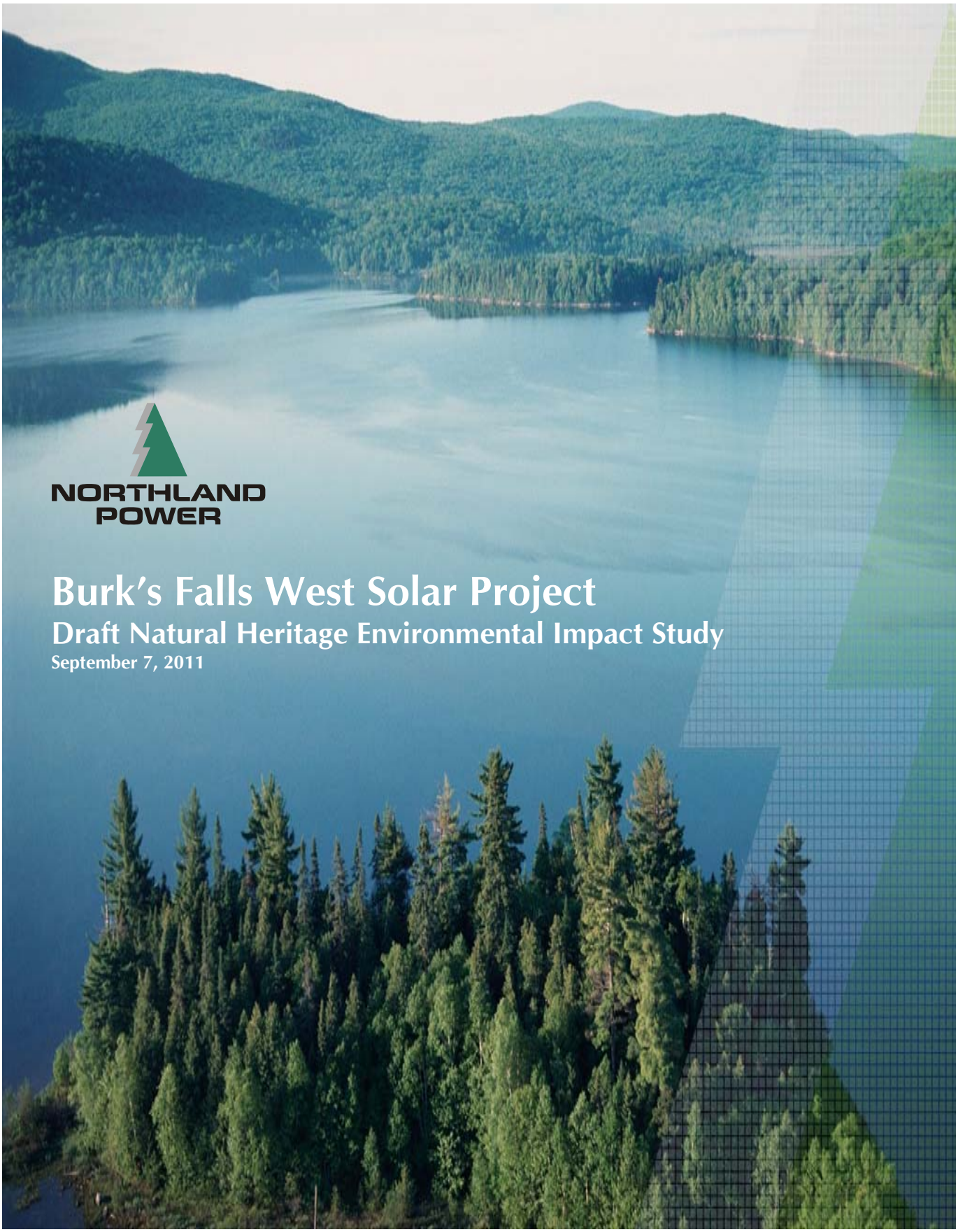


NORTHLAND POWER

Burk's Falls West Solar Project

Draft Natural Heritage Environmental Impact Study

September 7, 2011

Northland Power Inc.
on behalf of
Northland Power Solar
Burk's Falls West
Toronto, Ontario

Draft Natural Heritage Environmental Impact Study

Burk's Falls West Solar Project

H334844-0000-07-124-0183
Rev. 0
September 7, 2011

Project Report

September 7, 2011

Northland Power Inc.
Burk's Falls West Solar Project

DRAFT Natural Heritage Environmental Impact Study

Table of Contents

List of Tables

List of Figures

Blank back

1. Introduction

Northland Power Solar Burk's Falls West L.P. (hereinafter referred to as "Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic project titled Burk's Falls West Solar Project (hereinafter referred to as the "Project"). The Project will be located on approximately 40 hectares (ha) of land, located south of Highway 520 at the border of Armour and Ryerson Townships, in the single tier municipality of Armour Township (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 name plate 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 25 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, or

h) a woodland.

In respect of 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 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 3 of Section 25 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., 2011a) 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

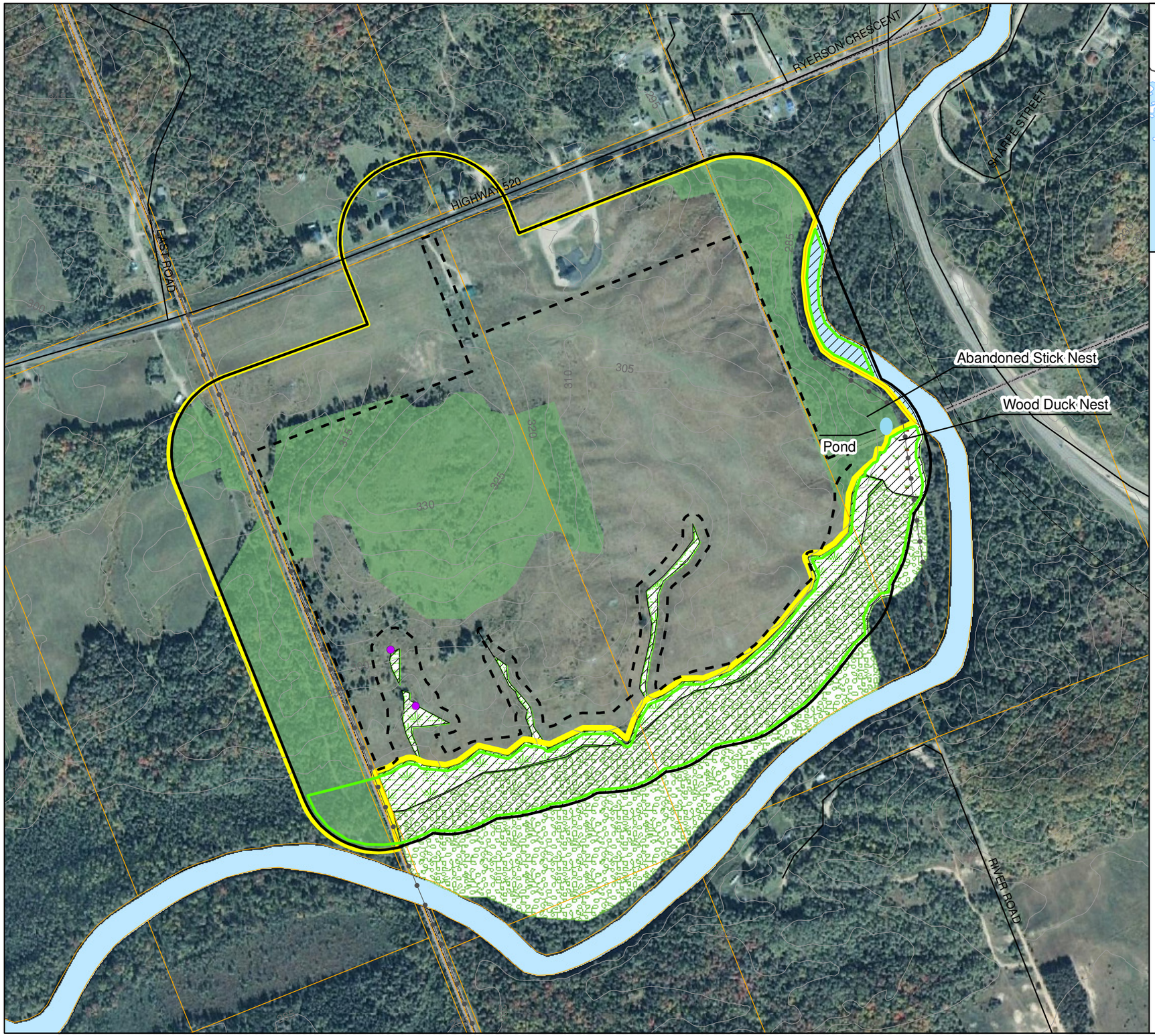
- whether the results of the analysis summarized in the Natural Heritage Records Review Report prepared under Subsection 25(3) are correct or require correction, and identifying any required corrections
- whether any additional natural features exist, other than those that were identified in the Natural Heritage Records Review Report prepared under Subsection 25(3)
- 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).

