Injasuti Developments

BEAVER CREEK SOLAR FARM

Municipality of Central Elgin, County of Elgin

CONSTRUCTION MANAGEMENT PLAN

JULY 2011

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1. INTRODUCTION

The purpose of this management plan is to outline the methodology to be used by Injasuti Developments (Injasuti) in implementing construction activities during the life of the solar farm projects in the Municipality of Central Elgin. Injasuti is proposing to develop a Class 3 Solar Facility south of Fruit Ridge Line along Centennial Road at Part Lot 10, Concession 4, municipally known as 43921 Fruit Ridge Line.

The partners of Injasuti have made efforts to establish good relations with the local community, and plan to be a long term members of the community. During construction, operation and decommissioning of the project, the company's emphasis will always be on control and mitigation of solar farm effects on the local community and the environment.

The goal of Injasuti during all phases of the solar farm project will be:

- Safe work performance;
- On-schedule facility completion;
- Quality assurance (QA);
- Municipal cooperation; and
- Quality community relations.

2. PURPOSE

Circulation of this document will provide general information to neighbours, municipal staff and the general public regarding the solar farm project as well as outline implementation procedures and protocols. This will facilitate understanding of the construction, operation, maintenance and decommissioning of the solar farm. The plan will be accessible and available for review by any interested persons at the Municipality of Central Elgin office and posted on the project website.

2.1 PRINCIPLES

The operation and management protocols are based on the following principles:

1. Open communications between the operators and the neighbours, municipality;
2. Quick response to any complaints or questions;
3. Accessibility of operator;
4. Fair and reasonable mitigation action; and
5. Resolving neighbours' complaints and issues in a timely manner.

2.2 Scope of the Management Plan

The Management Plan includes the following specific areas:

1. Construction Management – This plan addresses the construction of the project and related electrical studies, construction surveys and project management to be completed before and during the installation of all above and below grade equipment.
2. Traffic Management – This plan addresses the routing of construction traffic, possible impact on roads and safe traffic management during construction.
3. Emergency and Operational Management – This portion of the Management Plan addresses training and safe operation of the solar farm facility for the operators and the general public.
4. Dispute Resolution Protocol – The protocol sets out commitments by the operator to quickly address complaints made by neighbours when solar farm is operational.

3. CONSTRUCTION

3.1 Pre-Construction Studies

3.1.1 LOCATOR STUDIES

To identify and locate existing buried services. Locator studies will be carried out along the routing for underground high voltage (HV) collector lines, pole lines for the collector line and the HV transmission lines and the substation area.

3.1.2 ELECTRICAL WORKS, DISTRIBUTION AND TRANSMISSION WORKS – STUDIES

The objective of the power systems study is to determine that the station equipment principal ratings and protective devices are within the acceptable design limits intended for safe operation of the solar farm.

3.1.3 SHORT CIRCUIT STUDIES

The short circuit study will be undertaken to evaluate and determine the peak duty and maximum break duty fault currents on all of the photovoltaic solar panels switchgear and the interconnecting switchgear of the grid systems. The protection and switchgear fault clearance time will be estimated.

The following fault currents will be evaluated:

- Initial short circuit current;
- Peak fault current; and
- Break fault current.

The results of the short circuit studies will be presented in tables that will include circuit breaker, fuse and other equipment ratings that will be specified versus the calculated short circuit duties.

Injasuti will submit the study reports to the Local Distribution Company (LDC), to obtain the final connection approval.

3.1.4 ELECTRICAL SYSTEM COORDINATION STUDY

A coordination study will be undertaken to select power fuse ratings, protective relay characteristics and settings, ratios and characteristics of the PTs and CTs. The results of this study will be presented both graphically as well as in a table listing that includes circuit identification, IEEE device number, CT and PT ratios, manufacturer, type, range of adjustment, and recommended setting. The coordination study will determine maximum and minimum load and maximum and minimum voltage conditions.

Injasuti will submit study reports to the local LDC, to obtain the necessary approvals.

3.1.5 GROUNDING SYSTEM STUDY

Grounding system studies will be undertaken, utilizing information on soil resistivity that has been made available by the Owner or determined through testing. Grounding is required at all solar array transformer locations, the switching station, and all pole switching locations. It is also required for system neutrals at the pad mount / arrays, bonding of all non-current carrying metal parts to ground,

and the establishment of a low resistance ground system with respect to datum earth, step and touch potentials and lighting protection.

Injasuti will obtain necessary ESA approval for grounding system drawings and specifications.

