NORTHLAND POWER

North Burgess Solar Project

Construction Plan Report

September 13, 2012

Northland Power Inc.
on behalf of
Northland Power Solar
North Burgess L.P.
Toronto, Ontario

Construction Plan Report

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Project Report

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Report Revisions

Section	Report Date: November 11, 2011	Report Date: September 13, 2012 – Revised Content
1.1	"Northland Power Inc. on behalf of Northland Power Solar North Burgess L.P. (hereinafter referred to as "Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic project titled North Burgess Solar Project (hereinafter referred to as the "Project")."	"Northland Power Inc. on behalf of Northland Power Solar North Burgess L.P. (hereinafter referred to as "Northland") is proposing to develop an up to 10-megawatt (MW) solar photovoltaic project titled North Burgess Solar Project (hereinafter referred to as the "Project")."
1.1	"The solar modules will be mounted on fixed steel supports and arranged in the form of seven arrays, each of 1.6 MW. Electricity generated by solar photovoltaic modules from each array will be converted from direct current (DC) to alternating current (AC) by an inverter, and subsequently stepped up from a medium voltage to 44 kV in order to connect to the nearby distribution line."	"The solar modules will be mounted on fixed steel supports and arranged in the form of seven "power blocks", each of 1.6 MW. Electricity generated by solar photovoltaic modules from each "power block" will be converted from direct current (DC) to alternating current (AC) by an inverter, and subsequently stepped up from a medium voltage to 44 kV in order to connect to the nearby distribution line."
2.1	"The site work is scheduled to start in late summer of 2012 and have an estimated 6 to 8 month construction period."	"The site work is scheduled to start in late 2012 and have an estimated 6 to 8 month construction period."
Table 2.1		Updated Table 2.1: Project Timeline
2.2.6	"The contractor will prepare a fire control plan for the construction activities. It is anticipated that this will include establishing procedures for specific types of likely fires, training staff accordingly, and keeping fire protection equipment on site."	"The contractor will prepare a fire control plan for the construction activities. It is anticipated that this will include establishing procedures for specific types of likely fires, training staff accordingly, and keeping fire protection equipment on site. Northland has signed a Letter of Intent with Tay Valley Township to work with the Fire Department and Fire Chief."
2.2.7	"A 30-m setback will occur from the high water mark of each of the tributaries. Further drainage features (e.g., ditches, culverts) will be installed as necessary to adequately drain the Project location."	"A 30-m setback will occur from the high water mark of each of the tributaries. A stormwater management plan will be prepared and provided to the Township of Tay Valley to ensure that flows on and off of the Project site will not have a deleterious impact on neighbouring properties and infrastructure. Further drainage features (e.g., ditches, culverts) will be installed as necessary to adequately drain the Project location."
	The Project does not propose any major alteration to the existing landscape for construction purposes.	The construction contractor will determine whether any alterations to the existing landscape are required for construction purposes. If required, a grading plan will be produced. Should the construction contractor identify a need to conduct blasting to bring portions of the site to grade, this will be conducted in accordance with all relevant codes and regulations.

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2.3.1.3	"These roads will be approximately 2000 m in combined length within the Project area and 5 m wide."	"These roads will be within the Project area and 5 m wide."
2.3.2.1	"PV modules will be securely mounted on a lattice type structure supported by either a driven pile foundation, helical pile, ground screw and/or Cast-In-Drilled-Hole (CIDH) Pile depending on the soil conditions within the site."	"PV modules will be securely mounted on a lattice type structure supported by either a driven pile foundation, helical pile, ground screw and/or Cast-In-Drilled-Hole (CIDH) Pile depending on the soil conditions within the site, but may also be rock drilled, and/or blasted depending on subsurface conditions."
2.3.2.2	"Trenches will typically be 1 m deep by 0.5 m wide and will be excavated by using a 'ditch-witch' plough, or similar equipment."	"Trenches will typically be 1 m deep by 0.5 m wide and will likely be excavated by using a 'ditch-witch' plough, hoe-ram, blasting, or similar equipment."
2.3.2.3	"The structural support for the system will comprise a steel and/or aluminum lattice structure supported by a pile foundation. This lattice structure will be assembled on site, and mounted on the piles."	"The structural support for the system will comprise a steel and/or aluminum lattice structure supported by a steel pipe foundation. This lattice structure will be assembled on site, and mounted on the steel pipe (piles)."
2.3.2.4	"PV modules, weighing approximately 27 kg each, will be mounted on the supporting structure by PV installers."	"PV modules, weighing approximately 22 kg each, will be mounted on the supporting structure by PV installers."
2.3.2.6	"PV modules are proposed to be arranged in seven arrays, with two 800-kW inverters at the center of each array. The nameplate capacity of each module in an array will be approximately 280 W. There will be sufficient modules for each inverter to optimize inverter loading and meet a 1.2 DC-to-AC conversion ratio."	"PV modules are proposed to be arranged in seven arrays, with two approximately 800-kW (DC) inverters at the center of each "power block". The nameplate capacity of each module in a "power block" will be approximately 290 to 320 W."
4.2		"Although unlikely, adverse effects from foundation (galvanized post) installation to groundwater at neighbouring properties has been considered. Northland has committed to sampling and testing of groundwater neighbouring properties as outlined in the Baseline Well Water Monitoring Program and Construction Response Plan. Additional commitments have also been made with regard to well water monitoring in accordance with the Letter of Intent between Northland Power and the Township of Tay Valley. In the event of a complaint with regard to groundwater quality/quantity, Northland has committed to a number of contingency measures which will be implemented."
4.3		"In addition to the above, a stormwater management plan will be prepared and provided to the Township of Tay Valley to

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		ensure that flows on and off of the Project site will not have a deleterious impact on neighbouring properties and infrastructure."
Appendix A		Appendix A has been replaced.

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1. Introduction

1.1 Background

Northland Power Inc. on behalf of Northland Power Solar North Burgess L.P. (hereinafter referred to as "Northland") is proposing to develop an up to 10-megawatt (MW) solar photovoltaic project titled North Burgess Solar Project (hereinafter referred to as the "Project"). The Project is located on Narrows Lock Road near the intersection with Scotch Line, within the Township of Tay Valley, within Lanark County.

The proposed Project will use solar photovoltaic technology to generate electricity. The solar modules will be mounted on fixed steel supports and arranged in the form of seven "power blocks", each of 1.6 MW. Electricity generated by solar photovoltaic modules from each "power block" will be converted from direct current (DC) to alternating current (AC) by an inverter, and subsequently stepped up from a medium voltage to 44 kV in order to connect to the nearby distribution line. The interconnection point will be on Narrows Lock Road, east of the Project location. The Project will connect to a distribution line that Hydro One will extend approximately 30 m from its current location.

Construction of the Project will commence once the REA has been obtained and a power purchase agreement is finalized with the Ontario Power Authority. The construction period is estimated to be approximately 6 months in duration, with Project commissioning anticipated in the spring of 2013.

