PROJECT SUMMARY

SOLAR FACILITY

MILLARD HILL ROAD
NEWFIELD NY 14867

Prepared by:
Delaware River Solar

Revised January 24, 2018
## Content

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ACRONYMS
AC  Alternating Current
DC  Direct Current
kV  Kilovolt
MW  Megawatt
PV  Photovoltaic
1.0. INTRODUCTION

Delaware River Solar, LLC ("Project Owner” or “DRS”) has prepared this preliminary project summary ("Project Summary") for the proposed development, installation and operation of two solar photovoltaic facilities (collectively, the “Solar Facility”), each including a 15 kilovolt (kV) interconnection line (collectively, the “Interconnection Line”), to interconnect the Solar Facility to the New York State Gas & Electric (“NYSEG”) electrical grid. The proposed Solar Facility and Interconnection Line are referred to collectively as the “Project”.

The proposed site for the Solar Facility (“Project Site”) would be on approximately 25 acres of undeveloped land located south east of the intersection of Millard Hill Road and Burdge Road, within the jurisdiction of the Town of Newfield.

The Solar Facility will have a total generation capacity, pursuant to current Community Solar guidelines, of not more than 2 MW AC per facility (in aggregate 4.0 MW AC). The final generation capacity will be determined based on final system design as accepted by NYSEG.

Energy generated from the Solar Facility will be distributed to NYSEG for daily use by NYSEG’s customers and directly benefit customers enrolled in the Project Owner’s “Community Solar Program”. The objective of the “Community Solar Program” is to offer electricity at a discount to NYSEG rates to those enrolled. It is the goal of the Project Owner to afford the residences and businesses in the Town of Newfield the opportunity to enroll in the program prior to opening enrollment to additional locations.

The connection of the Solar Facility to the NYSEG electrical grid, including the specific interconnection equipment, will be part of a standard “Interconnection Agreement” executed between the Project Owner and NYSEG.

The Solar Facility design will adhere to technical and environmental requirements in accordance with electricity distribution companies’ codes and current federal, county and municipality laws.
Key Attributes of the Project Include:

- Direct conversion of sunlight to electricity without generation of waste materials;
- Solar power generated producing no carbon emissions or air pollutants;
- No noise generated during solar power generation;
- No traffic disturbance during Project operational lifespan;
- No use of public water utilities;
- Uniform arrays approximately nine feet in height to minimize visual effect;
- All on-site structures limited to no more than eight feet in height to minimize visual effects;
- Vegetation to be planted around Project Site to minimize visual effects; and
- Modules secured using a racking system minimizing ground grading and ground disturbance.

This Project Summary includes descriptions of and guidelines for the design, construction, operation, maintenance, and decommissioning of the Project. The design, construction, operation, maintenance, and decommissioning of the Project will meet or exceed the requirements of the National Electrical Safety Code and U.S. Department of Labor Occupational Safety and Health Standards, as well as town and municipality requirements for the safety and protection of landowners and property.

The Project Owner has compiled this Project Summary with, to the best of its knowledge, currently available information. Additional reports, such as topography, geotechnical, and environmental, have not been completed but will be completed during the permitting process.

The information contained in this document is preliminary and not intended to describe all the relevant Project information and is qualified in its entirety by the final application and site plans.
1.1. Purpose

Provide a cost effective source of renewable solar electricity. Additional objectives include:

- Develop a solar generation facility that is feasible, quick to construct and easy to operate while providing NYSEG and its customers with a cost-effective, cleaner alternative;
- Establish emission-free solar electricity and reduce greenhouse gas (GHG) emissions while avoiding, minimizing, and mitigating the impacts to the environment;
- Generate electricity without utility water supply needs;
- Provide other important economic and environmental benefits to NYSEG and the municipality, including improving local air quality and public health, developing local energy sources, promoting local jobs and diversifying the energy supply; and
- Contribute to the State of New York goal of 50% of electricity from renewable sources.

Based on historical information, the energy usage for a standard home is 10,000 kWh/year. The proposed 4.0 MW Solar Facility would generate approximately 6,978,000kWh/year, equivalent to the electricity consumption of 696 homes. The Project Owner's preference would be for the residents and businesses of the Town of Newfield to participate in the Project Owner's Community Solar Program and be the direct beneficiaries of reduced electricity rates.

1.2. Estimated Construction Schedule

Construction of the Project is estimated to take approximately 3 months to complete.

Table 1. Gant's Diagram
2.0. PROJECT DESCRIPTION

2.1. Project Site and Control

DRS’s selection of the Project Site over other locations is based on several site criteria including:

- Contiguous site with relatively flat topography of adequate size to host the Solar Facility;
- Proximity to existing NYSEG electrical grid;
- Availability, under a lease agreement with current landowner of Project Site;
- Avoiding sensitive areas, such as river, lakes, deep forest etc.;
- Good highway access for construction, operation and maintenance activities.

The proposed Project Site is located in the Town of Newfield, Tompkins County, New York, southeast of the intersection of Millard Hill Road and Burdge Road (See Figure 1). Its nominal elevation is 1060 feet above sea level (Figure 2). Latitude and longitude is 42.387341, -76.580810.

The Project Site will be approximately 18 acres, including approximately 0.12 acres for the Interconnection Line. The Project Site will be leased from the property owner (“Property Owner”) and is part of approximately 29.74 acres owned by the Property Owner (Figure 3). Project Site access is anticipated to be through Burdge Road.

Figure 1. Project Location (source Google Maps)

(See also Plan 3 – P02 SOLAR FACILITY LOCATION)
Figure 2. Topography

Figure 3. Property Boundaries
2.2. **General Overview of Solar Facility**

A grid-connected photovoltaic (“PV”) power system is an electricity generating solar system that is connected to the utility electrical grid. A grid-connected system consists of solar modules one or more inverters, a power conditioning unit and grid connection equipment. The proposed installation is composed of a field of photovoltaic generators (See Figure 4).

