



Construction Plan Report

In support of an application for a
Renewable Energy Approval (REA)
Pursuant to Ontario Regulation 359/09

For the

Penn Energy – Edwardsburgh_Morrisburg-1

SOLAR ENERGY FACILITY

FIT Contract No. F-000628-SPV-130-505

FIT Application No. FIT-F46NQGB



In the

Township of Edwardsburgh/Cardinal
County of Leeds and Grenville
ONTARIO, CANADA

April 4, 2011

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A note regarding REA application requirements and additional Project Information:

This document is one component of a series of reports and other related documents that, collectively, constitute a complete Renewable Energy Approval (REA) application package which will be submitted to the Ministry of the Environment (MOE) for review and approval. As such, this report is intended to compliment the other documents and may reference and/or rely upon information contained in them; therefore, the contents herein should not be considered independently.

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Notice:

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1.0 INTRODUCTION

Penn Energy Renewables, Ltd. (Penn) has executed a FIT contract with the Ontario Power Authority (OPA) for the construction of a 10 MW, ground-mounted, Class 3 solar energy facility near the Town of Prescott, in the County of Leeds and Grenville, Ontario. The subject lands are located in part of Lots 34 Concession 1 of the Township of Edwardsburgh/Cardinal (former Township of Edwardsburgh). The proposed Renewable Energy Generation Facility (REGF) would consist of a collection of solar photovoltaic (PV) modules (each approximately 1.00 m x 1.67 m or 1.00 m x 2.00 m in dimension) that are grouped into arrays tilted and facing south. These stationary arrays are strung together forming a series of rows oriented east to west. The Environmental Protection Act (EPA) administered by the Ministry of the Environment (MOE) regulates Renewable Energy Approvals (REAs) under Part V.0.1 of the act, pursuant to Ontario Regulation 359/09. A proponent of a renewable energy project is required to submit numerous reports as part of an REA application; one of which is a Construction Plan Report (CPR).

According to the MOE's publication "Technical Bulletin #3: Guidance for preparing the Construction Plan Report as part of an application under O.Reg.359/09,"

The purpose of the Construction Plan Report is to describe in sufficient detail project activities related to the construction phase so that all potential negative environmental effects may be identified. The report must describe mitigation measures in respect of negative environmental effects of the construction or installation.

This report begins with a summary of the construction stages and general timing of each. It continues by detailing specific tasks and attributes of each stage, potential negative environmental effects due to construction/installation activities, and any proposed mitigation or monitoring. Much of this information is taken from other reports prepared for this REA application, for example, the *Natural Heritage Assessment and Environmental Impact Study Report* by Bowfin Environmental Consulting (**NHA/EIS**), the *Archaeological Assessment Report* by Northeastern Archaeological Associates (**AA**) and the *Water Assessment Report* by Bowfin Environmental Consulting (**WA**).

2.0 DESCRIPTION OF CONSTRUCTION PROCESS

The primary stages (with approximate timing) of REGF construction are **Site Preparation** (3 months), **Facility and Equipment Installation** (4 months), **Interconnection/Testing/Commissioning** (1 month) and **Close-out** (2 weeks). Since these stages will overlap significantly, the anticipated total duration is approximately 6 months – anticipated to commence in Spring 2012. The entire REGF will likely be constructed and installed in one continuous phase, unless interrupted by winter weather.



2.1 Site Preparation

Surveyor layout and staking; temporary power; water well; erosion and sediment controls; clearing/grubbing; topsoil stockpiling; rough grading; temporary parking and staging areas; internal lanes and roadway access connections; perimeter fencing.

Materials Brought On Site: Utility poles and low-voltage conductor; erosion/sediment control materials (fencing, fabric, straw bales, etc.); gravel/aggregate to provide necessary bearing capacity for lanes, parking and staging areas; chain-link fencing and barbed-wire. Portable toilets, an office trailer and refuse/recycling dumpster(s) will also be utilized throughout construction.

Construction Equipment Utilized: Typical earth-moving equipment (grader, bulldozer, backhoe, front-loader, dump truck, water storage tank/truck, etc.); light-duty trucks and similar vehicles.