1.2 Objective and Scope

The Construction Plan Report (hereinafter referred to as "the Report") is required as a part of an application for all renewable energy projects that must submit a REA under Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*. The Report serves several purposes. First, it details all anticipated activities during the Project construction phase so that all potential negative environmental effects may be identified. Second, the Report describes the actions that are anticipated to be taken to mitigate the negative environmental effects of the construction and installation of the facility. Finally, the Report functions as a communication tool for public, agency, municipal and Aboriginal consultation to convey to these groups the construction activities. A draft of the Construction Plan Report must be made public 60 days prior to the final public consultation meeting in accordance with Section 16 of O. Reg. 359/09 and provided to the Aboriginal communities more than 60 days prior to the final public consultation meeting.

Section 2 of the Report describes the Project development, construction and installation activities. The potential environmental effects and proposed mitigation measures to prevent/minimize those effects are presented in Sections 3 and 4, respectively. Section 5 includes the environmental effects monitoring plan and Section 6 provides the references.

2. Project Construction Plan

2.1 Construction Overview

The site is approximately 10 km southwest of Perth, with access via Narrows Lock Road (municipal road) from the east. Appendix A provides the site layout and refers to many of the site facilities and features discussed below.

The construction process of the Project consists of four phases:

- Phase 1 – Site Preparation
- Phase 2 – Construction and Installation of Plant
- Phase 3 – Testing and Commissioning
- Phase 4 – Site Restoration

The site work is scheduled to start in late 2012 and have an estimated 6 to 8 month construction period. It is anticipated that the operation of the Project (Project life) will be at least 20 years.

The timeline and duration of each of the main construction phases is provided in Table 2.1.

Table 2.1 Project Timeline

Activity	Approximate Timeline (2012/2013)	Duration (days)
Installation of Site Access Components	November 1 – January 31	92
Safety and Security	November 1 – June 30	242
Temporary Facilities	November 1 – June 30	242
Power and Communication	November 1 – January 15	76
Site Preparation	November 1 – November 30	30
Foundation	December 1 – December 31	31
Structural Support	January 2 – February 15	45
Solar Modules	February 15 – March 31	44
Electrical Collection System	December 1 – May 1	152
Landscaping, Vegetation and Drainage	June 1 – June 30	30

Information on the construction and installation activities is provided in the following sections.

2.2 Construction Methodology

2.2.1 Safety Management

Safety is Northland's primary objective with a Project goal to maintain a safe working environment that results in completion of the Project with zero fatalities, zero critical injuries and zero lost time injuries, while maintaining the safety of the public at all times.

The Project will comply with all applicable Ontario Occupational Health and Safety Act requirements during the construction period. A site-specific health and safety plan will be developed and a safety and compliance officer will be assigned to the Project to implement and strictly enforce the plan.

The Contractor is required to provide construction method statements and related Job Safety Assessments (JSA), for review by the Owner's Construction Manager, prior to commencement of work.

2.2.2 Workforce

The Project will employ a workforce recruited from within the local area to the greatest extent possible. The workforce will include construction supervision, general and skilled labour, equipment operators, technicians for electrical systems and commissioning, plant installation and

operation, security and general maintenance. The construction workforce is estimated to be 50 workers on average for the approximately 6 to 8 month construction period, with a peak of approximately 90 workers.

Construction hours will normally be from 7:00 a.m. to 5:00 p.m., Monday through Friday. Occasionally, when work may have to be continued after dusk and on the weekends, the Project will follow the local municipal requirements and minimize impacts to the local community.

2.2.3 Site Access

The proposed site is about 10 km southwest of Perth and can be accessed via a municipal road (Narrows Lock Road) from the east.

2.2.4 Construction Equipment

Table 2.2 summarizes the construction equipment that is typically required for this type of site work.

2.2.5 Security Gate, Fencing and Lighting

The site will be gated and fenced, with additional security measures installed as required by Northland. The fence design includes a chain-link fence, about 2.0 m high, with barbed wire on top of the fence. Inner fencing will be erected around the substation area, and the site will be under continual surveillance by the supervising construction staff. In addition, 24-hr on-site security may be utilized.

For security and maintenance purposes, task-specific lights will be installed on the Project location during construction. A set of lights will be installed near the entrance to the facility. Additional motion sensor security lighting may be installed.

2.2.6 Fire Control Plan

The Project is very unlikely to be a source of fire, or a contributor to spreading an existing fire. However, there is some rare potential fire hazard due to electrical faults at the PV modules and ancillary equipment. The contractor will prepare a fire control plan for the construction activities. It is anticipated that this will include establishing procedures for specific types of likely fires, training staff accordingly, and keeping fire protection equipment on site. Northland has signed a Letter of Intent with Tay Valley Township to work with the Fire Department and Fire Chief.

2.2.7 Drainage

Based on site visits and preliminary assessments, the drainage of the Project location is dominated by four tributaries of Grant Creek. Wetland areas surround the tributaries. A 30-m setback will occur from the high water mark of each of the tributaries. A stormwater management plan will be prepared and provided to the Township of Tay Valley to ensure that flows on and off of the Project site will not have a deleterious impact on neighbouring properties and infrastructure. Further drainage features (e.g., ditches, culverts) will be installed as necessary to adequately drain the Project location.

Table 2.2 Project Equipment

Equipment	Power & Weight	Usage	Quantity
Track-Type Tractor (D8)	179 kW 37.6 T	Land Clearing and Grubbing; Spreading granular material for access road	2
Wheel Tractor-Scraper (615C)	198 kW 25.6 T	Excavating and moving topsoil	1
Hydraulic Excavator (325B)	125 kW 25.9 T	Excavating topsoil and placing backfill	1-2
Backhoe Loader (446B)	82 kW 8.9 T	Excavating topsoil and placing backfill	1
Wheel Loader (966F)	164 kW	Moving soil and granular material	1
Dump Truck (D25D)	194 kW 19.5 T	Transport and placement of granular for access road.	2-4
Motor Grader (14H)	160 kW 18.8 T	Grading of access road during construction (as necessary)	1
Drum Vibratory Compactor (CS-563C)	108 kW 10.9 T	Granular compaction for access road	1-2
Crawler Crane (LS-118)	267 kW 48.9 T	Pile driving	1
Pile Driving Equipment (B-6505 HD)	300 kJ 19.5 T	Mounted on the crawler crane, used for driving piles	4
Rough Terrain Crane (RT500C)	90 kW 23.4 T	Unloading, moving material, equipment, and plant	1
Telescopic Handler (TH83)	81 kW 10.0 T	Unloading, moving material, equipment, and plant	1-2
Concrete Transit Mixers (6 m^3)	12.7 l 450 hp	Transportation and placement of concrete mix for foundations	1-4
Pick-up Trucks (F150 Super Crew)	V8 5.7l	General transportation of small equipment, materials, and personnel	5
Diesel Generators, Air Compressors	175 kW	Power supply for electrical equipment (hand tools, etc)	3
Hand Tools - drills, wrenches, concrete vibrators, welding machines, saws, etc (as necessary)		General construction and assembly activities	15+

2.2.8 *Landscaping and Vegetation*

The construction contractor will determine whether any alterations to the existing landscape are required for construction purposes. If required, a grading plan will be produced. Should the construction contractor identify a need to conduct blasting to bring portions of the site to grade, this will be conducted in accordance with all relevant codes and regulations.