The Solar Facility is composed of polycrystalline photovoltaic modules electrically interconnected with the same orientation and tilt. Modules are interconnected in series of strings of 28 modules. Peak power is expected to be 2 MW ac with a ratio \( P_{pk}/P_n \) of approximately 1.36 (2.72 MW dc) for each Project.

Collecting all DC output, an inverter station and step-up power transformer will be interconnected, conditioning the electric parameters for feeding energy to the electric distribution network. Power generated from the modules will be transferred via shielded cables within underground conduits to switch gear which forms part of the main power generation facility.

The modules themselves are electrically protected and above-grade wires are both shielded and secured in order to avoid exposure or accidental contact. All necessary protections for this type of facility and supporting structures for photovoltaic modules are included.
2.3. Acreage and General Dimensions of the Project Site

The total acreage of property owned by the Property Owner is approximately 29.74 acres. The Project Site would be located on approximately 18 acres; including approximately 0.12 acres for the Interconnection Line per project, which assumes a maximum of 20 ft. of temporary, and 2 ft. permanent wide, 1370 foot trench for the first project and 1672 foot trench for the second project. Table 2 below identifies significant structures and equipment, including dimensions, and the covered area (7.15 covered acres in aggregate; modules, inverter station and Interconnection Line).

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Area</th>
<th>Area (#1)</th>
<th>Area (#2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Facility</td>
<td>16.81 Acres</td>
<td>8.43 Acres</td>
<td>8.38 Acres</td>
</tr>
<tr>
<td>Modules Covered Area</td>
<td>6.88 Acres</td>
<td>3.44 Acres</td>
<td>3.44 Acres</td>
</tr>
<tr>
<td>Inverter Station Covered Area</td>
<td>0.026 Acres</td>
<td>0.013 Acres</td>
<td>0.013 Acres</td>
</tr>
<tr>
<td>Interconnection Line (Permanent) Covered Area</td>
<td>0.24 Acres</td>
<td>0.12 Acres</td>
<td>0.12 Acres</td>
</tr>
</tbody>
</table>

The Project Site may be subdivided for (a) NYSEG interconnection requirements and (b) tax assessments / allocations for the landowner.

2.4. Solar Facility

The following sections describe the major components of the Solar Facility. *Selected manufacturers are not indicated as manufacturers may change during the design and permitting process due to market and economic conditions.* The final selected equipment is expected to have similar characteristics.

2.4.1. Summary of Project Features

Approximately 8064 modules of 325 Wp for each project, or similar, distributed into arrays and mounted on a specific supporting structure.

<table>
<thead>
<tr>
<th>Description</th>
<th>Project (#1)</th>
<th>Project (#2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak power (MWpk)</td>
<td>2.72</td>
<td>2.72</td>
</tr>
<tr>
<td>Tilt &amp; Azimut</td>
<td>25º/0º South</td>
<td>25º/0º South</td>
</tr>
</tbody>
</table>
Supporting structures are set considering economic, technical and land conditions for the modules to capture the most amount of solar radiation and obtain the best solar yield possible.

The arrays are distributed into rows and consider surrounding shadings in the array design. There are open corridors between the rows of modules in order to perform the tasks of construction, maintenance and landscaping.

The inverter station, which contains the transformer, will be located near the circuit line in order to connect the Solar Facility to the existing distribution network.

### 2.4.2. Solar Modules

The module manufacturer will depend on the availability of the modules during the procurement period. Expected minimum requirements of the modules are:

- High Module Conversion Efficiencies
- Dimensions 1960x992x45mm
- Cell type: Monocristalline
- Maximum System Voltage: 1500 Vdc (UL)
- Efficiency up to 20.00 %
- 25 years power output warranty
- Electrical Characteristics STC
- Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000W/m², Cell Temperature 25°)

<table>
<thead>
<tr>
<th>Module Disposition</th>
<th>Portrait</th>
<th>Portrait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal power (MW)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Modules/String</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Total Modules</td>
<td>8064</td>
<td>8064</td>
</tr>
<tr>
<td>Strings/DC BOX</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>DC BOX</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Inverter Station</td>
<td>2 MW</td>
<td>2 MW</td>
</tr>
<tr>
<td>Transformer</td>
<td>2 MVA</td>
<td>2 MVA</td>
</tr>
</tbody>
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Table 4- STC Module Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Maximum Power Current (Imp)</td>
<td>8.66 A</td>
</tr>
<tr>
<td>Maximum Power Voltage (Vmp)</td>
<td>37.6 V</td>
</tr>
<tr>
<td>Short Circuit Current (Isc)</td>
<td>9.1 A</td>
</tr>
<tr>
<td>Open Circuit Voltage (Voc)</td>
<td>46.7 V</td>
</tr>
</tbody>
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2.4.3. Supporting Structures

Evaluation of the structural design of support for the modules shall account for permanent loads, snow and wind loads, seismic design construction, structural calculation and foundations, module sizing, control of connections, geotechnical report and effects of temperature changes in accordance with applicable law and building code.

The metallic supporting bases for modules shall be of steel components hot dip galvanized, with a minimum average thickness of 70μm as ISO/EN 1461 or equivalent or by an appropriate anodized aluminum of heavy-duty type and alloy for the better anti-corrosion protection of the construction. All connections including bolts, nuts, shall be of A2 stainless steel or compliant with other industry standard practices appropriate for the application defined.