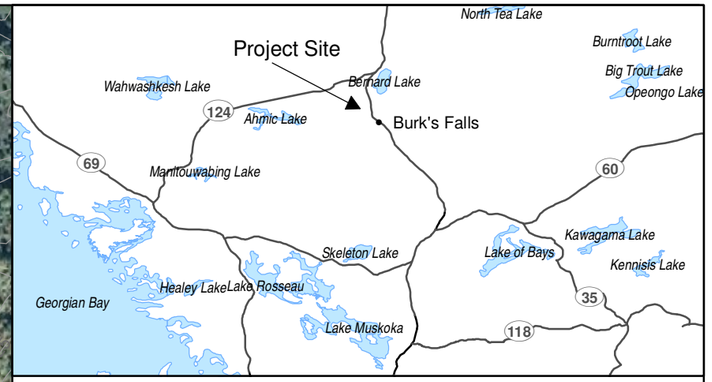
The Natural Heritage Site Investigation Report (Hatch Ltd., 2011b) was prepared to meet these requirements.

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
- 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.





Legend

- Seepage Area
- Road
- Railway
- Trail
- Transmission Line
- Topographic Contour (5 m Interval)
- Project Location
- 120 m from Project Location
- Parcel
- Woodland

Significant Natural Heritage Features

- Milksnake Habitat
- Waterfowl Stopover and Staging Area / Turtle Over-wintering Sites
- Animal Movement Corridor
- Snapping Turtle / Northern Map Turtle Habitat

Wetlands (complexed to Magnetawan River Provincially Significant Wetland)

- Mineral Mixed Swamp
- Mineral Alder Thicket Swamp
- Mineral Meadow Marsh

0 50 100 200 Metres

NORTH

1:6,000

Notes:
1. Base and Environmental data downloaded from LIO, Feb 18, 2011.
2. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
3. Spatial referencing UTM NAD 83.
4. Satellite imagery obtained from Google Earth Pro, captured 2007.

Figure 1.1
Northland Power Inc.

Burk's Falls West Solar Project
Project Location and Significant Natural Heritage Features

HATCH™

P:\\NiaDATA2\Projects\NORTHLAND\334844\DATABASES\GIS\BurksW_Alt\BurksW_EOS_30Jun11.mxd Last updated Wednesday, August 31, 2011

Blank back

The Evaluation of Significance Report (Hatch Ltd., 2011c) 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 indicates 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., 2011e) addresses any negative environmental effects
- describe how the Construction Plan Report (Hatch Ltd., 2011d) 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 and described in Section 1.2.

1.2 Background Information on Natural Heritage Features

The Natural Heritage Records Review Report (Hatch Ltd., 2011a) and Natural Heritage Site Investigation Report (Hatch Ltd., 2011b) confirmed that the Project will be constructed within 120 m of several natural features. Of these natural features, several were identified as significant natural heritage features during the evaluation of significance (Hatch Ltd., 2011c).

The natural heritage features that are classified as significant are

- habitat for species of Conservation Concern (Milksnake, Northern Map Turtle, Snapping Turtle)
- Magnetawan River (including shoreline/riparian areas), and adjacent wetlands, within 120 m of the Project location as a significant animal movement corridor,
- Magnetawan River as a significant waterfowl stopover and staging area, and turtle over-wintering sites
- wetland within 120 m of the Project location is treated as a Provincially Significant Wetland.

These significant natural heritage features and their location 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., 2011e) and Section 6 describes how the Construction Plan Report (Hatch, 2011d) 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., 2011d), Design and Operations Report (Hatch Ltd., 2011e) and Decommissioning Plan Report (Hatch Ltd., 2011f).

The Site Layout from the Construction Plan Report (Hatch Ltd., 2011d) is provided in Appendix A to show the detailed components of the facility including solar panel, inverter, transformer, fence, and access road locations.

3.1 Construction

Construction is anticipated to occur over an approximately 6-month period with commissioning scheduled for fall 2012. The activities associated with construction are summarized in Table 3.1.

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

Activity	Description
Access Road and Parking Lot Construction	Activities associated with construction of internal access roads and parking lot will include • 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
Site Preparation	Activities associated with the site preparation will include • consultation with the land owner 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 • installation of sediment and erosion control features • clearing trees and grubbing from hedgerows and wooded areas on the Project location where required (shown in Figure 1.1).
Installation of Support Structures	Activities associated with the installation of support structures will include • creation of approximately 7100 piles (structural rack supports), spaced approximately 4 m apart within the array rows, for the photovoltaic arrays. Array rows will be spaced at 7.6 m. Detailed geotechnical analysis of the ground conditions on the Project location, which will ultimately determine the exact requirements for support structures, however the following applies: ◆ in areas with little or no rock present, Helical piles will be used with no drilling required ◆ in areas with significant rock present, a 3.5-in. to 4.5-in. hole will be drilled into the rock and a non-helical pile driven into the hole ◆ in areas with a combination of rock and soil, an approximately

Activity	Description
	460-mm hole will be drilled, followed by placement of concrete. Following concrete placement, pile installation would proceed as in areas with significant rock. • construction of foundations and/or support structures beneath transformers, inverters and photovoltaic panels • installation of photovoltaic panels on fixed racking structures; height of panels above ground is currently anticipated to be 1 m at the first row of panels • inspection of foundation construction and of support structures prior to the installation of photovoltaic modules, and wiring.
Underground Cable Installation	Activities associated with underground cable installation will include • installation of direct current (DC) wiring along the structural supports of the photovoltaic arrays. A network of underground DC cabling will be required at the termination point of the photovoltaic arrays to centrally located inverters which will then convert the electricity to alternating current (AC). • 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.
Distribution Line Erection	Activities associated with distribution line erection will include • construction of an underground distribution line which transports the electricity from the inverters to the transformer • erection of a 10 to 20-m overhead distribution connection from the transformer to transport the generated power from the Project to the 44-kV connection point (PCC on site layout in Appendix A)
Site Security	Activities associated with site security will include installation of gate and fence around the perimeter of the Project location shown in Figure 1.1, and not around the entire property available for the Project. Fencing will be chain link, about 2.0 m high, with barbed wire on top of the fence.
Revegetation	Following construction, the entire site, including beneath the solar panels, will be planted with grasses or other low-growth vegetation. Vegetation planted will be native species, where feasible and consistent with protecting slopes from erosion.