After installation of modules, the entire Project area, with the exception of roads and drains, will be covered with a suitable, locally grown, low maintenance vegetation. This will aid in the prevention of soil erosion and the invasion of non-native plant species as well as present a natural appearance. Any temporary access roads built for construction purposes will be cleared, tilled, levelled and covered with vegetation.

2.2.9 *Power and Communication*

During construction, electrical power will be provided by portable generators for small equipment and hand tools. For temporary and permanent use, Northland will also obtain an electrical power supply feed and communication line from the local utilities.

2.2.10 *Water Usage*

In order to meet the water demand during construction, the contractor will be required to provide a temporary water storage facility and to supply water by truck. The water will be used for construction and dust control purposes.

2.2.11 *Housekeeping*

It is the contractor's responsibility to maintain proper housekeeping and to keep the Project location orderly in order to prevent unnecessary safety and fire hazards. It is important to Northland to keep a tidy work site and to respect the Project's neighbours in this regard.

Typical construction waste, such as broken PV modules, electrical wires, wood, and miscellaneous packaging materials, will be managed in accordance with local, provincial, and federal regulations during construction. Recyclable waste will be transported to the closest recycling centre at the expense of the Contractor.

2.3 Construction Phases

2.3.1 *Phase 1 - Site Preparation*

Site preparation refers to all necessary activities prior to the construction of foundations, substation, and installation of the PV modules. It includes surveying/staking, site clearing and grubbing, construction of access roads and drainage systems, installation of security gate and fencing, and construction of a staging area.

2.3.1.1 Site Survey and Staking

A registered Ontario land surveyor will provide a site survey, and will stake the exact location of the site perimeter for fencing, access road layout, and all foundations and substation.

2.3.1.2 Site Clearing and Grading

The proposed land has a woodland located on the property. A portion of the woodland will be cleared in order to install PV modules and avoid shadows.

Site grading will occur for the construction of the access road, temporary facilities, staging area, substation and inverter foundations, and trenches for electrical cabling and instrumentation control.

Grading involves the excavation and on-site stockpiling of topsoil at designated areas, to be determined in consultation with the construction contractor, and not within 30 m of a water body. Topsoil will remain on site and will be used for site restoration following completion of construction activities. During temporary stockpiling, topsoil will be protected to minimize soil erosion due to wind and rain. Erosion and sedimentation control measures will be installed as necessary to minimize erosion and sedimentation.

2.3.1.3 Access Roads

The construction of a new access road will be necessary to support construction activities and will provide access to the site during the operation phase of the Project. The proposed 5-m wide access road will be constructed with a granular 'B' base and a finished surface of granular 'A' material, sourced from a local aggregate quarry. Geo-grid and geotextile fabric will be used where necessary. The minimum thickness of the access road granular base and top course material will be 300 mm. The road will be constructed with ditches, swales and culverts, where necessary, for proper storm water run-off, site drainage and to minimize road and soil erosion. The topsoil and subsoil will be removed prior to the placement of the granular base. The use of gravel will maintain permeability to avoid impacts on storm water flow and will minimize dust generation to reduce water use for dust control during construction. Design of roads, culverts, swales, and ditches will be in accordance with OPSS regulations and local municipal engineering guidelines. Ditches and culverts will be constructed, as necessary, to maintain existing site drainage conditions.

In addition to the main access road, an internal road system within the project area will be constructed, to provide an access network to the panel arrays and inverter stations. These roads will be within the Project area and 5 m wide. It is Northland's intention to minimize impacts to the environment and to the land. The design of the proposed 5-m wide internal access roads will be designed similarly to the 5 m wide main access road.

The Project location is on fairly level ground and has adequate drainage. Based on site visits and preliminary studies, major alteration in the existing drainage pattern for the proposed solar facility is not anticipated. Erosion and sedimentation control measures will be installed as necessary to minimize erosion and sedimentation.

2.3.1.4 Temporary Facilities

Part of the work site will be used as a construction staging area, which will require clearing, grading, removal of topsoil, placement of granular material, compaction, and security fencing, prior to use. The staging area will include construction offices, washrooms, first-aid station, parking, construction equipment, material and plant storage/laydown area, and an unloading/loading area. Modular trailers will be used for the construction offices, washrooms and first-aid station. Washrooms (portable toilets) will be maintained daily during construction. Following Substantial Completion (Project in service), the temporary facilities will be removed from site, followed by removal of granular material, topsoil backfill, and site revegetation.

2.3.2 Phase 2 - Construction and Installation of Plant

2.3.2.1 Foundations

Foundation construction for electrical equipment, substation, and oil containment basin comprises of excavation and removal of in situ material, placement of granular material, formwork, reinforcing

steel, grounding, and placement of concrete. PV modules will be securely mounted on a lattice type structure supported by either a driven pile foundation, helical pile, ground screw and/or Cast-In-Drilled-Hole (CIDH) Pile depending on the soil conditions within the site, but may also be rock drilled, and/or blasted depending on subsurface conditions. These underground support structures will be driven to a design depth below the frost line, capable of supporting the structure.

Ready-mix concrete will be delivered by transit mixer truck from a local supplier. Foundations will require a minimum of 28 days to cure to allow for concrete to reach its specified compressive strength prior to erection of structural support and equipment installation.

Note that there will be no wash station provided on site for pressure washing concrete trucks and/or heavy construction equipment. All equipment will be cleaned off site and is the responsibility of the contractor and/or subcontractor.

2.3.2.2 *Trenches for Cable and Instrumentation Control*

Trenches will be excavated for electrical cabling (including DC cables from the modules to the inverter and AC cables from the inverter to the transformer). Trenches will have a sand base layer below and above the cabling, and will be backfilled with excavated, or suitable imported material in accordance with OPSS guidelines. The layout of the trenches will be such that it will have minimum impact on the existing drainage. Trenches will typically be 1 m deep by 0.5 m wide and will likely be excavated by using a 'ditch-witch' plough, hoe-ram, blasting, or similar equipment. Where trenching is not possible due to encountered rock or other reasons, above ground cable-trays will be used. Where necessary, high density polyethylene (HDPE) conduits of suitable diameter will be provided to cross roads.

2.3.2.3 *Structural Support*

The structural support for the system will comprise a steel and/or aluminum lattice structure supported by a steel pipe foundation. This lattice structure will be assembled on site, and mounted on the steel pipe (piles). Modules will then be mounted on the structural support system. Lifting will be done by a small crane.

2.3.2.4 *Solar Modules*

PV modules, weighing approximately 22 kg each, will be mounted on the supporting structure by PV installers.

2.3.2.5 *Substation*

The substation will be located as depicted in Appendix A. Construction will include excavation of topsoil, installation of ground grid, foundation construction, covering of surface area with crushed stone, and installation of electrical equipment. Switchgear and protection and control equipment will be housed in a weatherproof "E-House" building, which is bolted to a concrete foundation. Any outdoor electrical cabinets, such as the transformer control cabinet, will be weatherproof NEMA 4X cabinets. The substation area will be fenced and appropriately signed for safety and security purposes.

2.3.2.6 *Electrical System*

PV modules are proposed to be arranged in seven arrays, with two approximately 800-kW (DC) inverters at the center of each "power block". The nameplate capacity of each module in a "power

block" will be approximately 290 to 320 W. There will be sufficient modules for each inverter to optimize inverter loading and meet a 1.2 DC-to-AC conversion ratio.