To minimize ground disturbance, the supporting bases will be pile driven into the ground taking into account the results of a geotechnical study. Following are several examples of a support structures considered for the Project.
Figure 5. Supporting structure overview
(See also Plan 6 – P06 SUPPORTING STRUCTURE)

Key points of the Supporting Structure:

- Portrait mounting
- Mono-post anchored to the ground
- One tie bar and a crossbar in which the straps are supported.
- Modules fixed to the structure by clamping plates on the straps.
- All connections bolted without welding.
- The depth piling varies according to the soil conditions
- Easy installation and maintenance in a grid-like pattern

<table>
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<th>Table 5- Supporting Structure Summary Details</th>
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<tbody>
<tr>
<td>Module height above ground (low part)</td>
</tr>
<tr>
<td>Module height above ground (high part)</td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Angle</td>
</tr>
<tr>
<td>Area</td>
</tr>
<tr>
<td>Piling depth</td>
</tr>
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2.5. Inverter and Transformer Station

2.5.1. Inverter

Inverters shall be installed in pre-fabricated lockable containers or in an outdoor installation protected with weather-proof material to NEMA 3S protection degree. Inverters shall meet at least the following requirements, international standards and tested by:
The Inverter is available in a turnkey MW platform. Delivered with factory tested Inverters, MV Pad-mounted transformer and auxiliary equipment, skid mounted solutions reduce installation, commissioning and decommissioning time and cost.

2.5.2. Transformer

The pad-mounted transformer is part of an Open Skid Platform, designed for large scale utility solar facilities, with complete factory integrated DC & AC disconnects and protection, a step up pad-mount transformer and auxiliary equipment. On a skid solution, critical power connections are completed and tested made in a factory environment and the pre-tested unit is shipped to the field ready for the final field connections. Standard MV skid platforms can reduce installation and commissioning time. The all-in-one solution simplifies the installation, saves space and the visual impact is lower than other options of configuration.
231 232 Figure 7. “All-in-one” Recombiner Box & Inverter & AC Cabinet &Transformer Station
(See also P08 INVERTER & TRANSFORMER STATION)

234

2.6. Electrical Installation

235 This section contains the remainder of the electrical devices required in the Solar Facility.

237

2.6.1. DC Electric Switchboards

238 Within each array, 24 strings of modules are to be combined in parallel in a combiner box of with a protection rating of NEMA 3S or above. The total amount of DC Box is 12 for each. The combiner boxes will have at least the following characteristics:

240 • Suitable for outdoor installation;
241 • Mounting lugs and required nuts and bolts for installation;
242 • Designed for UV resistance;
243 • Self-extinguishing and halogen-free materials;
244 • Protection isolation;
245 • Coverage of electrical items with methacrylate plate;
246 • Disconnecting isolators 1500VDC must comply with applicable standards;
247 • Fitted with surge protection Device, 3pole, 1500Vdc, 40kA;
248 • Fully labeled and color coded wiring (as per project all strings);
249 • Appropriate number of string inputs and associated fuse sizing;
250 • Anti-condensation filter;
253  • DC fuse in negative pole per string;
254  • Grounding copper tape;
255  • Cable glands for output DC cable (up to 4x1x300mm² Al XLPE cable; defined per project)
256     and signaling cable input & output
257  • In case of armored cable, glands have to be able to earth the aluminum armor.
258  • Cable glands for communication cable and grounding cable.
259
260  Operational ambient conditions are to be as follows:
261  • Temperature: 77.0°F to + 10.0 °F
262  • Relative humidity: 15 to 95 %

263 2.6.2. Wiring
264  Two types of wiring will be required in the Project, from modules to DC Box, and from DC Box to
265     the general DC Disconnect Switch. Cables will meet the requirements of UL standard 4703,
266     appropriate for solar photovoltaic applications.
267
268  Wiring will consist of single conductor, sunlight-resistant, direct burial photovoltaic wire rated
269     90°C wet or dry, 2000 V for interconnection wiring of grounded and ungrounded photovoltaic
270     power systems with the following features:
271  • Rated 90°C wet and dry
272  • Rated for direct burial
273  • Deformation-resistant at high temperatures
274  • Excellent moisture resistance, exceeds UL 44
275  • Stable electrical properties over a broad temperature range
276  • Increased flexibility
277  • Excellent resistance to crush and compression cuts
278  • Resistant to most oils and chemicals
279  • UV/sunlight-resistant
280  • Meets cold bend and cold impact tests at -40°C

281  Figure 8. Project Wiring
2.6.3. Grounding

Metal enclosures containing electrical conductors or other electrical components may become energized as a result of insulation or mechanical failures. Energized metal surfaces, including the metal frames of modules, can present electrical shock and fire hazards.

By properly bonding exposed metal surfaces together and to the earth, the potential difference between earth and the conductive surface during a fault condition is reduced to near zero, reducing electric shock potential. The proper bonding to earth by the equipment grounding system is essential, because most of the environment (including most conductive surfaces and the earth itself) is at earth potential. The conductors used to bond the various exposed metal surfaces together are known as equipment grounding conductors (EGCs).

The metallic device used to make contact with the earth is the grounding electrode. The conductor that connects the central grounding point (where the equipment grounding system is connected to the grounded circuit conductor on grounded systems) and a grounding electrode that is in contact with the earth is known as the grounding electrode conductor (GEC).

Combined Direct-Current Grounding-Electrode Conductor and Alternating-Current Equipment Grounding Conductor: An unspliced, or irreversibly spliced, combined grounding conductor shall be run from the marked dc grounding electrode conductor connection point along with the ac circuit conductors to the grounding busbar in the associated ac equipment.

See Figure 9 for the combined EGC/GEC routing. Note that the NEC allow this combined conductor to be terminated at the first panel board that has a grounding busbar with an attached GEC to a grounding electrode.
2.7. Monitoring

Sensors include:

- Combiner Box temperature
- Ambient temperature
- Panel temperature
- Solar irradiation
- Wind speed

All sensors such as the weather station and pyranometers must use dedicated Modbus Channels for the collection of measurements. The MODBUS channels cannot exceed a maximum of 16 devices (pyranometers, temperature sensors, wind sensors, weather stations) with no other devices such as string monitors, inverters or relays are to be connected to the dedicated Modbus channel for the weather sensors and pyrometer. All data sent to the Industrial PC (Supervisor software) must be received using Modbus TCP protocol.
The monitoring system considered is centralized. This becomes possible by using the Inverter Station as a core data collection through a basic set of equipment. It is first necessary to obtain the values of the different variables to monitor. The monitoring system can monitor the AC installation and the DC installation (panels). For monitoring smaller parts of the DC installation at the inverter level, there are more Combiner Boxer of lesser strings.