Timing and Operational Plans: Approximately three months overall; the surveying and utility installation will occur in the first month, while all erosion and sediment controls are installed; any necessary clearing and grubbing will coincide with stockpiling of topsoil and rough grading which should take about 6-8 weeks; then (during the last few weeks) internal lanes, road access, perimeter fencing and temporary parking/staging areas will be constructed. No woody vegetation (trees or shrubs) to be removed between **April 15th and July 31st**, inclusive, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared.

Temporary Land Uses: Much of the REGF Project Location will encounter changes and various uses during this stage. Some will be permanent (rough grading and construction of internal lanes/road connections) while others will only be temporary (e.g., staging areas and erosion/sediment controls).

Materials Generated at/Transported from Project Location: None anticipated other than waste from clearing and grubbing; rough grading is designed to balance cut and fill materials; topsoil will be retained for reapplication, landscaping and re-seeding; standard construction waste will be disposed of according to applicable regulations and standard practice.

2.1.1 Potential Negative Environmental Effects of Site Preparation

Stormwater Runoff Impacts: Because construction activities will occur immediately adjacent to a small wetland, there is a potential for the introduction of sediment into it.

Dust and Noise Emissions: Dust and noise emissions due to typical construction activities are unavoidable, but no negative environmental effects are anticipated – especially since stock mufflers will be utilized on construction equipment and machinery.

Destruction of Vegetation and Habitat: Much of the area within the limits of the project location will be cleared, but it will be re-seeded or landscaped prior to close-out of construction. Because there are



significant woodlands and wildlife habitat (wildlife movement corridor) located within 120m of the Project Location, the facility's layout has been re-designed to leave the northern portion of the site untouched – significantly reducing the amount of woodland clearing; avoiding the loss of 4.6 hectares of interior woodland habitat (in eastern forest); leaving un-severed the connection of forest areas to the east and west. Furthermore, based on comments received from the Ministry of Natural Resources, the project "footprint" was yet again reduced to allow the closed wayside pit to remain – eliminating indirect impacts to woodlands in the immediate vicinity.

There are two small, isolated wetlands within the project location; one of which will be reduced in size and the other eliminated. When evaluated together as a complex, these features fall substantially short of the score necessary to qualify as a significant wetland according to Ontario Wetland Evaluation System standards and contain very little (if any) surface water and no concentrations of amphibians or reptiles.

There is a potential to disrupt nesting activities; there is also potential to disrupt species as a result of noise or light from project activities. According to the MNR-confirmed NHA/EIS, however, properly implemented mitigation measures (see below) will avoid measurable negative impacts. The wildlife movement corridor features (in eastern woodlands) will continue to allow wildlife movements identified in the NHA/EIS, thereby avoiding negative environmental effects.

Impacts on Water Bodies: No water bodies exist in or within 120m of the project location. Although a closed wayside pit (holding water) will remain immediately adjacent to the project location, pursuant to O. Reg. 359/09 dug-out ponds are specifically excluded from the definition of a "water body."

Impacts Related to Water Taking: None. Penn anticipates that it will install a well on this property during the Site Preparation Phase of the Construction. Water from the well will be utilized primarily for dust control, and to a lesser extent, for other construction-related water needs during the construction of the project. During the construction phase of the projects, Penn anticipates that it would utilize not more than 7,600 liters of water per day on any day.

Fuel Spills: Spills from construction equipment/machinery are a potential threat to the environment, but this can be mitigated according to the MNR-confirmed NHA/EIS (see below for specific recommendations).

Impacts on Archaeological Resources: None. Following completion of a Stage 1-2 Archaeological Assessment, the REGF site plan was revised to ensure no archaeological resources materials would be impacted by the project.