The design and engineering activity will be managed by lead discipline engineers reporting to the Project Manager. Detailed engineering packages will be prepared for the procurement of engineered equipment from vendors and third party suppliers. Detailed engineering drawings and material take-off lists will be prepared for procuring bulk electrical materials and construction of the balance of plant.

The Project Manager will have overall responsibility for managing this phase of the project. Senior discipline engineers and the Project Manager will review and approve each of the vendors' packages, drawings, specifications and designs to ensure that the design of the project will meet the intended duty and will comply with specified requirements of the Owner.

3.2 PROCUREMENT

Injasuti's engineer will identify engineered equipment, including main power, transformer, pad mounted transformers, HV equipment and other long delivery materials. Injasuti will proceed with finalizing specifications and data sheets and the placing of an order to purchase equipment. Injasuti will facilitate procurement coordination, material management, inspection and expediting activities.

Injasuti will procure other bulk materials and non-engineered equipment.

3.3 PROJECT MANAGEMENT

Injasuti's Project Manager will be responsible for the successful completion of the solar farm project. The Project Manager will be supported on the Project by key design, procurement, project administration, planning/scheduling, construction management and supervision and other personnel assigned from affiliated companies, as required, to manage subcontractors and to self-perform work required to complete the Project.

3.4 SITE CONSTRUCTION MANAGEMENT

3.4.1 GENERAL

Injasuti's Construction Manager will monitor and review all aspects of the construction of the project to ensure that the work is undertaken safely in accordance with the requirements of the drawings and specifications and in accordance to the project programme. The Construction Manager will be responsible for all of Injasuti's site activities until the project close out. The Construction Manager will be assisted and supported by construction superintendents and civil and electrical personnel visiting from head office, commissioning and quality control, health and safety professionals.

The successful implementation of the construction work will depend upon the following components:

- Implementation of our Safety Management Plan;
- A comprehensive and realistic construction strategy;
- Experienced site organization and required labour resources;

- Management of the Injasuti Subcontractors; and
- Overall project coordination.

Injasuti will achieve successful implementation by:

- Early mobilization of construction resources and temporary facilities;
- Early approval for construction drawing release to support construction team;
- Timely erection equipment mobilization;
- Timely delivery of equipment & material to site; and
- Timely installation of all aspects of the Project.

3.4.2 SITE MANAGEMENT RESPONSIBILITIES

Injasuti's Construction Manager and the team will:

- Maintain good safety and health programs and practices as well as good environment control programs as part of all work activities;
- Execute site construction, installation and testing of equipment to a high standard of quality;
- Act as an interface with Injasuti's Project Manager and operational staff, the subcontractors, third party inspection (TPI) and other organizations involved with the Project;
- Manage any environmental and safety issues during construction and commissioning;
- Assist the Commissioning Engineer and their team in conducting site tests, including precommissioning, plant start-up, commissioning and supervise the TPI as required;
- Organize and attend regular site co-ordination meetings, progress meetings and prepare minutes of meetings;
- Maintain on site, complete and proper records of the progress of the Project;
- Maintain accounts and records of the cost of the works;
- Maintenance of correct as-built drawings reflecting all changes and modifications;
- Training of Injasuti operations and maintenance personnel; and
- Construction completion, testing and commissioning of all balance of plant items.

3.4.3 SUBCONTRACT MANAGEMENT

Subcontract control will be conducted to ensure that all subcontractors carry out their work at the site in accordance with the Project safety and quality requirements and complete their work in accordance with the Project schedule.

Subcontractors will be controlled, with emphasis on the following:

- Safety;
- Control of technical information;
- Fulfilling reporting requirements;
- Inspection and testing of construction material; and
- Non-conformance and quality control.

3.4.4 ENVIRONMENTAL EFFECTS MANAGEMENT

The Construction Manager will ensure that the project's construction phase will adhere to the recommendations outlined in the Environmental Impact Study as below:

3.4.4.1 Pre-Construction Site Preparation

Prior to construction, the Construction Manager will ensure that:

1) A Biologist will walk the project location to search for any significant natural heritage features (if any are noted, appropriate setbacks and mitigation will be developed according to wildlife species noted in project natural heritage reports and studies);
2) The existing fence installed at the north project location boundary that will function as a construction barrier;
3) A dual function construction barrier/silt fence will be constructed 10 metres inside the project location on the west side;
4) A construction barrier will be installed at the project location on the south and east sides;
5) A construction barrier and construction barrier/silt fence will remain installed until the security fence is installed; and that
6) The silt fence at the west end will remain throughout construction.