The best way to capture inverter information is using a system to provide communication with a PC, as thus used the inverter own hardware for measurement, hardware that is already included with the central inverter, so the price is usually lower than other solutions. Measuring switchboards have the advantage that they are able to monitor multiple system parameters, such as level of harmonics, phase equilibrium, etc.

The inverter station is a central monitoring system of the Solar Facility with these features:

- Grid visualization
- Generator visualization
- Inverter visualization
- Clearly visible external warning signals concerning voltage at the base of pad-mounted transformer and substation
- Registers
- Fault history visualization
- Warning history visualization
- Status visualization
- Internal debug
- SI visualization menu

2.8. **Mid Voltage Connection**

The Solar Facility will satisfy NYSEG technical interconnection requirements in order to work in parallel with the utility distribution system. The Project will meet the following requirements:

- Voltage response range
- Frequency response range
- Inverters certified
- Protective function requirements
2.8.1. Mid Voltage Interconnection Line

The proposed Interconnection Lines would be designed for 12.47 kV three-phase Wye-grounded (three conductors) circuits. The Interconnection Line will connect the transformer to the existing electrical grid west of the Solar Facility, on NYSEG’s 0205 Substation Circuit #5202 connecting to the Substation 0205 Bank.

The Interconnection Line would be by underground duct, conductors rated at 15 kV, backfilled with select and native backfill, and compacted. The main characteristics of the wire are:

- EPR/Copper Tape Shield with overall LSZH
- Conductor 1350 Aluminum Compact Class B strand
- Three conductor and grounding wire in contact with metallic shielding cape
- Medium-Voltage Power
- Shielded 15 kV
- UL Type MV-105, 133%
- Ins. Level, 220 Mils
- For use in aerial, conduit, open tray and underground duct installations
- Rated at 105°C
- Excellent heat and moisture resistance
- Excellent flame resistance
- Flexibility for easy handling
- Low friction for easy pulling
- Electrical stability under stress
- Chemical-resistant
• Meets cold bend test at -35°C
• 105°C rating for continuous operation
• 140°C rating for emergency overload conditions
• 250°C rating for short circuit conditions
• RoHS Compliant
• According to National Electrical Code (NEC), UL 1072 and more compliances

![Figure 10. Mid Voltage Wire](image)

### 2.8.2. Point of Common Coupling (PCC)

The PCC is the point where the Project interconnects with the electric utility grid.

<table>
<thead>
<tr>
<th>Table 6. The PCC Configuration Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Voltage at PCC (kV)</td>
</tr>
<tr>
<td>PCC Line Type</td>
</tr>
<tr>
<td>PCC Line Configuration</td>
</tr>
</tbody>
</table>

### 2.8.3. AC Generator Disconnect Switch

In order to isolate and protect the Solar Facility from the utility electrical grid, a load break disconnecting switch is necessary. The disconnect switch 3-phase located between the generating equipment and interconnection at the PCC, must be manual, visible, lockable and gang-operated.

The Project Owner will have 24-hour/7-day unlimited access and control of this isolation switch.

The disconnect switch must be rated for the voltage and current requirements of the installation. Disconnecting means shall be rated to interrupt the maximum generator output; meet applicable Underwriters Laboratories (UL), American National Standards Institute (ANSI), and IEEE standards; and shall be installed to meet the NEC and all applicable local, state, and federal codes.

It will be clearly marked with permanent large letters: “Generator Disconnect Switch”.

In accordance with the Project Owner’s safety rules and practices, this isolation device must be used to establish a visually open, working clearance boundary when performing maintenance and repair work. The designated generator disconnect also must be accessible and lockable in the open
position and have provisions for both Project Owner and NYSEG padlocks and be capable of being tagged and grounded on the Project Owner side by Project Owner personnel.

The visible generator disconnect switch shall be a gang-operated, blade-type switch (knife switch) meeting the requirements of the NEC and nationally recognized product standards.

Installation will also require a recloser with remote control and data access to be installed to:

- Monitor voltage, current
- Act as a utility controlled redundant protection system
- Provide for remote disconnect

2.9. Operation and Maintenance

During operation, maintenance activities will focus on the scheduled preventive maintenance and repairs of the solar generating equipment. The maintenance and repair of Project components is expected to be coordinated through monitoring, on-site inspections and technical support from the various warranty services of the original equipment manufacturers.

The Solar Facility will operate 7 days per week, generating electricity during the daylight hours. Preventive maintenance activities will occur during normal working hours twice per year with the occasional need to conduct corrective maintenance to certain equipment or facilities during non-scheduled or weekend hours.

The solar generating equipment will be continuously monitored and controlled from the central control room during normal working hours with 24 hour monitoring from a remote source. The generation units, auxiliary systems and balance of the Solar Facility will be connected to the SCADA system.
Standard maintenance for the Solar Facility will be as follows:

- **Modules Cleaning**: Module cleaning will be performed during preventive maintenance hours or extraordinary snow storms.

- **Scheduled Project Maintenance**: There will be the need to periodically inspect the modules (removal snow, ice, grass, vegetation) and make necessary alignment adjustments (i.e. tighten fasteners) or replace damaged modules to prevent breakdowns and production losses. Project components will go through maintenance checklist once or twice per year.

  The checklist shall include such items as:
  - Checking wire connections
  - Testing voltage/current at any part
  - Inspecting components for moisture
  - Confirming settings on the inverter
  - Transformer maintenance
  - Resealing of system components

- **Corrective Maintenance**: Corrective maintenance will occasionally be required due to uncontrollable circumstances such as severe weather or premature failure of components. These unscheduled repairs will be undertaken in a manner to minimize impacts to the continued operation of the Solar Facility.

- **Monitoring Management**: uses real-time data to oversee Project parameters.

---

**Figure 11. Highlights of the Solar Facility Maintenance**
Typical equipment required to support operation and maintenance of the Solar Facility includes:

- Cleaning systems;
- Standard electrical tools;
- Building support systems
- Transport vehicles (pick-up truck, ATV, etc.)
- Standard machinist tools.