Modules will be strung together in strings of approximately 18 modules. These strings will be brought to combiner boxes. From each combiner box, a single run of DC conductor will be brought to an inverter. The Project will have fourteen 800-kW inverters. These inverters will convert the DC power collected into AC power, and this will be stepped up by transformers adjacent to the inverters to a planned intermediate voltage of 27.6 kV. Conductors at this intermediate voltage will run underground to the Project substation, where one main transformer will step power up to the local distribution voltage of 44 kV. Power will then be run overhead to the nearest Hydro One owned distribution line and switched onto the Hydro One distribution network.

Power collection will be by underground cabling. These cables will be buried at a minimum depth of 915 mm below grade, as is required by the Ontario Electrical Safety Code. The cables will be laid in a trench with a layer of sand above and below, and the trench will then be filled in with the original local material or imported. There will also be a caution tape buried in the trench above the cabling. After filling, the trenches will be graded to bring the land back to its original contours. This will restore the natural drainage prior to the Project development and will have minimum impact to the local flora and fauna. Where trenching is not possible due to encountered rock or other reasons, above ground cable-trays will be used.

There will be a need to construct an overhead distribution line to transmit power from the Project substation to the local distribution network. Northland is working with Hydro One, the operator of the distribution system in the area, to construct a new distribution line between the Project substation and the "point of interconnection" on the nearest Hydro One owned distribution line. The interconnection point will be on Narrow Locks Road, just east of the Project location. Hydro One is anticipated to complete all the necessary approvals to build, operate and maintain the line for Northland.

2.3.3 Phase 3 – Testing and Commissioning

Testing and commissioning will be performed on the installation prior to start up and connection to the power grid. Solar modules, inverters, collection system, and substation will be checked for system continuity, reliability, and performance standards. If problems or issues are identified, modifications will be made prior to start up.

2.3.4 Phase 4 – Site Restoration

Site restoration will be applicable for the entire Project location. The main objective will be to re-instate the area to the original pre-construction condition, such as the ecosystem, vegetation, and drainage. All construction material, equipment, temporary facilities, and waste will be removed from the site. Topsoil will be backfilled where required, including landscaping to achieve proper drainage. Revegetation will include planting of native plants and hydro-seeding where required.

3. Environmental Effects

This section describes the potential negative environmental effects that could occur during the construction and installation activities associated with the Project. All construction and installation activities are expected to occur at the Project location; however, potential environmental effects are

considered within 300 m of the Project location. Information on the existing baseline conditions of the natural heritage and water body features can be found in the following documents:

- Natural Heritage Records Review Report (Hatch Ltd., 2012a)
- Natural Heritage Site Investigation Report (Hatch Ltd., 2012b)
- Water Body Records Review Report (Hatch Ltd., 2012c)
- Water Body Site Investigation Report (Hatch Ltd., 2012d)

Potential environmental effects are addressed by resource below.

3.1 Soils

A number of construction activities could potentially result in negative effects on soil quality and loss of soils due to erosion. These activities include soil stripping, vegetation removal, site grading, addition of fill for temporary or permanent access roads, stockpiling of materials, heavy equipment use and accidental spills.

Stockpiling of excavated materials may result in the development of anaerobic conditions or mixing of topsoils and subsoils (if present), which could negatively affect the soil's productivity.

The use of gravel or granular materials as a base for access roads could result in the mixing of these materials with underlying soils, potentially impacting soil structure and/or texture, infiltration of surface water and vegetation growth.

Excessive soil compaction can result in inhibited vegetation growth by impeding root penetration within the soil, reducing aeration, and altering moisture intake (i.e., decreased infiltration due to decreased pore space within the soil structure) (DeJong-Hughes et. al., 2001). Decreased water infiltration into the soil could also potentially result in an increase in surface runoff which could increase soil erosion.

Surficial soils will also be disturbed throughout the construction sites due to topsoil and subsoil stripping, grading and use of heavy machinery. These activities have the potential to increase soil erosion due to exposure of bare soil (not protected by vegetation) to the effects of stormwater or wind. In addition, any changes in surface runoff from the Project location resulting in higher rates of runoff or more concentrated flow paths could potentially result in increased soil erosion on or off site.

Potential adverse effects on soils due to accidental spills are discussed in Section 3.16.

These effects will result in some minor impacts to soil quality and loss of soils from the Project location. This could potentially affect the quality of the remaining soil and in particular, its ability to support vegetation growth. Loss of soils due to erosion and sedimentation could also potentially affect other environmental components (e.g., surface water quality, aquatic habitat and biota). Mitigation measures to address these impacts are described in Section 4.1.

3.2 Groundwater

Excavations for transformer pads and potentially solar module footings (depending on the type of footing and the installation method) could encroach upon the groundwater table. These activities have the potential to cause seepage into the excavations and pumping may be necessary to keep the

area dry during the construction period. If significant amounts of pumping are required, it could potentially result in lowering of the local groundwater table around the excavation. However, due to the small size of the excavations and the limited time they will be open (<2 weeks), significant impacts on the groundwater table are not anticipated.

Groundwater quality could also be impaired as a result of contamination from accidental spills during construction (see Section 3.16).

3.3 Surface Water Quality

Surface water quality of the watercourses (e.g., unnamed tributaries of Grant's Creek) located on and within 300 m of the Project location could potentially be impaired during construction by increased turbidity resulting from

- erosion/sedimentation of excavated or exposed soils
- erosion caused by increased runoff from impervious or less pervious areas (e.g., concrete slabs, access roads), or
- deposition of fugitive dust.

These effects are temporary in nature and will result in only short-term minor impacts to the waterbodies in the vicinity of the Project location. Mitigation measures to address these impacts are described in Section 4.3.

Potential adverse effects to surface water quality as a result of accidental spills are discussed in Section 3.16.

3.4 Aquatic Habitat and Biota

Installation of solar modules will not have any direct adverse effects on aquatic habitat and/or biota, since no construction of solar modules will occur within 30 m of the average annual high water mark of any of the watercourses or the seepage area on or adjacent to the site.

Additionally, negative effects to aquatic habitat and/or biota could potentially occur as a result of changes in surface water quality (see Section 3.3) and/or sedimentation due to wind or water erosion of adjacent soils. Increased turbidity could affect biota (e.g., clogging of gills, alterations in behaviour, smothering of incubating eggs). Sedimentation within waterbodies could also adversely affect aquatic habitat by infilling of interstitial spaces in areas with rocky substrates.

Mitigation measures to address these potential adverse effects are described in Section 4.4.

Aquatic biota could also be negatively affected by accidental spills during construction (see Section 3.16).

3.5 Vegetation

There will be some removal of natural vegetation required for the Project associated with the woodland. The removal of these trees will not modify the significance of the woodland, and compensation plantings are planned (Hatch, 2012f).

Vegetation communities in the vicinity of the Project location may also be impacted by dust deposition on leaf surfaces, resulting in minor impairment of growth. These effects are temporary in

nature and will result in only short term minor impacts to vegetation communities adjacent to the Project location. Mitigation measures to address these impacts are described in Section 4.5.