3.2 Operation

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. All maintenance materials such as hydraulic fluids, will be brought on site as required and non 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. It is anticipated that occasional vegetation management will be required on the Project location. Vegetation management will be conducted through mechanical means (mowing), i.e., herbicides will not be used to control vegetation growth. 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.

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 20 years after operations commence, i.e., after the Feed-In-Tariff (FIT) contract that has been presently obtained expires.

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 site restoration process comprises the following activities:

- Removal of the scrap metal and cabling. Where possible, these materials will be recycled, with non-recyclable material taken to an approved disposal site.
- Removal of support structures and foundations. These materials will be recycled where possible.
- Removal of access roads and parking lot. Granular material to be made available for reuse 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, the fields will be returned to their condition prior to the Project 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.

These negative effects and mitigation measures are discussed by significant natural feature.

4.1 Milksnake Habitat

Agricultural fields and woodlands on and within 120 m of the Project location were identified as significant Milksnake habitat. Potential impacts to Milksnake habitat are discussed further below by construction, operations, and decommissioning phases of the Project.

4.1.1 Construction

Construction of the Project will result in direct encroachment onto the significant wildlife habitat for Milksnake that is present on the Project location. This will result in a temporary loss of general use habitat for Milksnake during construction of the Project. Habitat lost represents a fraction of the

available habitat for Milksnake within the region, and no hibernacula features are known from the Project location. It is not possible to mitigate this effect, however, this effect is not expected to impact the form or function of Milksnake habitat present within the regional area beyond the lands on the Project location. Further, in order to minimize the scale of impact, work areas will be well marked and workers will be advised to remain within the bounds of the demarcated work areas.

Beyond direct impacts to their habitat, Milksnake are habitat generalists and may be at risk of incidental take as a result of construction activities. In order to minimize the potential for incidental take of wildlife, speeds on access roads of the Project location will be restricted. Further, daily visual monitoring of the project location and construction machinery will be completed to search for wildlife to ensure that potential impacts to these species are minimized. It is not expected that once construction activities are actively ongoing that Milksnake will enter an active work area, and therefore risk of mortality will be minimized. In addition, the construction workforce will be made aware of the potential for Milksnake occurring on the Project location and that measures should be taken to avoid Milksnake wherever possible. Prior to construction, protocols for wildlife encounters on the Project location will be established with the Ministry of Natural Resources (MNR) in order to ensure there is no impact on the species. It is expected that such protocols will consist of

- allowing wildlife to move freely through the Project location (the preferred option)
- directing wildlife (i.e., approaching wildlife from the direction opposite the preferred escape route) off the Project location where possible (i.e., in case of deer or turkeys), or
- removal of the wildlife out of harm's way by an individual trained in the safe handling and transport of wildlife.

The use of the mitigation measures identified above is expected to result in a negligible risk to Milksnake of incidental take. However, if incidental take of Milksnake are noted, work within the area will be ceased immediately, and the MNR will be contacted to make them aware of the occurrence. Work in the area will remain ceased until a survey is conducted by a trained biologist to ensure that there are no Milksnake present in the area. In addition, additional mitigation measures will be concurrently considered with MNR.

The presence of the construction workforce and construction activities associated with the Project will also result in auditory and visual disturbance of local wildlife populations. Milksnake may temporarily retreat from these areas during construction as a result of the disturbance; however, as there is abundant habitat within the area, this is not expected to impact the local population.

Therefore, as a result of the mitigation measures identified above, the sole impact expected on Milksnake habitat during construction is the loss of general use habitat within the Project location.

4.1.2 Operation

Operation of the Project is not expected to impact Milksnake habitat as all activities will be restricted to the previously disturbed Project location.

Similar to construction, beyond any direct impacts to their habitat, Milksnake may be at risk of incidental take during maintenance activities, such as site maintenance and vegetation management. Similar to construction, speeds on access roads of the Project location will be restricted. Further,

visual monitoring of work areas and maintenance machinery will be completed at the start of a work day, when these occur, to search for wildlife to ensure that potential impacts to these species are minimized. In addition, the maintenance workforce will be made aware of the potential for Milksnake occurring on the Project location and that measures should be taken to avoid Milksnake wherever possible. It is expected that vegetation management will only be required on an annual basis, with timing scheduled for late fall (i.e., late October/November) to ensure that Milksnake are not present on the Project location. Should additional mowing be required earlier in the year (i.e., vegetation growth is greater than expected), mowing will occur after June in the middle of the day, when Milksnake would be expected to be most active and able to evade equipment. As previously described in Section 4.1.1.1 with respect to construction, prior to operations, protocols for wildlife encounters on the Project location will be established with the MNR in order to ensure there is no impact on the species.

Given that specific habitat features for Milksnake have not been identified on or within 120 m of the Project location, the use of the mitigation measures identified above is expected to result in a negligible risk to Milksnake of incidental take. However, if incidental take of Milksnake are noted, work within the area will be ceased immediately, and the MNR will be contacted to make them aware of the occurrence. Work in the area will remain ceased until a survey is conducted by a trained biologist to ensure that there are no Milksnake present in the area.

Given that maintenance activities are expected to be short term, and since Milksnake are commonly observed around man-made structures, operations activities are not expected to disturb Milksnake populations.

As a result, operations are not expected to result in impacts to Milksnake or Milksnake habitat.

4.1.3 Decommissioning

During the decommissioning phase, all disturbed areas of the Project location will be restored such that there will be a restoration of all previously lost general use Milksnake habitat. As decommissioning will require several months, it is not possible to restrict decommissioning to Milksnake inactive periods. Decommissioning will occur during the summer months. Disturbances present in the area will be similar to those that may occur during the construction phase as described in Section 4.1, and mitigation measures employed during construction will be used during decommissioning.

Overall, there will be a net benefit for Milksnake during decommissioning as a result of habitat restoration previously lost as a result of Project construction.

4.2 Turtle Over-wintering Sites/ Waterfowl Stopover and Staging Area

The Magnetawan River within 120 m of the Project location is identified as a significant turtle over-wintering site, and waterfowl stopover and staging area. Potential impacts to these significant wildlife habitats as a result of construction, operations, and decommissioning are addressed below by project phase.

4.2.1 Construction

These significant wildlife habitats are located entirely off of the Project location. The minimum distance between the Project location and these habitats is 50 m. Given this separation between the

Project location and these habitat features, construction activities are not expected to result in disturbance of wildlife within the waterfowl stopover and staging area. As construction will occur during the summer months, there will be no impact to over-wintering turtles.

The Magnetawan River which provides these habitats may also be impacted by alterations to surface water quality, i.e., impacts to the form of the feature.

Negative environmental effects that could occur during the construction phase that would have the potential to affect surface water quality in ditches and nearby watercourses include (i) increased erosion and sedimentation, (ii) dust generation, (iii) accidental spills of fuels and (iv) accidental spills of concrete.