3.4.4.2 Construction

During construction, the Construction Manager will ensure that:

1) Should natural heritage features, such as turtle nests or turtles, be observed, the sighting will be reported by construction crew to the Construction Manager and that the Construction Manager will ensure that construction work will stay at least 5 metres distant from such nests until the nesting period is complete or the nest is scavenged (generally during month of June);
2) The silt fence is monitored weekly to ensure it is intact and functioning correctly;
3) Construction equipment will be stored within the fenced area, within the project location;
4) Careful fueling methods are adhered to and undertaken within the project location; and that
5) Work should proceed from west to east, within the expected three month timeline (August – November 2011).

3.5 PROJECT CONTROL

The development of an achievable and comprehensive schedule is essential to the success of the Project. A project schedule will be prepared along with activity spreadsheets for PSP activities, which will form the basis of progress monitoring and act as principal indicator toward overall completion of the Project.

The subcontractor programmes will be reviewed to ensure that they accurately reflect the sequence and timing of Project activities. If any anomalies are identified, Injasuti will discuss these with the subcontractors to ensure that a detailed schedule is produced that is acceptable to all parties.

3.5.1 PROJECT MEETINGS

Design and construction coordination meetings will be convened as-required during the various phases of the project work. Injasuti's Project Manager and/or representative will plan and attend project meetings in order to review the project and to resolve any issues related to the project.

4. TRAFFIC MANAGEMENT

4.1 Purpose

The purpose of this section is to identify the safety measures, transport routes, monitoring and rehabilitation of municipal or county roads as needed over the duration of the project construction. The intent will be to maintain safe use of the roadways and minimize interference with the existing farm and passenger traffic around the solar farm site. No road impact is expected beyond what might normally occur from permitted agricultural or industrial operations in the vicinity of the project. The size of equipment used to deliver the materials, grade and construct the solar farm will not exceed the normal truck or trailer sizes permitted on the public roads. No long or oversize truck permits will be needed for construction.

4.2 Pre-Construction

The Project Manager will inform and consult with the Municipality regarding the expected use of abutting roads, any road improvements or changes needed for access points or drain crossings in accordance with established municipal criteria. The PM will identify the expected number of days of construction and hours of construction. It is expected the construction process will take three months with additional time related to site preparation and commissioning. The PM will advise the Municipality of any changes to transport routes or timing due to unexpected delays.

4.3 Construction

The solar farm Project Manager will manage traffic in accordance with all Provincial, County and municipal laws in the applicable jurisdiction. The PM will ensure that the appropriate signage is posted at the entrance and exit to the construction site from Centennial Road, warning of the activity. The PM will provide the necessary flag person to ensure safe entrance and exiting to the site as needed. Truck operators will be informed of related to the safe operation of vehicles in and around the construction site. The site will ensure safe turning movements to and from the site to avoid the need to back onto public roads. During construction all signage, signalling and related controls will be undertaken in accordance with the Manual of Uniform Traffic Control Devices, Ministry of Transportation Division 5, Temporary Conditions, and April, 1987.

The PM will ensure the road is maintained and cleaned as needed in accordance with Municipal standards. On a weekly basis, the PM will ensure that no construction debris or mud from the site is left on the public roadway. The PM will report any damage resulting from construction activity to the Municipality.

5. EMERGENCY AND OPERATIONAL MANAGEMENT

Under the direction of a commissioning representative, Injasuti will carry out tests at site, pre-commissioning tests and commissioning tests of all systems in the substation, collector system, overhead distribution lines and operations building and the photovoltaic solar panel equipment.

5.1 Emergency Management

Emergency management establishes sound safety practices in response to risks associated with injury to persons or damage/loss to property. There is no specialized training or equipment needed for local emergency response services associated with the solar farm. Solar farm equipment and infrastructure do not change the demand or scope of emergency response services because the materials and operation have the same risk associated with materials and equipment used on industrial sites elsewhere in the Municipality of Central Elgin. The local fire, police and ambulance services are trained for emergency response to industrial sites in the Municipality and are therefore equipped and trained to respond to the solar farm projects.

Emergency response is provided through 911 calls for the Municipality of Central Elgin. In addition emergency contact phone numbers will be posted at the entrance to the solar farm and at the visitor/operations building located on the site. The on-site/on-call solar farm operator will be available 24 hours per day and 7 days per week all year, to provide emergency response assistance on behalf of the owner.

5.2 Operations and Maintenance Training

The training program is designed to provide basic understanding of the equipment and its associated auxiliary systems for the solar farm operator and staff. The training will consist of a combination of walk-downs during the erection of the equipment, review of operations and maintenance manuals and monitoring of the commissioning of the equipment. All training will be provided at the site.