2.10. **Site Security**

Limiting access to the Project Site to non-authorized personnel is necessary both to ensure the safety of the public and to protect equipment from potential theft and vandalism.

Some or all of the perimeter of the overall Solar Facility may be fenced with an approximately eight-foot-high chain-link fence to facilitate Project and equipment security. Surveillance methods such as security cameras, motion detector, or heat sensors may be installed. Lighting may be installed only at critical equipment locations. The level and intensity of all lighting will be the minimum needed for security and safety reasons. The security lights will be activated by motion sensors or turned on by a local switch.

Both, owner and operator can be reached on a 24-hour basis. Phone numbers will appear on a sign placed at the entrance of the Solar Facility.

2.11. **Temporary Construction Facilities**

Temporary construction staging areas would be required for temporary construction offices and construction parking. These areas will be located on the Project Site and used throughout the approximately 3-month Project construction period and then decommissioned. The exact location of the temporary construction staging areas will be defined in the General Layout.

The staging areas would include material laydown and storage areas, an equipment assembly area, construction trailers, construction worker parking, and portable toilet facilities.
Graded all-weather roads may be required in selected locations on the Project Site during construction to bring equipment and materials from the staging areas to the construction work areas. These roads may not be decommissioned after construction, and may be utilized for long-term Project operation and maintenance.

2.12. Water Uses and Sources

The Project will not use any utility water for electrical power generation.

2.13. Erosion Control and Storm Water Drainage

A storm water pollution prevention plan ("SWPPP") study will be conducted, if required.

2.14. Vegetation Treatment and Management

Based on the use of existing access, roads, and right-of-ways, it is anticipated that minimal clearing and/or loss of native vegetation would occur for the footprint of the Project.

2.15. Waste Materials Management

The Project will generate a variety of non-hazardous wastes during construction and operation. These waste items may include the materials listed in Table 7:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC Cement</td>
<td>Adhesive used for underground PVC conduit and sleeve ground.</td>
</tr>
<tr>
<td>Cardboard</td>
<td>General packaging</td>
</tr>
<tr>
<td>Plastic</td>
<td>General packaging, wiring</td>
</tr>
<tr>
<td>Cold Galv</td>
<td>Anti-rust galvanizing spray used when cutting material to prevent rust.</td>
</tr>
<tr>
<td>Copper &amp; Aluminum</td>
<td>Used wiring systems</td>
</tr>
</tbody>
</table>

Material Safety Data Sheets will be provided at the time of installation and would be kept at the job site as they are specific to the product purchased and all wastes shall be disposed according to what is specified in its Material Safety Data Sheets.
2.15.1. Construction Waste Management

During construction, inert solid wastes may include recyclable items such as paper, cardboard, solid concrete, metals and wire, Type 1 to 4 plastics, drywall, and wood. Non-recyclable items include insulation, other plastics, food waste, packing materials, and other construction wastes. Management of wastes will be the responsibility of the Project Owner. Typical management practices required for contractor waste include recycling when possible, proper storage of waste and debris to prevent wind dispersion, and weekly disposal of waste at the local landfill. A waste management plan will be implemented during construction.

It is expected that a 40-cubic-yard container, would need to be emptied on a weekly basis during the first month of construction and monthly thereafter. This construction waste is not expected to have an impact on public health or cause adverse effects on the local landfill capacity.

Hazardous wastes are not expected. Lubricating oils generated from construction vehicles, if any, would be recycled at local approved recycling facilities.

2.15.2. Operations Waste Management

During operations, inert solid wastes generated would be predominantly routine maintenance wastes, such as scrap metal, wood, and plastic from surplus and deactivated equipment. Scrap materials such as paper, packing materials, glass, metals, and plastics will be segregated for recycling. Non-recyclable inert wastes would be stored in covered trash bins in accordance with local ordinances and picked up by an authorized local trash hauler for transport and disposal.

2.16. Fire Protection

Fire protection at the Project Site will include safety measures to ensure the safeguarding of human life, preventing personnel injury, and preserving property.
2.17. **Health and Safety**

Workers will be instructed to use required personal protective equipment (PPE) during construction activities. Required PPE will be approved for use, distinctly marked to facilitate identification, and be used in accordance with the manufacturer’s instructions. The PPE will be of such design, fit, and durability as to provide adequate protection against the hazards for which it is designed. The use of PPE for site activities includes, but is not limited to: safety glasses or goggles, hardhat, earplugs, dust mask, leather and/or insulated gloves, safety-toe and/or metatarsal shoes, apron and safety belt.

During construction, a first aid station, complete with all emergency medical supplies, will be provided in the operation and administration building near the break room.

3.0. **CONSTRUCTION OF THE SOLAR FACILITY**

The following section generally describes the activities that are anticipated to occur before and during Project construction and throughout operation and maintenance of the Project.

3.1. **Solar Field Design, Layout, Installation and Construction Processes**

The site plan for the Solar Facility is shown in Figure 12. The Solar Facility consists of arrays anchored to the ground. Arrays may be reconfigured as required by site characteristics such as boundaries, roads, topography or similar constraints.

The arrays are installed in a block configuration. Modules are attached to horizontal steel shafts supported by vertical steel posts. All ground-mounted panels will be around eight (8) feet in height and the minimum height in relation to the ground will be approximately 2 to 3 ft. All mechanical equipment will be completely enclosed by an approximately 8’ high fence.
3.2. Access and Transportation System, Component Delivery, Worker Access

The Project Site access for employee and general construction traffic will be from Burdge Road by creating an access path. Traffic will come from there onto the main access road to the Project Site where all deliveries will occur. The main access road will also be the primary route for workers to access the Project Site.
Parking will be provided at the Project Site. It is not expected, but if it is necessary a traffic and transportation plan will be developed to address flagging and traffic management along public roads during the construction phase. Construction traffic would continue for approximately three (3) months from the start of construction.