4.2.1.1 Increased Erosion and Sedimentation

Disturbance of the Project location due to vegetation clearing, topsoil and subsoil stripping (if necessary), grading, use of heavy machinery, stockpiling and concentration of flow in drainage features (e.g., ditches) has the potential to increase soil erosion due to exposure of bare soil (not protected by vegetation) to the effects of surface water (e.g., rain, overland flow due to rain/snow melt). Erosion is defined *as* the process where individual soil particles are detached from the ground, whereas sedimentation is defined as the subsequent transport (by wind or water) and deposition of the detached soil particles. Erosion and sedimentation have the potential to affect surface water quality by resulting in higher levels of turbidity and possibly contaminants associated with the soil surface (e.g., pesticides due to previous agricultural activities) in receiving waterbodies. This is of particular concern along the southern and eastern edges of the Project location where the land slopes toward the Magnetawan River.

In order to mitigate this potential, a conceptual erosion and sediment control (ESC) plan is proposed below which will be supplemented during the detailed design phase by an ESC drawing and detailed plan to be prepared and stamped by the proponent's engineer or contractor's engineer. This detailed plan and drawing will be provided to MNR for review and comment prior to construction. The ESC will be supplemented by a stormwater management plan (SMP) that will also be prepared and stamped by the proponent's engineer or contractor's engineer. The SMP will ensure that the water budget/drainage is similar to existing conditions.

Preventing erosion from occurring in the first place is the primary goal of the ESC plan and measures such as proper construction phasing, minimizing the size and duration of soil disturbance and exposure and revegetating or stabilization as soon as possible after disturbance are all identified as effective erosion control measures. Sediment control measures are the last line of defence and are implemented to ensure that eroded soil particles are not transported off the Project location or to watercourses. Sediment control measures include measures such as silt fence barriers to trap and retain sediments.

The main mitigation measures that will form the basis for the ESC plan will include the following.

- Minimize the size of the cleared and disturbed areas at the construction site. Install limit of work devices to prevent the contractor from operating outside the defined construction area (e.g., silt fences at the edge of the 30-m buffer setback around the waterbodies).
- Terrace or regrade heavily sloped areas, if determined to be necessary.

- Existing ground cover vegetation will be left on site, to the extent possible to minimize exposure of bare soils.
- Phase construction to minimize the time that soils are exposed.
- Limit vegetation removal to areas within the development footprint and solar panel buffer requirements. Limit of work devices should be installed outside the drip line of residual trees, where possible to prevent damage.
- An adequate supply of erosion control devices (e.g., geotextiles, revegetation materials) and sediment control devices (e.g., silt fence barriers) to be provided on site to control erosion and sedimentation and respond to unexpected events.
- Sediment control fencing may be installed along the periphery of the Project location where there is the potential for sedimentation off site and at the edge of the 30-m setback area adjacent to the waterbodies as one of the first construction activities. These silt fence barriers should remain in place until construction is complete and site vegetation, and other long-term protection measures, are stabilized and adequate to prevent further erosion.
- Divert runoff from the temporary and permanent access roads or laydown areas through vegetated areas or into a properly designed and constructed drainage collection system to ensure that exposed soils are not eroded. Runoff velocities in ditches or other drainage routes, or along slopes, to be kept low via proper installation of flow velocity control measures such as enhanced vegetated swales or check dams, to minimize erosion potential. Runoff discharge locations to be protected with erosion resistant material, if required. Ditches to be lined where necessary.
- Orient access roads wherever possible to be perpendicular to the slope.
- Grade stockpiles to a stable angle as soon as possible after disturbance to eliminate potential slumping. Revegetation (if during the growing season) or some other means of stabilization (e.g., tarping) should occur for any disturbed surface that is to be left exposed for longer than 30 days.
- Revegetate with native plant species or stabilize exposed sites as soon as possible after they have been disturbed, using quick growing grasses or other vegetation comprised of native species approved for use in the area. Where revegetation is not possible, other erosion protection methods, such as erosion matting, of a mesh that does not have the potential to trap snakes and turtles, may be used.
- Excavated erodible material stockpiles to be placed in suitable designated areas away from waterbodies (i.e., outside the 30-m setback adjacent to waterbodies, away from temporary drainage channels) and properly constructed silt fence barriers should be installed around the stockpiles to limit the transport of sediment.
- Monitoring the tracking of mud onto adjacent roads during construction. If mud is transferred to the road, the contractor will be required to implement a system to prevent transfer of this material to local ditches and waterbodies. This could potentially include wheel washing areas at the exit from the construction site or end-of-day street sweeping/scraping to remove accumulated materials from local streets.

Implementation of these mitigation measures is anticipated to be effective in minimizing soil erosion and off-site transport from the construction area, such that waterbodies are not negatively affected. Monitoring will be conducted throughout the construction period to ensure ESC measures are functioning as designed (see Section 5).

4.2.1.2 Dust Generation

Dust may be mobilized due to vehicular traffic and heavy machinery use, drilling, blasting (if required) and soil moving activities. If unmitigated, excessive dust levels could adversely impact surface water quality and aquatic habitat if it were to be deposited in waterbodies.

However, it is not anticipated that dust generation will be a significant problem since 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 with native plant species 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 waterbodies occur as a result of dust.

4.2.1.3 Accidental Spills

Fuels, lubricants and other hazardous materials will be used on the construction site. Activities during the construction phase that could potentially result in transport of these materials to the surface water, with subsequent negative impacts on surface water quality, include

- refuelling and maintenance
- use of equipment containing fuels, lubricants or other materials
- storage of hazardous materials.

There are a number of general mitigation practices to be followed by the contractor during construction to minimize the potential for negative environmental impacts associated with the scenarios above which could be caused by the storage, use and disposal of fuels, lubricants and other hazardous materials. These include the following.

- Establish designated refuelling and maintenance areas at least 30 m from waterbodies, drainage ditches, channels or other wet areas.
- Locate designated hazardous material storage areas at least 30 m away from waterbodies, for all hazardous materials to be stored outside. Storage areas should be above ground and enclosed by an impervious secondary containment structure (e.g., berm or container) capable of holding the entire volume of the stored material, as well as some additional volume of rainwater. The area should be equipped with a drain so that it can be cleared of any spilled material or accumulated rainwater, which would be disposed of in a suitable manner. Secondary containment areas should be monitored throughout the construction period to ensure their integrity.
- A barrier will be erected around the storage area to prevent accidental damage to containers.
- Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- An emergency spill kit will be kept on site in case of fluid leaks or spills from machinery.
- Provide adequate spill clean-up materials/equipment (e.g., absorbents) on site. The contractor must have a spill clean-up procedure/emergency contingency plan in place prior to commencement of work at the site. All site staff should be trained in implementation of the procedure.

Given this mitigation, no adverse effects on surface water quality due to use of fuels, lubricants and other hazardous materials during Project construction is anticipated to occur. However, if spills do occur, the spill response and contingency plan protocol will be implemented and this will involve notifying the MOE Spills Action Centre.

A secondary containment structure will be installed around the main station transformer to contain transformer oils in the event of a leak. This will prevent transfer of these materials to nearby watercourses.

4.2.1.4 Accidental Spills of Concrete

Concrete will be used to construct the inverter and transformer pads, and depending on soil strength conditions, may also be used as ballast for the solar panel racking. Concrete will be brought on site by a ready-mix concrete supplier in concrete trucks and poured directly into the form for each transformer/inverter pad. If concrete ballast is required for the panel racking structures, it would likely consist of pre-fabricated structures brought to the site. No cement is anticipated to be stored or mixed on site.

Concrete, grout and associated materials (e.g., cement, mortars) typically have high pH values (i.e., highly basic or alkaline), which, if they enter a watercourse, could create adverse surface water quality conditions that are toxic to aquatic biota (Province of British Columbia, 2007).