Vegetation could also be damaged as a result of accidental spills, which are addressed in Section 3.16.

3.6 Wildlife

Impacts to wildlife could occur as a result of loss of habitat, disturbance from construction activities, or incidental mortality as a result of collision with construction vehicles.

There will be some minor loss of habitat on agricultural lands, in the woodland and within the hedgerow associated with the construction of the Project, but the majority of the site will remain suitable for use by wildlife species that would have been present on the agricultural fields prior to construction. The animal movement corridor function of the woodland will be retained.

The presence of the construction workforce and operation of construction machinery on site will result in avoidance of the Project location by species intolerant of these types of disturbances. Given the existing disturbance present in the area from the existing agricultural operations, and residential areas, it is not anticipated that there will be a significant avoidance of the area.

The movement of construction machinery across the site has the potential to result in the incidental take of wildlife species as a result of collisions with moving vehicles. Machinery operating on site will be travelling at low speeds, and therefore the potential for incidental take is considered low, and likely restricted to species of small mammals and reptiles/amphibians that may be unable to rapidly move away from oncoming machinery.

These effects are temporary in nature and will result in only short-term minor impacts to wildlife communities on and in the vicinity of the Project location. Mitigation measures to address these impacts are described in Section 4.6.

3.7 Air Quality and Noise

Dust may become airborne from vehicular traffic, heavy machinery use, and soil moving activities. Dust in the air can have a range of effects including, but not limited to the following:

- impacts on human health as a result of irritation to lungs, eyes, etc, which could impact construction workers or nearby residents
- impacts on surface water quality and aquatic habitat if the dust is deposited into waterbodies
- impacts on vegetation if heavy dust loads build up on photosynthetic surfaces, thereby resulting in mortality of the plants.

In addition to impacts from dust, a variety of construction, haulage and personnel vehicles, as well as portable generators, will be used on site during the construction period. The use of this equipment will result in exhaust emissions containing, among other emissions, carbon monoxide, nitrogen oxides and sulphur oxides. Operation of this equipment will result in some minor decrease in air quality in the immediate vicinity of operating equipment. This effect, however, will be temporary in nature and emissions would be expected to dissipate following the equipment being shutdown or its movement out of the affected area.

Construction and installation activities have the potential to result in increased noise levels on and within the vicinity of the Project location. Noise emanating from the Project location could disturb both the local sensitive receptors in the vicinity of the Project location (e.g., nearby residences) and local wildlife populations.

Both of these effects are temporary in nature and will result in only short term minor impacts on local air quality and noise levels. Mitigation measures to address these impacts are described in Section 4.7.

3.8 Traffic

Increased traffic volumes and equipment delivery to the Project location and temporary disruption along routes utilized by construction vehicles may result in occasional delays to local community traffic flow during the construction period. This potential negative effect is most likely to affect the local area road users in the vicinity of the Project location, as opposed to resulting in an inconvenience to a wider, regional area. Mitigation measures to address these impacts are described in Section 4.8.

3.9 Municipal Roadways

The use of municipal roadways by construction vehicle traffic may result in some minor damage to roadways during the construction of the Project, given their proximity to the Project location. Construction vehicles would potentially cause the most damage to roads which are highly travelled by construction traffic, especially in the vicinity of the construction vehicle entrance. Mitigation measures to address these impacts are described in Section 4.9.

3.10 Public and Construction Site Safety

Construction of the proposed development poses potential public and construction site safety concerns in the vicinity of the Project location. Potential impacts include injury from construction equipment or activities. Mitigation measures to address these impacts are described in Section 4.10.

3.11 Waste Management

Construction activities will likely result in the generation of recyclable material, as well as construction and sanitary waste. Generation of such material will occur within the Project location, and wastes and recyclables will be transported to the nearest approved facility for disposal or recycling. Mitigation measures to address these impacts are described in Section 4.11.

3.12 Land Use

Lands within the Project location will be removed from agricultural production upon Project construction. However, the agricultural land use may be restored following Project decommissioning. This potential negative effect is therefore considered to be negligible given its reversibility.

3.13 Protected Properties

No protected properties, as defined in Section 19(1) of O. Reg. 359/09, exist in the vicinity of the Project location. Therefore, no adverse effects on protected properties will occur.

3.14 Built Heritage and Cultural Heritage Landscapes

Upon completion of the Ministry of Tourism and Culture (MTC) – *Check Sheet for Environmental Assessments: Screening for Impacts to Built Heritage and Cultural Heritage Landscapes,* it has been

determined that no Heritage Impact Assessment for the Project would be required as no negative effect to built heritage and cultural heritage landscapes is anticipated.

3.15 Archaeological Resources

A Stage 1 and 2 Archaeological Assessment was conducted for the Project location. While two findspots of potential interest were identified during a Stage 1 and Stage 2 archaeological survey, the Ministry of Tourism and Culture has determined that they do not have cultural heritage value or interest and the setbacks will not be required. Following a standard archaeological assessment there remains a potential to uncover deeply buried heritage or archaeological resources (including human burial sites) which would not have previously been identified. In this instance, the MTC has specified mitigation that must be undertaken in the event of discovery of human remains or other archaeologically or culturally significant material. These mitigation measures are discussed in Section 4.12.

3.16 Spills

Spills of petroleum hydrocarbon materials from vehicles/equipment operating on site, such as fuel or hydraulic oils, or spills of concrete materials from concrete trucks, could occur during the construction process. Spills may occur as a result of leakage from vehicles/equipment due to malfunction, leakage from storage areas (if such materials are stored on site) as a result of weakness in the storage equipment, improper handling techniques, and/or improper refuelling techniques. Spills of these materials could result in the following negative effects:

- contamination of soils, surface water, and groundwater with materials inhospitable to the promotion of biological life
- uptake/ingestion by, or coating of, vegetation species or terrestrial and aquatic biota resulting in senescence or individual mortality.

The extent of these effects is highly dependent on the magnitude and location of the spills (i.e., larger spills or those in proximity to sensitive areas are anticipated to potentially have greater effects). The effectiveness of the spill response has a strong bearing on the scale of potential impact. Spill response measures are discussed in Section 4.13.

4. Proposed Mitigation Measures

The following sections detail the proposed mitigation measures to prevent or minimize the potential negative environmental effects discussed in Section 3. Three types of mitigation measures were included and documented where applicable:

- modifying the types of construction activities
- installing treatment technologies (e.g. erosion and sedimentation control measures)
- changing the schedule.

4.1 Soils

As identified in Section 3.1, soils on and in the vicinity of the Project location may be negatively affected as a result of construction and installation activities. Negative effects were documented with

respect to soil displacement, soil quality and sedimentation/erosion processes. Mitigation measures are identified below in consideration of these areas.

In order to assess if excessive soil compaction has occurred, at the completion of construction activities, disturbed areas will be visually monitored for evidence of rutting or flattened areas beneath stockpiles. Restoration efforts (e.g., discing or other soil loosening methods) will be undertaken as required to prevent significant long-term impacts due to excessive amounts of compaction.

In order to prevent mixing of topsoil and subsoils (if encountered), these materials will be stored separately, where excavation is required. The depth of topsoil stockpiles is to be limited to the greatest extent possible, with depths preferably restricted to <1 m. Stockpiling to depths >1 m may result in adverse effects on the health of the soils at the base of the stockpile by promoting the generation of anaerobic conditions (Harris and Birch, 1989; cited in Strohmayer, 1999).