2.1.2 Proposed Mitigation/Monitoring Plan for Site Preparation

Modifications of Construction Activities:



- Clearly delineate the area to be cleared to prevent the loss of woody vegetation not intended for removal.
- No removal of woody vegetation (trees or shrubs) between April 15th and July 31st, inclusive, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared;
- Establish a 5 m wide allowance between the location of the perimeter fence and the edge of the woodland to remain.
- Utilize small machinery (such as a small backhoe) for the removal of woody vegetation along the perimeter (outside the fence) to minimize harm to the root system of trees not intended for removal.
- All stockpiling or infilling activities will be confined to within the fenced in area and will not extend more than 5 m of the outside of the fence in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the wetland.
- All topsoil removal will be confined to within the fenced area and will not extend more than 5 m outside of the fence to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the wetland.
- All machinery should remain outside of the wetland and the 30 m boundary (with exception of small machinery for the mowing of the perimeter land).
- The perimeter lane should be left as a farm lane (i.e. unpaved, gravel or dirt road).

Treatment Technologies:

- Fueling and maintenance activities would occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area should be at a minimum 30 m away from the wayside pit and wetlands (portion that is not intended for removal).
- Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800.268.6060)

Scheduling and Operational Changes:

- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.

Environmental Effects Monitoring Plan: According to the MNR-confirmed NHA/EIS, no monitoring is required for this project.

2.2 Facility and Equipment Installation

PV array foundations (piles/screw-posts), racking and modules; low-voltage wiring and combiner/collection cabling; trenching for conductors; collection house/transformer foundation pads; placement of collection houses; inverters and mid-size transformers; final connections of collection equipment; overhead structures; high-voltage conductors to substation; permanent power (120-240v).



Materials Brought On Site: Metal posts and racking materials for assembly of PV arrays; PV modules and associated wiring; combiner/collection accessories (cables, connectors, etc.); stone and conduit for trenches; stone and concrete for building/transformer foundations; pre-fabricated collection houses (including pre-installed inverters, control equipment and accessories); mid-size transformers; wood or steel poles and high-voltage conductors; related wiring, cables, controls, switches, disconnects, etc.

Construction Equipment Utilized: Typical light-duty construction equipment; specialized machines for installation of PV array foundations (similar to a Bobcat); delivery and staging vehicles (medium and large trucks, fork lift, etc.); bucket truck; concrete truck; small- to medium-sized grading/compacting equipment; hand tools.

Timing and Operational Plans: Numerous tasks and trades will be concurrently underway throughout this 4-month stage. Because of the large number of modular, repetitive components, installation can be progressively staggered (e.g. the panel installation following the racking installers who can be right behind the foundation crew.) Additionally, other components can be erected at the same time: low- and high-voltage conductors, collection houses, transformers, etc.

Temporary Land Uses: In addition to the construction office trailer, dumpster and parking areas, the primary temporary use of land will be for staging of materials, equipment and related supplies.

Materials Generated at/Transported from Project Location: No materials requiring export from the site will be generated other than standard construction waste, which will be disposed of according to applicable regulations and standard practice.

2.2.1 Potential Negative Environmental Effects of Facility and Equipment Installation

Stormwater Runoff Impacts: None.

Dust and Noise Emissions: Dust and noise emissions due to typical construction activities are unavoidable, but no negative environmental effects are anticipated – especially since stock mufflers will be utilized on construction equipment and machinery.

Destruction of Vegetation and Habitat: None.

Impacts on Water Bodies: None.

Impacts Related to Water Taking: None. Penn anticipates that it will install a well on this property during the Site Preparation Phase of the Construction. Water from the well will be utilized primarily for dust control, and to a lesser extent, for other construction-related water needs during the construction of the project. During the construction phase of the projects, Penn anticipates that it would utilize not more than 7,600 liters of water per day on any day.



Fuel Spills: Spills from construction equipment/machinery are a potential threat to the environment, but this can be mitigated according to the MNR-confirmed NHA/EIS (see below for specific recommendations). Penn anticipates selecting a primary transformer for the grid-tie substation that utilizes biodegradable transformer oil(s), such as, by way of example, vegetable-based FR-3. Such transformer oils are non-toxic and readily biodegradable. They are less volatile than petroleum-based oils and have higher flash points for improved safety. They are known to quickly and thoroughly degrade in both soil and aquatic environments.