Although the use of concrete during Project construction is relatively limited and will not occur within 30 m of any water body, mitigation measures are proposed to prevent negative effects. The Province of British Columbia (2007) has identified a number of construction best management practices to prevent adverse impacts on surface water quality and biota due to the use of concrete. Therefore, in order to mitigate potential adverse effects due to concrete and cement use, the following mitigation measures are to be implemented.

- No alkaline cement products will be deposited directly or indirectly into or adjacent to any watercourse.
- Concrete truck rinsing will occur at a designated area at least 120 m from any waterbodies or drainage routes in a manner to contain the rinse water and concrete residue to prevent off-site transport.
- No cement is anticipated to be stored on site. However, if some cement bag storage is required, bags are to be stored indoors, where possible. If outdoor storage is required, cement bags should be covered with waterproof sheeting and raised off the ground (e.g., on wooden palates) to ensure no contact with surface water runoff. Impervious material will be placed under the elevating mechanism to collect any spills (e.g., due to ripped bags). Empty cement bags are to be collected as soon as possible after use and spills of cement or concrete cleaned up as appropriate.

Given this mitigation, no negative effect on surface water quality due to use of concrete during construction is anticipated to occur.

4.2.2 Operation

No impact to the function of the wildlife habitats is anticipated as a result of operation activities. Similar to construction, wildlife habitats may be impacted as a result of impacts to surface water quality. Long-term site alterations associated with the operations phase that would have the potential to affect surface water quality in nearby watercourses include (i) erosion and sedimentation from the Project area, (ii) maintenance activities such as panel cleaning and (iii)accidental spills.

4.2.2.1 Erosion and Sedimentation from the Project Area

Given the mitigation associated with design of the Project during the construction phase to mitigate potential erosion and sedimentation (such as orientation of access roads, run off velocity control and diversion as necessary, terrace or regrading as necessary) on the site as discussed in Section 4.2.1.1, no erosion is anticipated to occur throughout the operations period. Precipitation running off each solar panel face will be concentrated at the point where it intercepts the ground surface and therefore, could potentially have more erosive force than normal diffuse precipitation patterns. However, the ground cover vegetation beneath the solar panels will be sufficient to prevent erosion of the underlying soils due to this concentrated impact. Precipitation will then drain from the site in a similar manner as presently occurs. Therefore, no erosion is anticipated due to runoff from the solar panels.

General site monitoring will be conducted during the general site inspections throughout the life of the Project to determine if erosion is occurring on or adjacent to the site, including in the runoff area from the panels. Remediation would be undertaken as necessary to prevent any further erosion.

Given this mitigation and monitoring, no erosion and sedimentation and therefore no adverse effects on surface water quality are anticipated to occur during the operations period.

4.2.2.2 Maintenance Activities

As noted in Section 3.2, normal maintenance activities will include inspection of components and panel washing, if rainfall and snow are not sufficient to prevent dust build up on the panel faces. Normal maintenance and inspection are not anticipated to have any negative effects on waterbodies. If extra water is required to be brought on site for panel cleaning purpose, it is anticipated that volumes will be relatively low and less than that which would occur during a normal precipitation event. No cleaning agents (e.g., detergents) will be used to clean panels. Therefore, no adverse effects on surface water quality are anticipated to occur due to maintenance activities.

4.2.2.3 Accidental Spills

Use of fuels, lubricants and other potentially hazardous materials during the operations phase will be limited to those materials brought on site during periodic maintenance activities. This would include fuel and other lubricants in maintenance vehicles that are used to maintain the solar facilities. All maintenance vehicles will be equipped with a spill kit and a spill contingency and response plan will be in place for the duration of the operational period. Given this mitigation, and the limited quantity of material on site and the limited frequency and duration that it will be on site, no adverse effects due to accidental spills are anticipated to occur.

The main transformer will contain a small volume of transformer oil, that could potentially be transferred to surface water in the event of a leak. In order to mitigate this potential, a containment structure will be installed around the transformer. Therefore, in the event of a leak, spilled fluid will be contained within the concrete pad surrounding the transformer. It would then be removed and disposed of in accordance with regulatory requirements. More details on the proposed containment system are provided in the Design and Operations Report (Hatch Ltd., 2011c). No adverse effects on surface water are anticipated to occur due to presence of transformer oils on site. However, if spills do occur, the spill response and contingency plan protocol will be implemented and this will involve notifying the MOE Spills Action Centre. If the spill is determined to have the potential to impact surface water, remedial measures will be taken, such as excavating the soil that was contaminated by the spill, in order to prevent infiltration of contaminants into the surface water.

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 4.3.1, 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 waterfowl stopover or staging areas, or turtle over-wintering sites during decommissioning.

4.3 Wetland/Animal Movement Corridor/Northern Map Turtle Habitat/Snapping Turtle Habitat

4.3.1 Construction Phase

In order to ensure that there will be no impact to wildlife communities using the wetland, minimum setbacks from the wetland community have been established as follows (as shown in Figure 1.1):

- 5 metres from the boundary of the meadow marsh community; and
- 15 metres from the boundaries of the 2 finger wetlands; and
- 50 metres from the boundary of the alder thicket swamp **west** of the eastern finger-like projections of the wetland community and **east** of the easternmost drainage channel; and
- 30 metres from the boundary of the alder thicket swamp **east** of the eastern finger-like projections of the wetland community and **west** of the easternmost drainage channel.

In addition, there will be no access road installed along the southern fence line, and in the portion of the Project location where the 30 metre setback applies, the solar panels will be placed no closer than 35 m from the thicket swamp.

The presence of the Project in upland areas adjacent to the wetland community will restrict the amount of upland habitat available, however use of these upland areas by wetland wildlife species is expected to be minimal given the existing avifaunal and amphibian populations recorded within the communities, i.e., shrub-nesting aerial insectivorous birds, and amphibian species that breed and reside within the wetland. In addition, there was no evidence of wildlife habitats for wetland species associated with upland areas, such as waterfowl nesting or turtle-nesting areas, identified during the site investigations. Therefore, the use of this setback will not impact the provision of wildlife habitat by the wetland community. Similarly, the previously identified setbacks would not be expected to impact the wildlife use of the animal movement corridor. Much of the wildlife movement along the corridor would be expected to occur either within the river (for ducks, turtles, beaver, etc.) or along the upland area immediately adjacent to the Magnetawan River (for larger mammals, such as deer and moose), which is more than 50 m from the Project location. Amphibians and passerine bird species may be move likely to move through the shrub thicket, however the width of the shrub thicket community, at more than 50 m, would ensure sufficient retreat habitat from any disturbance associated with construction near the corridor, thereby maintaining function of the corridor.

Prior to construction, the boundary of the feature will be delineated, and the setbacks marked off with staking/flagging spaced at distances of 20 m, and at any location where the work area boundary changes direction; this will ensure that the setback is preserved. Impacts to the form of the wetland may occur as a result of impacts to groundwater, surface water quality, or surface water runoff. Potential impacts to surface water quality along with mitigation measures to minimize effects have been previously addressed for all Project phases in Section 4.3. These mitigation measures will ensure that there is no impact to the form of the wetland community as a result of potential impacts to surface water quality.

Activities that could occur during the construction phase that would have the potential to affect surface water runoff pattern and rates or groundwater levels include (i) excavations, (ii) land grading and ditching associated with access roads, (iii) soil compaction due to heavy equipment or stockpiling, and (iv) vegetation removal.

The measures identified below will ensure that there are no impacts to the form of the wetland and associated wildlife habitat.