Following the stripping of the topsoil and prior to the deposition of the gravel base along access road areas, a layer of geotextile fabric will be placed over the entire area to prevent mixing of gravel with the underlying native soils.

Preventing erosion from occurring will be the primary goal of an erosion and sedimentation control plan, to be prepared by the construction contractor. The main mitigation measures that will form the basis for the sediment and erosion control plan will include

- erosion and sediment control measures to be placed throughout the Project location, as required, to minimize the potential for erosion and sedimentation. This will include, at minimum, silt fencing installed around the Project work areas where there is potential for off-site sediment transport, and in the vicinity of drainage features on and adjacent to the Project location. All erosion and sediment control measures are to be installed and maintained in accordance with Ontario Provincial Standards Specification (OPSS) 577.
- all necessary erosion and sediment control measures must be in place prior to the start of any earthworks, and are to remain in place until areas disturbed during construction have been stabilized.
- an adequate supply of erosion (e.g., geotextiles, revegetation materials) and sedimentation (e.g., silt fences) control devices is to be provided on site to control erosion and sedimentation and respond to unexpected events.
- the size of the disturbed areas at the construction site is to be minimized. The extent of the work area is to be demarcated on the site to ensure that the contractor does not work beyond these bounds.
- phase construction to minimize the time that soils are exposed.
- revegetate/stabilize slopes as soon as possible after exposure.
- erosion and sedimentation control measures (e.g., silt fence barriers, flow dissipaters, rock flow check dams etc) will be installed and maintained as required in accordance with OPSS.
- sediment control measures will be used during any dewatering of open excavations, should they be required.

- stockpiles will have appropriate barrier/covers to prevent wind and water erosion, as necessary.

With the implementation of the proposed mitigation measures as outlined above, it is anticipated that soil erosion on the construction site will be minor, temporary and localized.

4.2 Groundwater

As discussed in Section 3.2, groundwater pumping from open excavations could potentially result in lowering of the local groundwater table in the vicinity. Should dewatering be required, all groundwater will be pumped out of the excavated area, treated, if required to meet MOE water quality discharge criteria, and discharged toward the vegetated 30-m buffer area surrounding the watercourses. The duration of groundwater pumping will be limited to the extent possible to avoid significant changes in the groundwater table. If groundwater seepage into excavations is extensive, other mitigation measures may be installed to prevent seepage from entering the excavations in order to avoid/minimize pumping requirements. Therefore, if pumping is required, it may result in short-term localized lowering of the groundwater table, but significant changes are not anticipated to occur.

Although unlikely, adverse effects from foundation (galvanized post) installation to groundwater at neighbouring properties has been considered. Northland has committed to sampling and testing of groundwater neighbouring properties as outlined in the Baseline Well Water Monitoring Program and Construction Response Plan. Additional commitments have also been made with regard to well water monitoring in accordance with the Letter of Intent between Northland Power and the Township of Tay Valley. In the event of a complaint with regard to groundwater quality/quantity, Northland has committed to a number of contingency measures which will be implemented.

Rehabilitation of significant areas of soil compaction following construction (as discussed in Section 4.1) will ensure that soil compaction around the site is limited with no significant adverse effects on water infiltration, and hence groundwater recharge, anticipated to occur.

Section 4.13 details the mitigation to prevent or minimize the potential adverse effects of accidental spills during construction.

4.3 Surface Water Quality

Mitigation measures identified with respect to other resources will be effective at preventing impacts to surface water quality:

- mitigation for contamination from accidental spills (see Section 4.13)
- mitigation for erosion/sedimentation is addressed in Soils (see Section 4.1)
- mitigation for fugitive dust deposition is addressed in Air Quality (see Section 4.7)
- mitigation during installation of the water crossing structure and distribution line crossing the drainage feature is addressed in Aquatic Habitat/Biota (see Section 4.4).

In addition to the above, a stormwater management plan will be prepared and provided to the Township of Tay Valley to ensure that flows on and off of the Project site will not have a deleterious impact on neighbouring properties and infrastructure.

As a result of the use of effective mitigation measures, it is anticipated that there will be no resulting adverse effect on surface water quality.

4.4 Aquatic Habitat/Biota

Aquatic biota (e.g., fish and benthic invertebrates) and their habitat in the watercourses and wetlands, will not be directly affected by solar module, inverter and transformer installation, since none of these will occur within 30 m of the average annual high water mark of the watercourse.

Indirect effects on aquatic biota and habitat due to changes in surface water runoff and quality could also occur. Mitigation measures to prevent/minimize adverse effects are discussed in the following sections. Additional detail on the mitigation measures to prevent/minimize adverse effects on surface water quality in the tributary during construction can be found in the Waterbodies Environmental Impact Study (Hatch Ltd, 2011e).

4.4.1 Indirect Effects

Aquatic biota and habitat could potentially be indirectly affected if changes in surface water runoff, surface water quality and groundwater quality or quantity were to occur as a result of the construction phase of the Project. However, the mitigation proposed previously is anticipated to be effective in preventing/minimizing negative effects associated with these other biophysical components of the environment, such that there are no adverse effects on aquatic biota and habitat within the tributary on and adjacent to the site. Given this, no specific mitigation measures, other than those noted in the above-mentioned sections, are required to prevent adverse effects to aquatic biota and habitat.

4.5 Vegetation

As was identified in Section 3.5, vegetation communities may be impacted by clearing of the woodland, accidental spills or movement of dust off site. Mitigation measures with respect to potential impacts of accidental spills on vegetation communities are addressed in Section 4.13. In addition, mitigation measures with respect to the movement of dust from the Project location are described in Section 4.7. As a result of the effective use of the mitigation measures identified in these sections, potential impacts to vegetation communities from these impacts are expected to be fully mitigated, and there is no resulting effect.

In order to mitigate the impacts of clearing from the woodland, compensation planting will occur (the details of which are identified in Hatch 2011f). In order to minimize potential losses from surrounding vegetation communities, areas where clearing is required will be well marked, and workers will be instructed not to enter areas of natural vegetation. In addition, cleared and grubbed materials will be piled away from the surrounding woodlands, and trees will be felled into cleared areas.

4.6 Wildlife

As described in Section 3.6, wildlife populations could be impacted by loss of habitat, disturbance due to construction activities, and incidental take.

In order to minimize the potential for habitat loss, work areas will be demarcated in order to ensure that the contractor does not work beyond those bounds. Vegetation ground cover to be used on the Project location will be selected in consideration of promotion of wildlife features.

In order to minimize potential for disturbance or incidental take of wildlife, construction activities will be timed outside of the breeding bird period (generally May through July), wherever possible. If this is not possible, a trained avian biologist will inspect the proposed work area, plus an additional 100 m around the area, for nesting birds prior to any work being done to delineate workable areas (i.e., avoiding nests or other sensitive breeding habitat until area is abandoned for wildlife breeding). If an active nest of a species covered under the federal *Migratory Birds Convention Act* (MBCA) or the provincial F*ish and Wildlife Conservation Act* (FWCA) is located within a proposed work area, a mitigation plan (which may include the establishment of buffers around the active nests) will be developed to prevent impacts on birds or their active nests, and submitted to Environment Canada (EC) (for MBCA species) or Ontario Ministry of Natural Resources (MNR) (for FWCA species) for review prior to implementation.