The training program will cover the following:

- Commissioning of the systems;
- Operational features of the plant, including solar panels; and
- Maintenance aspects.

Injasuti operations personnel will witness and take part in the commissioning activity, as this becomes an integral part of on-the-job (OTJ) training. Commissioning will include all activities associated with start-up and energization so as to permit PSP commissioning by others. Injasuti will conduct and supervise the testing, and attend and witness the tests on completion to determine that the solar farm is safe, ready and complete. Injasuti will prepare the test results to determine that each solar panel park has been satisfactorily completed, has met its conditions of the contract and ready is for hand over to Injasuti.

It is anticipated that Injasuti's operations personnel will actively participate during the erection and commissioning phase of the project in order to have an OTJ training experience. The following documentation will be provided:

- Operating and Maintenance manual;
- Function and logic diagrams;
- Single line diagrams; and
- Protection diagrams.

5.3 Operating and Maintenance Manuals

The operation and maintenance manuals will provide the equipment suppliers' instructions required for safe operation and maintenance of the equipment.

Injasuti will collate the information supplied by the equipment suppliers and subcontractors for use by the operators on site.

6. DISPUTE RESOLUTION PROTOCOL

6.1 Purpose

A Dispute Resolution Protocol is based on the premise that two neighbours should work together to resolve potential disputes. This protocol suggests a process for people living in proximity to solar farms (hereafter referred to as the neighbours) and the operators of the solar farms (Injasuti) hereafter referred to as the operator) to resolve concerns related to reflection, noise, drainage and any related solar farm matters. The process will be a voluntary one, between the neighbour(s), and the operator. The protocol is intended to expeditiously resolve concerns locally and encourage positive relationships within the municipality. The process will commence at the date of construction start-up of the solar farm and continue for the life of the project until it is decommissioned.

6.2 Complaint Resolution

The solar farm operator will establish a call-in telephone number. In addition, voicemail messaging will be available twenty-four hours a day, seven days a week. The call-in telephone number will be distributed annually to all neighbours abutting and living in proximity to the solar farm. For emergency purposes, and if immediate contact is necessary, the message center will advise a caller of an emergency number and contact person.

The protocol establishes a one business day response time by the operator to received telephone complaints. Upon discussions with the neighbour(s) and documentation of all pertinent data, the operators will schedule a site visit at an appropriate time with the neighbour(s). The operator commits to setting up the meeting within two business days of the phone contact.

The operator will conduct an assessment of the potential impact within ten business days of the site visit. The assessment will be conducted by qualified professional staff using currently accepted industry practices, standards and equipment.

The operator will, complete a report identifying the complaint, confirming the site visit, provide an analysis of the preliminary measurement results and determine if any of the impact(s) exceeds the standard. The operator commits to meet with the resident as soon as possible after the report is complete to share the data collected. If the results collected during the preliminary testing confirm that additional testing is warranted, the operator will contract the services of professional staff.

Where the assessment identifies the need for mitigation measures, the operator shall implement these actions within fifteen business days of the submission of the report or at a date mutually agreeable to all parties. In the event it is not possible to complete the mitigation measures within the agreed time frame, the operators will temporarily idle the electrical equipment until such mitigation measures are implemented.

If the testing confirms that the operator is compliant with the Certificate of Approval or any other related approval, no further action will be taken by the operator. The neighbour(s) will be asked to acknowledge, in a letter, all site visits, impact assessments and mitigation measures taken, if any, to resolve the issue, within 30 days of the complaint resolution. Where no written acknowledgement is received within the time frame, it will be determined the issue is resolved.

If the neighbour(s) does not accept the findings by the operator, the resident has the option of registering a complaint with the MOE at the address listed below:

Ministry of the Environment
London Regional Office
2nd Floor 733 Exeter Road
London ON N6E 1L3
Toll free number from area code 519: 1-800-265-7672
Tel: (519) 873-5000
Fax: (519) 873-5020

6.3 Implementation

This Dispute Resolution Process is intended to address concerns between neighbour(s) and the operator quickly and in a cost effective manner. This process is voluntary for all participants on the basis that it is in everyone's interest to resolve matters prior to complex and costly alternative processes.

The information collected with respect to the complaint, assessment, mitigation measures and any mediation reports shall be maintained by the operator through the life of the project. This resolution process will help residents in the area understand the nature, response and mitigation measures for the complaints received.

This Dispute Resolution Process will be reviewed annually or more frequently if required, after commissioning of the solar farm, to determine opportunities for improvement.