As there will be a buffer from the wetland community, and since the portions of the Project location along the boundary of the wetland present exist as a grassland, and native grasses or other low-growth vegetation will be planted beneath the solar panels, there will be no impacts to wildlife habitat functions of the wetland, including provision of Snapping Turtle and Northern Map Turtle foraging habitat.

The presence of the construction workforce and construction activities associated with the Project will also result in auditory and visual disturbance of local wildlife populations. Snapping Turtle and Northern Map Turtle, along with other wetland breeding species, may temporarily retreat from these areas during construction as a result of the disturbance; however, as there is abundant habitat for these species along the Magnetawan River and associated with the Magnetewan River Provincially Significant Wetland, this is not expected to impact the local population.

4.3.1.1 Effects on Groundwater Due to Project Excavations

The only Project excavation anticipated to be potentially deep enough to intersect the groundwater table and where dewatering could potentially be required would be the excavations for transformer/ inverter pads. Should these excavations intersect the groundwater table, some pumping of groundwater may be required to keep the excavation area dry to facilitate construction and such pumping could potentially result in localized decrease in groundwater levels. Inverter locations will be located at least 30 m from the boundary of the wetland community, such that it is expected that there will be no impact on the groundwater table at the wetland, and discharge of any pumped groundwater will occur into the 30-m naturally vegetated buffer from the wetland community (associated with the most westerly extension of the wetland community north into the Project location around the drainage feature), or onto an appropriately sized dispersal pad to prevent erosion.

Any groundwater entering project excavations, as well as any accumulated precipitation, is to be pumped out of the excavated area, treated, if required to meet the Ministry of the Environment (MOE) water quality discharge criteria, and discharged to a vegetated buffer area.

Given the very small size of the excavations required for transformer/inverter pads and the limited duration that they will be exposed (2 weeks or less), it is not anticipated that pumping of groundwater at these sites will have any significant effect on the local groundwater table, and therefore on the wetland community. Further, water levels within the wetland community are likely more influenced by the Magnetewan River than by the groundwater table within the upland habitats associated with the Project location.

4.3.1.2 Soil Compaction

Soil compaction may result from the use of heavy equipment (e.g., tracked bulldozers and backhoes), and stockpiling of heavy materials (e.g., soils). Soil compaction occurs when heavy equipment or material causes the soil particles to be pushed together, thereby increasing soil density and reducing the pore space within the soil structure (DeJong-Hughes et. al., 2001). Excessive soil compaction can result in inhibited water infiltration due to decreased pore space within the soil structure (DeJong-Hughes et. al., 2001).

Prior to site rehabilitation, disturbed areas will be visually monitored to assess if compaction has occurred, as noted by rutting or flattened areas beneath stockpile locations. Restoration efforts (e.g.,

discing or other soil loosening methods) will be undertaken as required to prevent long-term impacts due to excessive amounts of compaction. Soil compaction will likely occur in localized areas within the zone of disturbance during the short-term construction period. However, no significant long-term change in soil structure is anticipated following implementation of site restoration and associated mitigation to remediate significantly compacted areas, although minor amounts of compaction may persist in localized areas.

Therefore, no measurable change in groundwater recharge or surface water runoff is anticipated to occur due to minor, localized soil compaction occurring during the construction phase.

4.3.1.3 Land Grading and Ditching

No major grading works are anticipated to be required to install solar panels throughout the majority of the Project location, which will consist primarily of agricultural land. Minor, localized soil grading may be required in some panel installation areas (if necessary) and for temporary laydown areas, inverter/transformer pads and access roads. This minor grading may locally alter runoff patterns compared to the existing diffuse runoff from the existing field. Any minor grading will take into consideration the current land grade and will try to replicate the present stormwater flow pattern. However, the size of the graded area will be very small relative to the size of the Project location, so no measurable effect on surface water runoff is anticipated to occur as a result of this grading.

Drainage features including ditching and cross culverts will be required to maintain site drainage across access roads traversing the Project location. These drainage features will serve to concentrate site runoff at discharge points, which, depending on site layout, will consist of areas adjacent to undisturbed agricultural fields, naturally vegetated features, or adjacent to the naturally vegetated area surrounding the watercourses. Therefore, surface runoff at these discharge points may be at a higher rate than runoff from the existing Project location, since runoff from the Project location is more diffuse.

This higher rate of runoff from the Project location, or portions thereof, could potentially result in negative effects on the watercourses. In order to mitigate negative effects a number of measures are proposed, including the following.

- If ditch discharge points are located next to the 30-m buffer adjacent to the watercourses (see Figure 1.1 for locations), flow dissipation measures (e.g., rock check dams or enhanced vegetated swales) will be installed to temporarily retain water and decrease flow velocity, and offshoot ditches will be installed from the main ditch into the 30-m buffer zone, to promote diffuse overland flow through the vegetated buffer area (where grades allow) or swales, so flow is dissipated prior to entering the watercourses
- Runoff in the ditches will be slowed through the use of rock flow check dams and/or straw bales to promote minor ponding and water retention. This will also promote the removal of sediment from the runoff at these features, thereby reducing the overall amount of sediment being transported within the runoff in the ditches to receiving waterbodies.
- Ditches will be grassed or lined to the extent possible to further retain water (via uptake in vegetation) and also reduce erosion potential.

Therefore, surface water runoff from the site may be increased at ditch discharge areas compared to more diffuse runoff from the existing fields. However, the mitigation noted above to control runoff entering the waterbodies downstream from the ditch discharge locations will prevent negative effects on waterbodies and associated wildlife habitats.

4.3.1.4 Vegetation Removal

The Project location development area currently consists entirely of hay fields. During construction, all existing ground cover will be left in place in areas where no grading works are required. Therefore, minor vegetation removal within the hay fields will have a negligible effect on surface water drainage on the Project location.

No vegetation removal will be required within the 30-m buffer adjacent to any of the waterbodies. Therefore, this buffer vegetation will remain undisturbed and will continue to provide stormwater management control functions including slowing the velocity of surface water runoff and interception of precipitation and uptake in plants and roots. This will also assist in mitigating overall changes in surface water runoff from the Project location during construction.

4.3.2 Operations Phase

No impact to the function of the wetland or animal movement corridor and Northern Map Turtle and Snapping Turtle habitat is anticipated as a result of operation activities given the minimal disturbances associated with Project activities and the setback from wetland communities. The fence associated with the Project will not be installed through the animal movement corridor. The fence may restrict casual movement of wildlife from the animal movement corridor onto the Project location, however there will be no impact on connection between critical habitats of wildlife species that are linked through the animal movement corridor. Movement of Northern Map Turtles or Snapping Turtles onto the Project location is not expected as no habitat functions have been identified in these areas.

Similar to construction, the form of the wetland and associated wildlife habitats may be impacted as a result of impacts to surface water quality or surface water runoff. Potential impacts to surface water quality have been previously assessed and mitigated in Section 4.2. Long-term site alterations associated with the operational phase of the Project that could potentially affect surface water runoff are limited to changes in vegetation structure and density. As similar vegetation to what is presently on the Project location will be planted beneath the solar panels, there will be no impact to the form of the wetland.

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, animal movement corridor, or Northern Map Turtle habitat and Snapping Turtle habitat.

5. Environmental Effects Monitoring Plan – Design and Operations Report

As discussed in the Design and Operations Report (Hatch Ltd., 2011c) 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 feature have been reproduced here, in Table 5.1. Monitoring measures relating to surface water runoff and groundwater are addressed in the Waterbodies EIS (Hatch, 2011g).