Impacts on Archaeological Resources: None. Following completion of a Stage 1-2 Archaeological Assessment, the REGF site plan was revised to ensure no archaeological resources materials would be impacted by the project.

2.2.2 Proposed Mitigation/Monitoring Plan for Facility and Equipment Installation

Modifications of Construction Activities:

- Utilize small machinery outside of perimeter fence during all activities.
- Where possible, do not disturb rock walls or rock piles; if necessary, removal of rock walls should occur outside of the hibernation period, preferably between late May and September.
- Ensure that properly operating mufflers (i.e. standard OEM, or similar) are used on all project machinery and vehicles to minimize noise impacts; and
- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.
- All stockpiling or infilling activities will be confined to within the fenced in area and will not extend more than 5 m of the outside of the fence in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the wetland.
- All machinery should remain outside of the wetland and the 30 m boundary (with exception of small machinery for the mowing of the perimeter land).

Treatment Technologies:

- Fueling and maintenance activities would occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area should be at a minimum 30 m away from the wayside pit and wetlands (portion that is not intended for removal).
- Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800.268.6060)

Scheduling and Operational Changes:

- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.



Environmental Effects Monitoring Plan: None.

2.3 Interconnection/Testing/Commissioning

Grid-tie substation (main 44 kV transformer, switchgear, disconnects, meter, etc.); foundation pads for various equipment and a maintenance building; placement of pre-fab maintenance building; overhead structure(s); 44 kV conductor to existing LDC distribution line; LDC coordination; system testing, calibration and troubleshooting; commissioning.

Materials Brought On Site: 44kV transformer, switchgear, disconnects, meter and related equipment; pre-fabricated maintenance building; wood or steel poles and high-voltage interconnection conductor; fencing and gates; tele-protection communication equipment and mounting pole; site lighting and security system.

Construction Equipment Utilized: Small- to medium-sized grading/compacting equipment; delivery and staging vehicles (medium and large trucks, fork lift, etc.); bucket truck; concrete truck; typical light-duty construction equipment; small crane; hand tools.

Timing and Operational Plans: Much of this work can be executed in parallel with the previous stage (Facility and Equipment Installation); of course the testing and commissioning require almost all construction and installation activities to have been completed. Overall, these activities may last approximately one month;

Temporary Land Uses: Only a relatively small area will be used temporarily for tasks in this stage; they will be primarily for staging of the equipment and supplies as well as crew parking.

Materials Generated at/Transported from Project Location: No materials requiring export from the site will be generated other than standard construction waste, which will be disposed of according to applicable regulations and standard practice.

2.3.1 Potential Negative Environmental Effects of Interconnection/Testing/Commissioning

Stormwater Runoff Impacts: None.

Dust and Noise Emissions: Dust and noise emissions due to typical construction activities are unavoidable, but no negative environmental effects are anticipated – especially since utilizing stock mufflers will be utilized on construction equipment and machinery.

Destruction of Vegetation and Habitat: None.

Impacts on Water Bodies: None.



Impacts Related to Water Taking: None. During the Interconnection/Testing/Commissioning phase of the Construction, Penn anticipates that it will perform the initial cleaning of the modules. The duration of the module cleaning scope of work is approximately one week. It is anticipated that the module cleaning process will use not more than 30,240 liters of water per day on any day.

Fuel Spills: Spills from construction equipment/machinery are a potential threat to the environment, but this can be mitigated according to the MNR-confirmed NHA/EIS (see below for specific recommendations). Penn anticipates selecting a primary transformer for the grid-tie substation that utilizes biodegradable transformer oil(s), such as, by way of example, vegetable-based FR-3. Such transformer oils are non-toxic and readily biodegradable. They are less volatile than petroleum-based oils and have higher flash points for improved safety. They are known to quickly and thoroughly degrade in both soil and aquatic environments.

Impacts on Archaeological Resources: None. Following completion of a Stage 1-2 Archaeological Assessment, the REGF site plan was revised to ensure no archaeological resources materials would be impacted by the project.