3.3. Construction Work Force Numbers, Vehicles, Equipment, Timeframes

Construction activities would include road and access construction, solar installation, operation and maintenance facility construction, Interconnection Line trenching, installation of a direct buried rated Interconnection Line, cleanup, and site reclamation. The anticipated number of workers and type of equipment to construct the Project are provided in Table 8.

<table>
<thead>
<tr>
<th>Item:</th>
<th># of Personnel</th>
<th>Equipment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey</td>
<td>3</td>
<td>2 pickup trucks</td>
</tr>
<tr>
<td>Solar Installation</td>
<td>12</td>
<td>1 piling and drilling machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 fork lift</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 trucks</td>
</tr>
<tr>
<td>Temporary Road Construction</td>
<td>6</td>
<td>1 excavator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 road grader</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 trucks</td>
</tr>
<tr>
<td>Trench and backfill</td>
<td>4</td>
<td>1 excavator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 compactor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 trucks</td>
</tr>
<tr>
<td>Interconnection Line</td>
<td>4</td>
<td>1 spool truck</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 trencher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 truck</td>
</tr>
<tr>
<td>Clean-up</td>
<td>4</td>
<td>1 truck</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>2</td>
<td>1 truck</td>
</tr>
<tr>
<td>Estimated personnel</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

3.4. Site Preparation, Surveying and Staking

A detailed land survey will be performed to establish local benchmarks and Project Site boundaries. A topographic survey will be performed to establish the Project Site’s grading and drainage plans for the arrays, roadways, and other Project features. Detailed maps with GPS coordinates will be supplied to the proper authorities having jurisdiction as required for permitting.
A licensed survey team, prior to commencement of construction, will stake the Project Site physical boundaries and construction footprints. The survey team will stake the path through any right of ways (“ROWs”) for the Interconnection Lines or provide a detailed map using GPS coordinates.

3.5. Site Preparation and Vegetation Removal
Vegetation will only be removed in disturbed areas as required for placement of electrical equipment or shading events. Vegetation removal will be minimized as much as possible.

The Project Site isn’t expected to be graded. It is expected that the racking system will be adapted to the existing topography required for installation of the racking. Minimum grading may be required for the inverter and transformer pad which is approximately 20' by 20'.

3.6. Solar Facility Construction
Prior to installation of the modules, the supporting steel posts would be installed, generally pile driven to minimize ground disturbance. The modules would be mounted by hand to the steel posts and all necessary electrical, communications, and other connections will be made. All significant assembly and erection will be conducted on site.

3.7. Project Construction
The construction schedule is anticipated to be three months.

3.8. Gravel Needs and Sources
Gravel needs would be moderate. The main access road, if needed, would use compacted, crushed gravel imported from offsite. Materials would be locally sourced.

3.9. Electrical Construction Activities
Power generated by the modules will be collected through a power collection system. The collection system will direct the output from the modules to the on-site transformer to be transmitted through the Interconnection Line.
3.10. Interconnection Line Construction Sequence
The construction of the Interconnection Line is a several step process. The initial step will be clearly
surveying the ROW boundaries and marking any existing underground utilities. After the ROW has
been staked, excavation equipment can be used to dig the trench. The excavated soil will be used
for backfill or hauled off-site for disposal as appropriate. When the trench is prepared, the conduit
installation process can begin, utilizing the proper backfill around the conduit, if required. Above
the conduit placement, the previously excavated native soil can be used to fill in the remaining
trench depth.

3.11. Operation and Maintenance
3.11.1 Operation and Maintenance Contract
The Project Owner will enter into an Operation and Maintenance Contract ("O&M Contract"), the
scope of which shall include essential works and services needed for the proper operation and
maintenance of the Solar Facility. The scope of work shall include the following items:

a) Compliance with the Local, State and Federal Rules, Codes, Regulations and Laws regarding
the health and safety O&M works.

b) Performance of a preventive and corrective maintenance plan.

c) Control and monitoring of the Solar Facility 24/365, including, CCTV alarms and system
failures, and coordination with the local fire department and law enforcement.

d) Maintain and operate all the infrastructures, equipment and facilities related to the Solar Facility
required for the proper operation.

e) Provide reports in a monthly and yearly basis, and of any major unexpected event.

f) Administer and manage supplier's guarantees and warranties.

g) Management and paperwork involved with third party site visits such as insurance,
governmental agencies and others related.

h) On site annual peak power and degradation performance testing of modules to a
representative sample of modules.

i) Annual IR thermography field test of modules and connections of the electrical panels. The
test will be done in the appropriate weather conditions taking into account that the main
purpose is to detect hot spot events.

j) Spare parts stock management, including all cost associated like insurance, security or transportation.

3.11.2 Preventive and Corrective Maintenance Programs

The O&M contractor shall comply with the preventive and corrective maintenance programs in order to maintain and operate the Solar Facility in the proper way. These actions shall include:

a) Inspect, test, and clean the Solar Facility equipment, including a periodically cleaning of the modules.

b) Replace all spare parts, supplies and consumables necessary for performance of the O&M Contract according to the Preventive and Corrective Maintenance Program and the manufacturer's user manual.

c) Perform annual field tests and fix any potential failures that arise due to the test.

d) Provide Project Owner a monthly report including at least the following information: energy estimate, energy production, % of availability, weather station information, preventive maintenance services performed, corrective maintenance services performed including spare parts and consumables used. The monthly report should include a detailed description of:

1. Any material failure covered by any warranties, action plan and expected timeframe to cover the incident;

2. Any violation of any applicable law, applicable permit or prudent industry practice due to the O&M practices, including environmental laws, rules, or regulations enforced by governmental agencies;

3. Any adverse events or conditions that may affect normal Solar Facility operation.

4. Record of all tests and reviews performed to maintain all systems in compliance with the manufacturer user manual, including name of company involved and nature of service.

e) Guaranties and warranties of the manufacturers related to the Solar Facility that arise, including without limitation any claims or remedies against any subcontractors or suppliers.

f) Comply with all permits and maintain in effect all permits required for operation and maintenance of the Solar Facility.
The scope of works of preventive maintenance services will also include:

a) Fire protection.

b) Landscaping, periodic clearing and cutting back of vegetation.

c) Maintenance of access roads.