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.

Environmental monitoring will be conducted by a designated environmental inspector. Monthly environmental monitoring reports will be prepared during construction and submitted to the MOE for review. If contingency measures are required during construction, the environmental inspector will ensure that the designated contractor completes all contingency measures as specified in Table 5.1.

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., 2011d). 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. Though additional mitigation is proposed to address negative effects during construction not related to natural features, all mitigation measures relating to natural features have been reproduced in this report.

7. Summary and Conclusions

As discussed in the Natural Heritage Records Review (Hatch Ltd., 2011a), the Natural Heritage Site Investigation (Hatch Ltd., 2011b) and the Evaluation of Significance (Hatch Ltd., 2011c), there are

significant wildlife habitat features on and within 120 m of the Project location, and an assumed provincially significant wetland 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 the 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. Monitoring measures have been proposed to confirm that mitigation measures are having the intended effect and that performance objectives are being met.

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., Moncreif, J.F., Vorhees, W.B. 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.

Hatch Ltd. 2011a. Burk's Falls West Solar Project – Natural Heritage Records Review Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011b. Burk's Falls West Solar Project – Natural Heritage Site Investigation Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011c. Burk's Falls West Solar Project – Evaluation of Significance Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011d. Burk's Falls West Solar Project – Construction Plan Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011e. Burk's Falls West Solar Project – Design and Operations Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011f. Burk's Falls West Solar Project – Decommissioning Plan Report. Prepared for Northland Power Inc.

Hatch Ltd. 2011g. Burk's Falls West Solar Project – Waterbodies Environmental Impact Study. Prepared for Northland Power Inc.

Hatch Ltd. 2011h. Burk's Falls West Solar Project – Project Description Report. Prepared for Northland Power Inc.

Province of British Columbia. 2007. Interim Standards and Best Practices for Instream Work, Appendix IV: Concrete Work. On-line at http://www.env.gov.bc.ca/wld/BMP/concrete.html. Accessed July 5, 2010.

Blank back

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 onto Milksnake habitat	Work areas to be well marked.	Minimized size of disturbed area.	Visual monitoring of work area.	Throughout construction site.	Ongoing during construction.	Visual monitoring would ensure boundaries of work areas are respected.	Reported in monthly environmental monitoring report during construction.	If work beyond the boundaries is noted, remediation actions to be undertaken to restore impacted area.
Increases in surface water runoff from the construction site	Stormwater management measures including grassed swales, enhanced vegetated swales, ditch flow controls and filter strips, and temporary construction measures as necessary (e.g., hay bales).	Minimize changes to surface water runoff conditions to drains.	Visual assessment of structural stability of mitigation measures and identification of unintended impacts.	Throughout construction site.	Once per week and during/ after storm events.	Visual monitoring will confirm that stormwater management measures remain as designed (e.g., rock flow check dams, straw bale flow checks, ditches, etc) and identify deficiencies.	Reported in monthly environmental monitoring report during construction.	Stormwater management measures will be remediated as necessary to ensure that they are functioning as designed. Alternate measures may be required and will be determined based on on-site issues and conditions.
Soil compaction due to heavy equipment use and stockpiling	Remediation of compaction following construction.	No significant compaction that would inhibit vegetative growth.	Visual monitoring for signs of compaction.	Throughout construction site.	Once after remediation.	Visual monitoring will identify areas requiring remediation.	At close-out of project.	Areas of compaction will be remediated as necessary to alleviate compaction (e.g., discing).
Erosion and sedimentation resulting in increased turbidity in site runoff	Erosion and sediment control measures.	No significant changes to surface water quality in watercourse.	Visual monitoring of sediment and erosion controls (e.g., silt fence barriers).	All ESC controls throughout work site.	Once per week and in advance and following major precipitation.	ESC measures to be monitored to ensure they are functioning as designed and in good working order to meet performance objectives.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
			Visual monitoring of surface water quality conditions in drains during construction	Throughout length of the drains on Project site.	Once per week and once during all in-water works.	Visual monitoring would identify areas of turbidity and would show that remedial measures would be necessary to prevent further erosion issues.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
Dust generation and off-site transport	Standard construction site best management practices to prevent fugitive dust (see Section 4.2.1.2).	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.	Alternative dust control measures implemented as necessary to prevent/minimize dust generation.
Potential for adverse surface water and ground water quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur (see Section 4.2.1.3).	No long-term environment effects due to spills.	Visual monitoring of spill prevention/ mitigation measures.	Throughout construction site.	Once per week.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in monthly environmental monitoring report during construction.	Spill contingency measures implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.
Incidental take of wildlife	Daily visual monitoring of work areas and construction equipment prior to start of work. Wildlife observed will be removed from areas of impact through established protocols.	Avoid occurrences of incidental take.	Daily visual monitoring will be conducted by workers on foot of the areas to be worked on the given day.	Throughout construction site.	Ongoing during construction on a continued basis.	Incidental take will be reported by construction workforce to the on-site personnel responsible for environmental protection if incidents occur.	Reported in monthly environmental monitoring report during construction, unless the species is a species of conservation concern in which case reporting will	If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.