2.3.2 Proposed Mitigation/Monitoring Plan for Interconnection/Testing/Commissioning

Modifications of Construction Activities:

- Utilize small machinery outside of perimeter fence during all activities.
- Where possible, do not disturb rock walls or rock piles; if necessary, removal of rock walls should occur outside of the hibernation period, preferably between late May and September.
- Ensure that properly operating mufflers (i.e. standard OEM, or similar) are used on all project machinery and vehicles to minimize noise impacts; and
- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.
- All stockpiling or infilling activities will be confined to within the fenced in area and will not extend more than 5 m of the outside of the fence in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the wetland.
- All machinery should remain outside of the wetland and the 30 m boundary (with exception of small machinery for the mowing of the perimeter land).

Treatment Technologies:

- Fueling and maintenance activities would occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area should be at a minimum 30 m away from the wayside pit and wetlands (portion that is not intended for removal).



- Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800.268.6060)

Scheduling and Operational Changes:

- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.

Environmental Effects Monitoring Plan: None required.

2.4 Close-out

Removal of temporary services and facilities (e.g. portable toilets, office trailer and refuse/recycling dumpsters); topsoil replacement and final grading; landscaping and re-seeding;

Materials Brought On Site: Sod/seed mix for turf grass and various plants for the perimeter landscaping.

Construction Equipment Utilized: Medium and/or large trucks, fork lift, etc. to remove temporary facilities; small- to medium-sized landscaping equipment; bucket truck; concrete truck; typical light-duty construction equipment; small crane; hand tools.

Timing and Operational Plans: approximately two weeks

Temporary Land Uses: none

Materials Generated at/Transported from Project Location: Portable toilets, an office trailer and refuse/recycling dumpster(s)

2.4.1 Potential Negative Environmental Effects of Close-out

Stormwater Runoff Impacts: None.

Dust and Noise Emissions: Dust and noise emissions due to typical construction activities are unavoidable, but no negative environmental effects are anticipated – especially since utilizing stock mufflers will be utilized on construction equipment and machinery.

Destruction of Vegetation and Habitat: None.

Impacts on Water Bodies: None.

Impacts Related to Water Taking: None. During the Close-out phase of the Construction, Penn will utilize water to help establish the landscaping and seeding areas of the site. Penn anticipates that it



would utilize not more than 37,800 liters per day of water during the period in which it is establishing the seeded and landscaped areas. After the seeded and landscaped areas are established, the primary use of water will be for module cleaning. Averaged over the course of a year, this usage is expected to be less than 1,000 liters per day.

Fuel Spills: Spills from construction equipment/machinery are a potential threat to the environment, but this can be mitigated according to the MNR-confirmed NHA/EIS (see below for specific recommendations).

Impacts on Archaeological Resources: None. Following completion of a Stage 1-2 Archaeological Assessment, the REGF site plan was revised to ensure no archaeological resources materials would be impacted by the project.

2.4.2 Proposed Mitigation/Monitoring Plan for Close-out

Modifications of Construction Activities:

- Sediment fencing will be maintained throughout the construction phase. Re-seed any exposed soil and allow vegetation to grow before removing sediment fencing
- Minimize removal of vegetation (only clear where necessary) in vicinity of wetland.
- Clearly delineate the boundaries of areas not intended for clearing and/or grading on the construction plans and in the field.
- Utilize small machinery outside of perimeter fence during all activities.
- Where possible, do not disturb rock walls or rock piles; if necessary, removal of rock walls should occur outside of the hibernation period, preferably between late May and September.
- Ensure that properly operating mufflers (i.e. standard OEM, or similar) are used on all project machinery and vehicles to minimize noise impacts; and
- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.
- All stockpiling or infilling activities will be confined to within the fenced in area and will not extend more than 5 m of the outside of the fence in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the wetland.
- All machinery should remain outside of the wetland and the 30 m boundary (with exception of small machinery for the mowing of the perimeter land).

Treatment Technologies:

- Fueling and maintenance activities would occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area should be at a minimum 30 m away from the wayside pit and wetlands (portion that is not intended for removal).



- Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800.268.6060)

Scheduling and Operational Changes:

- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.

Environmental Effects Monitoring Plan: None required.