The Engineering, Procurement and Construction contractor ("EPC Contractor") shall provide a compilation of all user manuals, guarantees and warranties to the Project Owner and O&M Contractor including a data sheet for each item of equipment.

4.0. ENVIRONMENTAL CONSIDERATIONS

4.1. Description of Project Site and Potential Environmental Issues

4.1.1. Special or Sensitive Species and Habitats

The Project is located in an undeveloped area in Tompkins County. The majority of the Project Site is grass. General locations where rare animals, rare plants, and significant natural communities (such as forests, wetlands, and other habitat types) are already documented in New York State.

4.1.2. Visual

The current visual characteristics of the proposed Project Site consist mainly of open fields. There are several groups of structures located north and southwest of the Project Site. The decision of increasing the existing vegetation will be taken on-site, after an initial study. He Project Owner will prepare a visualization analysis (in a separate document) that shows the views and possible screening selections selection.
Intersection of Burdge Road and Millard Hill Road (East View)

Millard Hill Road (North East of Project Site South View)
The solar arrays will be constructed to a maximum height of approximately 9 feet. The combination of a perimeter fence and additional vegetation will minimize views from the surrounding areas. No known inventoried aesthetic resources are located off-site within the potential visual field of the proposed solar arrays.

### 4.1.3. Glare

In general, the concept of efficient solar power is to absorb as much light as possible while reflecting as little light as possible, standard solar panels produce less glare and reflectance than standard window glass. Solar panels use “high-transmission, low-iron” glass, which absorbs more light, producing smaller amounts of glare and reflectance than normal glass.

This is pointed out in US patent # 6359212 (method for testing solar cell assemblies and second surface mirrors by ultraviolet reflectometry for susceptibility to ultraviolet degradation), which explains the differences in the refraction and reflection of solar panel glass versus standard window glass.
When a ray of light falls on a piece of glass, some of the light is reflected from the glass surface, some of the light passes through the glass (transmitted), and some (very little) is absorbed by the glass. Following are parameters to take into account when considering glare from solar panels:

- The measure of the proportion of light reflected from surface is called reflectance (reflection): $R$
- The measure of the proportion transmitted is the transmittance (this is where the term high light transmission glass comes from because the glass is formulated to allow more light to pass through its surface than would pass through a standard glass surface): $T$
- The measure of the proportion absorbed is absorptance (absorption) (this amount is very small for clear glass, much smaller proportionately, than the other two components): $A$

Each quantity is expressed as a fraction of the total intensity (quantity) of a ray of light. Intensity may be expressed as follows: $R + A + T = 1$.

![Figure 2-2. Solar radiation through a glazing material is either reflected, transmitted or absorbed](image)

### Table 9. Solar Radiation through a Glazing Material

<table>
<thead>
<tr>
<th>Glazing Material</th>
<th>Reflectance</th>
<th>Transmittance</th>
<th>Absorptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Glass</td>
<td>0.1</td>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>Tinted Glass</td>
<td>0.2</td>
<td>0.8</td>
<td>0.0</td>
</tr>
</tbody>
</table>

The reflection/refraction behavior of a medium is directly related to its index of refraction. Lower the index of refraction is suitable because the medium is allowing more of the incident ray to pass directly through.
Table 10. Common Reflective Surfaces

It should be noted from the graph and the table below, that the reflected energy, in percentage, of solar glass is much lower than water and even below that of forest reflection.

Table 11. Anti-Reflective Coating reflect a lower percentage of light than smooth water.

Table 12. Analysis of typical Material Reflectivity with sunlight angle (from normal).

Steel, a common building material, reflects far more incident sunlight than a solar panel.
The percentage of the incoming sunlight that is reflected is very low for high sun angles (most of the day) and increases for a very low sun angles (near sunrise and sunset when the intensity of the sun is already substantially lower than at mid-day.).

Taking into account landscaping and fencing surrounding the Solar Facility as well as the aforementioned information regarding glare off the solar modules, roadways, buildings and flights paths will not be impacted by glare from the panels.

4.1.4. Storm Water Drainage

4.1.4.1 Storm Water Drainage off Modules

The storm water impacts of a solar installation will depend upon the project design, site conditions and characteristics, as well as topographic conditions.

A SWPPP determines the impact, if any, of the existing runoff conditions and remediation actions, if needed, for the proposed runoff conditions. The Solar Facility is fixed mounted and is installed with minimal impact to the current topography and groundcover conditions. The Solar Facility is designed with sufficient distance between modules to allow rainfall to infiltrate between each module and flow between arrays, allowing any runoff to naturally infiltrate and drain over the ground surface.

The conceptual design of the Project has been arranged, to the maximum extent practicable, to mimic the natural hydrology. Rainwater falling on the modules will not channel or accumulate in large volumes as it will run-off the modules using the gap between each module, about 1 inch. Rain water will fall off each module within a few feet of where it would naturally fall. Additionally, the site has full grass ground cover, minimizing erosive actions.
Elements of the Solar Facility that alter the natural infiltration, such as steel poles driven into the ground and any other racking components on the ground are treated as impervious. Other impervious elements would include concrete pads or foundations for racks or inverter cabinets.

The following factors have been considered during the design process:

- Runoff to flow onto and across vegetated areas to maintain the disconnection
- Disconnecting impervious surfaces works best in undisturbed soils.
- Minimizing ground disturbance.

The Solar Facility will be installed in an existing meadow. The rows of solar panels will be installed according to Figure 15 below. In this scenario, the disconnection length is the same as the distance between rows and is at least 80% of the width of each row. Therefore, each row of modules is adequately disconnected between modules and between rows.
4.1.4.2 Vegetation under Modules

The modules will reduce direct sunlight under each module in direct proportion to its total collection area; this may reduce plant coverage and density under the modules. In contrast, this shading will increase the moisture of the ground providing an extra water source for vegetation.