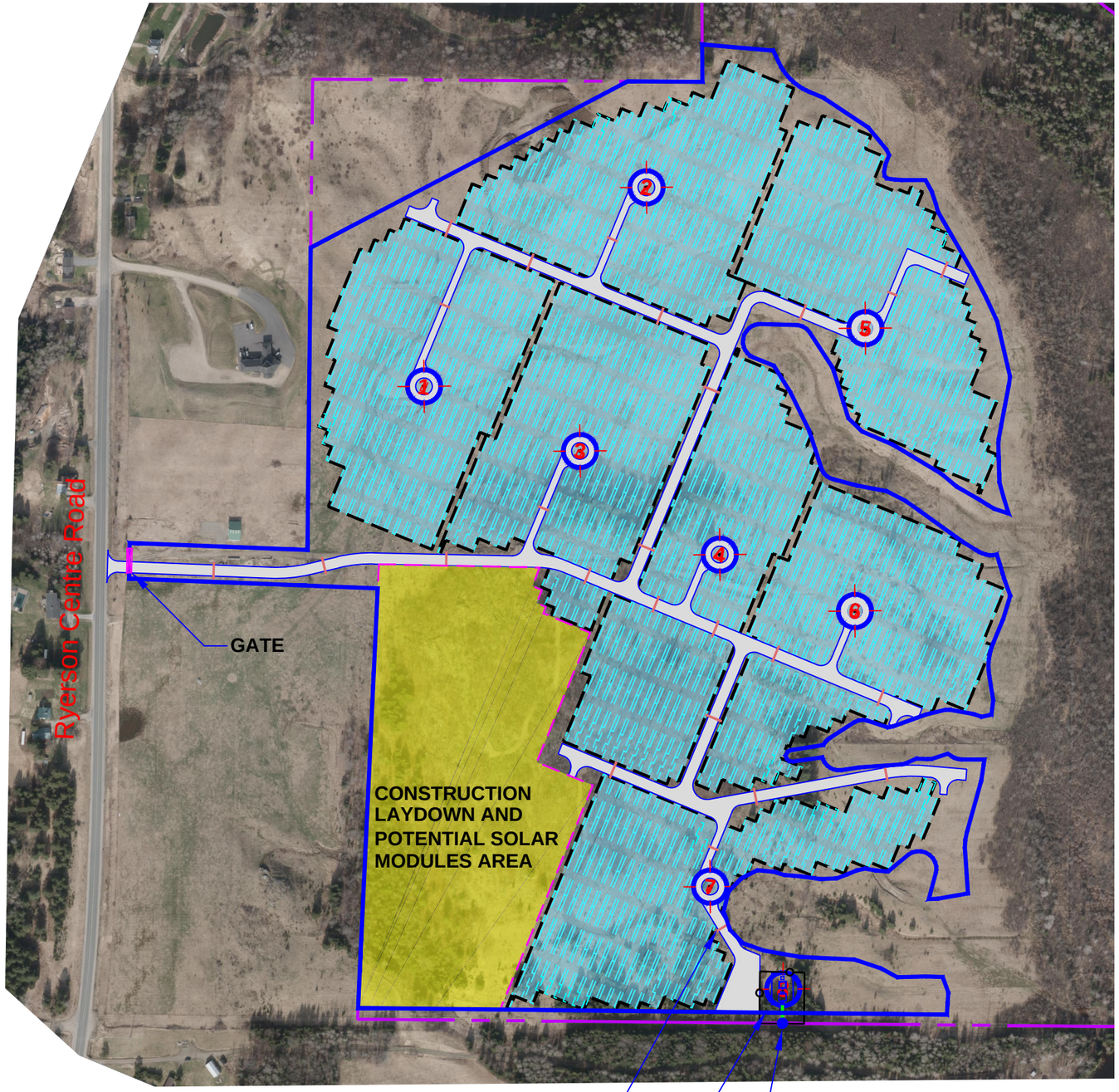
Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methodology	Monitoring Locations	Frequency	Rationale	Reporting Requirements	
	Speeds to be limited on Project location and construction workforce to be made aware of potential for sensitive species and their habits/habitats that may occur on the Project location.		Any wildlife observed will be managed in accordance with protocols for wildlife encounters to be developed with MNR.				be immediate to the MNR.	
Operations Phase								
Erosion and sedimentation resulting in increased turbidity in site runoff	Vegetation to prevent erosion due to stormwater.	No long-term erosion from site over and above existing conditions.	Visual monitoring of Project area to identify areas of erosion (e.g., rills, gullies).	Throughout Project site.	Twice per year during site inspections.	Visual monitoring of erosion would identify potential areas of concern.	Reported in annual operational environmental monitoring report.	Erosion remediated as necessary to ensure no long erosion issues. Additional measures such as mulch, modified grass species etc. could be considered.
Potential for adverse surface and ground water quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur.	No long-term environment effects due to spills.	Visual monitoring of spill prevention/ mitigation measures during maintenance activities.	Throughout Project site where maintenance occurs and at transformer locations.	Twice per year during site inspections.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in annual operational environmental monitoring report.	Spill contingency measures implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.
Incidental take of wildlife	Speeds to be limited on Project location and maintenance workforce to be made aware of potential for sensitive species and their habits/habitats that may occur on the Project location. Visual monitoring of access roads for wildlife species.	Avoid occurrences of incidental take.	Occasions of incidental take to be reported as they are identified.	Throughout Project location.	Ongoing during maintenance activities.	Incidental take will be reported by maintenance staff to the on-site personnel responsible for environmental protection if incidents occur.	No requirement; unless the incident involves a species of conservation concern in which case reporting will be immediate to the MNR.	If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.
Decommissioning Phase								
Encroachment onto Milksnake habitat	Work areas to be well marked.	Minimized size of disturbed area.	Visual monitoring of work area.	Throughout decommissioning site.	Ongoing during decommissioning.	Visual monitoring would ensure boundaries of work areas are respected.	Reported in monthly environmental monitoring report during decommissioning.	If work beyond the boundaries is noted, remediation actions to be undertaken to restore impacted area.
Erosion and sedimentation resulting in increased turbidity in site runoff	Erosion and sediment control measures.	No significant changes to surface water quality in drains.	Visual monitoring of sediment and erosion controls (e.g., silt fence barriers).	All ESC controls throughout work site.	Once per week and in advance and following major precipitation and snow melt events.	ESC measures to be monitored to ensure they are functioning as designed and in good working order to meet performance objectives.	Reported in monthly environmental monitoring report during construction	Alternate ESC measures will be used as necessary to ensure required control.
			Visual monitoring of surface water quality conditions in drains during construction.	Throughout length of tributary on Project site.	Once per week and once during all in-water works.	Visual monitoring would identify areas of turbidity and would show that remedial measures would be necessary to prevent	Reported in monthly environmental monitoring report during construction	Alternate ESC measures will be used as necessary to ensure required control.

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methodology	Monitoring Locations	Frequency	Rationale	Reporting Requirements	
						further erosion issues.		
Potential for adverse surface and ground water quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur.	No long-term environment effects due to spills.	Visual monitoring of spill prevention/ mitigation measures.	Throughout construction site.	Once per week.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in environmental monitoring report during decommissioning.	Spill contingency measures implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.
Incidental take of wildlife	Daily visual monitoring of work areas and decommissioning equipment prior to start of work. Wildlife observed will be removed from areas of impact through established protocols. Speeds to be limited on Project location and decommissioning workforce to be made aware of sensitive species and their habits/habitats that may occur on the Project location.	Avoid occurrences of incidental take.	Daily visual monitoring will be conducted by workers on foot of the areas to be worked on the given day. Any wildlife observed will be managed in accordance with protocols for wildlife encounters to be developed with MNR.	Throughout decommissioning site.	Ongoing during decommissioning on a continued basis.	Incidental take will be reported by decommissioning workforce to the on-site personnel responsible for environmental protection if incidents occur.	Reported in monthly environmental monitoring report during decommissioning, unless the species is a species of conservation concern in which case reporting will be immediate to the MNR.	If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.

Blank back

Appendix A

Site Layout



LEGEND:

- GRAVEL ACCESS ROAD
- OVERHEAD 44 kV LINE
- OVERHEAD 44 kV LINE BY HYDRO ONE
- PROPERTY BOUNDARY
- CULVERT
- AVAILABLE AREA BOUNDARY / FENCE LINE & PROPERTY SETBACK @ 10 m (CONSTRUCTION SILT FENCE)
- CONSTRUCTION LAYDOWN AND POTENTIAL SOLAR MODULES AREA
- CONNECTION POINT
- 114 RACK IN ONE GROUP, 3 STRINGS OF 18 PANELS PER RACK COMBO (SET @ 34° TILT WITH 8.5 METERS PITCH SPACING) 43,092 PANELS USED NOMINAL CAPACITY: 12 MW $_{DC}$ OR 10 MW $_{AC}$
- 7 — 2 x 800 kVA INVERTER, 1 x 1600 kVA TRANSFORMER

0m 50m 100m 150m 200m

1:2000 SCALE

PRELIMINARY LAYOUT
NOT FOR CONSTRUCTION

REVISIONS

NO	DATE	SYMBOL	REMARKS
P0	JULY 2011		ISSUED FOR CONSTRUCTION PLAN REPORT
P1	SEPT 2011		ROAD AND LAYOUT CHANGED

STAMP

COGENERATION
Associates Limited

PREPARED FOR

NORTHLAND POWER

PROJECT

NORTHLAND POWER SOLAR BURKS FALLS WEST

DRAWN BY	TIEN PHAM	VERIFIED BY	
SCALE	N.T.S.	VERIFIED BY	
DATE	JULY 2011	APPROVED BY	
ISSUED FOR TENDER			

PROJECT No.

TITLE: SOLAR FARM PROJECT SITE PLAN

DRAWING No.: SP-02 (BURKS FALLS W.) Rev.P1