In spite of the mitigation measures identified above, it is anticipated that there will be some disturbance of wildlife populations on and in the vicinity of the Project location during construction, however these effects are minor, temporary, and reversible. In addition, it is possible that there may be an incidental take of a species of wildlife during the construction; however, species observed on the Project location are common to the regional area and loss of one or a few individuals will have a negligible effect on population size at the local and regional levels. In order to minimize the potential for incidental take of wildlife, speeds on access roads of the Project location will be restricted. Further, the construction workforce will be made aware of the potential for wildlife occurring on the Project location, and the characteristics and behaviour of species of conservation concern will be identified to the workforce to make them aware of their potential presence. The construction workforce will be advised that measures should be taken to avoid wildlife wherever possible.

4.7 Air Quality and Noise

The use of standard construction best management practices and mitigation measures, such as those identified in "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Cheminfo Services Inc., 2005), will be used. These mitigation measures are to include, as required:

- use of dust suppression (i.e., water) on exposed areas including access roads, stockpiles and work/laydown areas as necessary
- hard surfacing (addition of coarse rock) of access roads or other high-traffic work 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., taped, mulched, graded, revegetated or watered to create a hard surface crust) to reduce/prevent erosion and escape of fugitive dust
- dust curtain to be used on loaded dump trucks delivering materials from off site
- workers to utilize appropriate personal protective equipment (e.g., masks, safety goggles) as necessary.

The use of these mitigation measures would be expected to mitigate most effects of dust on local air quality, with any impacts expected to be temporary in nature.

Construction and installation activities that produce a large amount of noise will be limited to daylight hours. Vehicles will also be regularly checked for properly working mufflers or other noise reducing equipment., and all construction equipment will meet MOE emission standards (NPC 115). Construction activities will commence at the required hours with consideration of the surrounding neighbours comfort. In spite of the mitigation measures identified above, it is anticipated that noise from the Project will have some effect on local wildlife populations (addressed in Section 4.6, above) and nearby sensitive receptors. In order to minimize impacts on sensitive receptors, receptors will be made aware of a contact person for complaints relating to noise during the Project construction. As construction will only last for approximately 6 months, the resulting effect on nearby receptors is expected to minor, temporary and reversible.

4.8 Traffic

Potential negative effects as a result of increased traffic volumes and equipment delivery to the Project location as well as temporary disruption along routes utilized by construction vehicles can be minimized with the implementation of the following proposed mitigation measures:

- designated transportation routes will be utilized
- a police or security escort will be utilized to guide or accompany major equipment deliveries to the Project location if necessary
- flagmen will be utilized as required to facilitate traffic flow and control if necessary
- construction vehicles will be driven in a proper manner with respect for all traffic laws
- signage providing any detour directions will be prominently displayed
- vehicle imprints or erosion gullies will be repaired or regraded as necessary.

As a result, impacts to traffic will be minor, temporary and reversible following Project construction.

4.9 Municipal Roadways

Construction vehicle traffic may cause damage to municipal roadways during the construction of the Project. The following mitigation measures are proposed to minimize this potential negative effect:

- designated and appropriate transportation routes will be utilized
- construction vehicles will be driven in a proper manner with respect for all traffic laws
- roadways will be photographed prior to construction and damage to municipal roadways, above and beyond normal wear and tear, will be repaired as necessary.

Therefore, there will be no residual effect to municipal roadways following the use of these mitigation measures.

4.10 Public and Construction Site Safety in the Vicinity of the Project

Implementation of the following mitigation measures will serve to minimize potential risk to public and construction staff safety within the Project location:

- public access to the construction area will be prevented through the use of fences, gates, and security procedures
- signage will be posted to notify the public of construction in the area
- workers will be required to adhere to prescribed safety procedures
- proper procedures for construction traffic will be developed, where required.

As a result the risk to public and construction site safety is effectively minimized following the use of these mitigation measures.

4.11 Waste Management

Solid wastes generated during construction will include construction waste such as material packaging and scrap material as well as domestic waste such as food and sanitary waste. Sanitary facilities on site will include portable self-contained toilets and washroom facilities. The following mitigation measures will serve to minimize any potential negative effects as a result of the generation of waste and recyclables:

- construction waste will be properly stored on site prior to disposal off site at local, registered disposal facilities
- all sanitary waste is to be contained and hauled off site by a designated hauler throughout the construction period
- hazardous wastes will be properly stored in secure containers inside impervious berms or other containment areas until disposal off site at a registered facility
- reuse and recycling will be practiced wherever possible.

The use of these mitigation measures will minimize any environmental effects resulting from the generation of waste.

4.12 Archaeological Resources

Consultation with the Ministry of Tourism and Culture following the completion of the Stage 1 and 2 Archaeological Assessment Report determined that no setbacks are required. Following a standard archaeological assessment there remains a potential to uncover deeply buried archaeological resources (including human burial sites) during construction of the Project, which would not have previously been identified. In this instance, the MTC has specified mitigation that must be undertaken in the event of discovery of human remains or other archaeologically or culturally significant material:

- should human remains or artifacts be identified during construction, all work in the vicinity of the discovery is to be halted immediately, as required under the *Ontario Heritage Act*
- if human remains are found, notification is to be made to the Ontario Provincial Police (OPP), or local police who will conduct a site investigation and contact the district coroner
- notification is to be made to the Development Plans Review Office of the Ontario Ministry of Tourism and Culture, Heritage Libraries Branch, Heritage Operations Unit 400 University

Avenue, 4th Floor, Toronto, ON, M7A 2R9, and Registrar of Cemeteries, Ontario Ministry of Consumer and Commercial Relations

- work is to be halted in the immediate area where artifacts are found. Work will resume once the site has been investigated and cleared by a licensed archaeologist.

The mitigation measures identified above will effectively minimize impacts on archaeological resources of the study area.

4.13 Spills

Accidental spills have the potential to occur during construction and, as such, appropriate safeguards will be put in place to prevent contamination of the terrestrial or aquatic environments. Contaminants that will be used during construction and have the potential to be spilled consist of petroleum hydrocarbons (from fuel storage and transport, vehicle maintenance and in transformers), concrete materials (from concrete trucks), sewage (from portable toilets), and silt (from clearing and earth-moving operations).

To mitigate the potential for spills during construction, the site engineer and environmental specialist will be responsible for ensuring that the Project is constructed using environmental best management practices. The following measures will be implemented:

- A designated Site Environmental Inspector will be appointed by the contractor. This person will be responsible for ensuring that the contractor(s) have prepared a spill clean-up procedure/ emergency response plan and appropriate equipment, with all staff trained in proper implementation in the event of a spill.
- Emergency Contacts will be posted, including 911, Police, Fire Department, MOE Spills Action Centre, and contacted as required.
- All potentially hazardous materials, fuels and lubricants must be stored in the laydown area, in a protected/bermed area and at least 30 m from watercourses.
- All refuelling and equipment maintenance activities will be conducted at specified locations.
- Equipment is to be monitored to ensure it is well maintained and free of leaks.
- Spill containment and cleanup supplies are to be maintained on site at all times.
- Spill will be cleaned up immediately and reported accordingly.
- In the event of a reportable spill, the MOE Spills Action Centre is to be contacted immediately, as required by provincial regulations.
- Portable toilets will be located no closer than 50 m from a watercourse/drain and will be pumped by an MOE approved hauler to an approved facility.
- A sediment and erosion control plan will be developed and implemented.
- Erosion and sediment control systems must be installed in any location where erosion or sediment from stored soil/rock piles, access roads, clearings activities, etc, could discharge directly into a surface watercourse. An adequate supply of erosion and sediment control devices (e.g., silt fences) will be maintained on site during construction.

- The size of cleared and disturbed area is to be minimized where possible.
- Excavated, erodible material is to be placed in suitable designated areas away from watercourses and stabilized with erosion protection.

As a result, the effective use of mitigation measures will prevent impacts on soils, groundwater, surface water, vegetation and terrestrial or aquatic biota.

5. Environmental Effects Monitoring Plan

The use of mitigation measures identified in Section 4 will either completely mitigate and/or reduce the scale of potential effects to an undetectable level. Therefore, environmental effects monitoring during construction will be restricted to ensuring compliance with the mitigation measures identified herein. Monitoring will consist of weekly inspections of the Project location site by a designated environmental inspector. The inspector will ensure that all mitigation measures described herein are in place and functioning according to design specifications. If required, remedial actions will be recommended and work ceased in the area of interest until the remedial actions are undertaken.

6. References

Cheminfo Services Inc. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared in conjunction with the Construction and Demolition Multi-stakeholder Working Group for Environment Canada, Transboundary Issues Branch. 49 pp.

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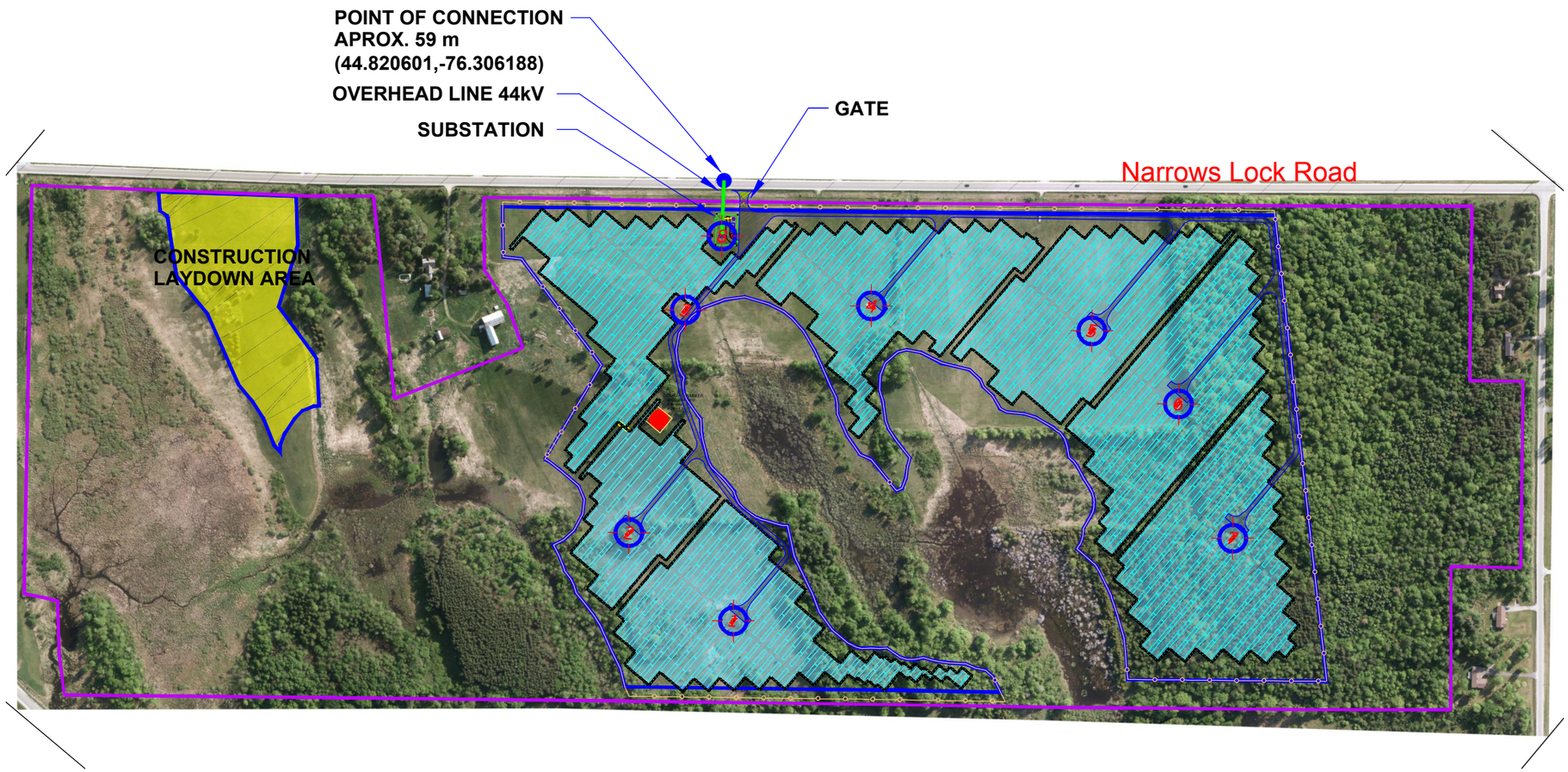
Appendix A

Site Layout



LEGEND:

- GRAVEL ACCESS ROAD
- OVERHEAD 44 kV LINE
- PROPERTY BOUNDARY
- AVAILABLE AREA BOUNDARY
- FENCE LINE
- CONSTRUCTION LAYDOWN AREA
- SOLAR BLOCK
- CONNECTION POINT
- INVERTER'S TRANSFORMER / SUBSTATION'S TRANSFORMER

0m 50m 100m 150m 200m

1:2500 SCALE

PRELIMINARY LAYOUT
NOT FOR CONSTRUCTION

REVISIONS

NO	DATE	SYMBOL	REMARKS
P0	DEC 2010		ISSUED FOR CONSTRUCTION PLAN REPORT
P1	JULY 2011		LAYOUT & INVERTER LOCATION CHANGED
P2	NOV/24 2011		LAYOUT & INVERTER LOCATION CHANGED
P3	SEPT/06 2012		LAYOUT & INVERTER LOCATION CHANGED

STAMP

COGENERATION
Associates Limited

PREPARED FOR

NORTHLAND POWER

PROJECT

NORTHLAND POWER SOLAR NORTH BURGESS

DRAWN BY	TIEN PHAM	VERIFIED BY	
SCALE	N.T.S.	VERIFIED BY	
DATE	DEC 2010	APPROVED BY	
ISSUED FOR TENDER			
PROJECT No.			
TITLE	SOLAR FARM PROJECT SITE PLAN		
DRAWING No.	SP-02 (N. BURGESS)		Rev.P3