Based on the proposed solar module array layout, there will be a maximum of 11-17 feet of shading underneath each module (varies based on sun position). Within this area there will be reduced sunlight intensity. Recordings made in similar conditions reduced the sunlight intensity to less than 600 Lx. The sunlight intensity is reduced but still enough intensity remains in the area allowing grass to persist under the shaded area. The growing pattern will be slower than the conditions associated with full open environments but good enough to allow grass to endure. Generally, the measurements made in the various light regimes indicate native grasses grows best when light values exceed 600 Lx but the growing patterns will be reduced to a level where the grass will have a thinner cover and resulting a slower growing path for the grass. Other contiguous grasses may actually benefit from some shading providing a slightly moister substrate that could be utilized by the grasses. (Source: proposed solar panels vegetation impacts, prepared by Joseph Arsenault, July 2010).

Based on the studies and research there will be limited impacts to the existing grass vegetation. and there should not be an adverse impact to existing ground cover.

4.1.5 Noise

Fixed panels mean no moving parts. Very minimal low level noise is generated from the electrical inverter and distribution transformer. Inverters are tested and do not generate disturbing noise levels, and noise from equipment will not be audible at the property boundary. Central inverters are usually surrounded by the solar panel arrays further distancing them from the property boundary.
At a distance of 1m, central inverters have a sound pressure level of about >70dB. Furthermore, because solar panels produce power only when the sun is shining, inverters will be silent at night.

### 4.1.6. Dust and Waste

The inclination of the modules allows water to flow freely through them and clean the surface when it is raining. No dust will be generated during operations. Modules after use (20 or 30 years) are 95% recyclable. The equipment will be designed for a 30 year lifespan, and end-of-life site remediation and equipment replacement options will be discussed.

### 4.1.7. Safety

A health and safety plan will be implemented during construction. All equipment installed will comply with safety rules.

Warning signs (visible, in good condition and permanent) will be posted. Perimeter fencing (See P12 PERIMETER FENCING & SILT FENCE in Drawings) and surveillance system will be considered. All the equipment will be tested and in warranty. Equipment must comply with Federal, State and local regulations and applicable laws. The electrical safety for workers will be designed and evaluated in detail. The hot parts will be isolated, and general equipment or switching devices will be mechanically interlocked. The electrical installations are equipped with protection against abnormal operating conditions, providing compliance with safety rules.

Limited security lighting maybe installed and designed to minimize light pollution. Lighting options will be briefly discussed along with recommendations.

### 4.1.8. Impacts during Construction

It is expected that some noise will be generated during construction activities. All actions involving risk will be considered: civil engineering, machinery, transportation, etc. Impacts due to construction will be investigated, and mitigation measures will be proposed. The contingency provision for the Solar Facility consists of a detailed analysis of the possible occurrence of an
incident while under construction; the purpose is to have a response to maintain the safety of people, environment and property.

4.1.9. Cultural and Historic Resource Sites and Values

The historic and archeological map will be utilized to identify if any cultural or historical significance exist on site. Any cultural resource that would be directly or indirectly impacted, if any, would be subject to further evaluation.

4.1.10 Solar Facilities Classified as Non-Hazardous Materials

Solar photovoltaic systems, have a life expectancy of 30 years. As the volume of solar installations in the US grows, the industry is planning ahead to create panel recycling programs.

Photovoltaic panels are designed to last more than 25 years, and many manufacturers back their products with performance guarantees backed by warranties. Many SEIA (Solar Energy Industry Association) members already operate take-back and recycling programs for their products. They are committed to guiding both state and federal regulations that support safe and effective collection and recycling of modules models.

End-of-life disposal of solar products in the US is governed by the Federal Resource Conservation and Recovery Act (RCRA) (http://www.epa.gov/lawsregs/laws/rcra.html), and state policies that govern waste. To be governed by RCRA, panels must be classified as hazardous waste.

To be classified as hazardous, panels must fail the Toxicity Characteristics Leach Procedure test (TCLP test). Most panels pass the TCLP test, and thus are classified as nonhazardous and are not regulated. Numerous companies make available to its customers modules that do not contain toxic heavy metals (no more lead or cadmium than allowed under RoHS).

Because panel materials are enclosed, and don’t mix with water or vaporize into the air, there is little, if any, risk of chemical releases to the environment during normal use. The most common type of panel is made of tempered glass, which is quite strong. They pass hail tests. Most residential
fires are not hot enough to melt components and systems must conform to state and federal fire
safety, electrical and building codes. Potential for emissions derived from components during
typical fires is limited given the relatively short-duration of most fires and the high melting point
(>1000 degrees Celsius) of materials compared to the roof level temperatures typically observed
during residential fires (800-900 degrees Celsius).

All solar panel materials, are contained in a solid matrix, insoluble and non-volatile at ambient
conditions, and enclosed. Therefore, releases to the ground from leaching, to the air from
volatilization during use, or from panel breakage, are not a concern. Ground-mounted arrays are
typically made up of panels of silicon solar cells covered by a thin layer of protective glass, which is
attached to an inert solid underlying substance (or “substrate”).

The main component of most modules is silicon, which isn't intrinsically harmful, but parts of the
manufacturing process do involve toxic chemicals and these need to be carefully controlled and
regulated to prevent environmental damage. It is important to note that the same materials are in
other electronic goods such as computers and TVs.

Generally, companies participate in a fully funded collection and recycling system for end-of-life
modules produced globally; has written a letter to the Solar Energy Industry Association (SEIA)
urging it to support EPR laws and regulations; supports public EPR policies in the regions where
the company manufactures and sells modules and takes responsibility for recycling by including the
“crossed out garbage bin” symbol on module name plates, including a PV Cycle link on the
company website; and clearly describing on the website how customers can responsibly return
modules for recycling.
Transformers used at solar installations are similar to the ones used throughout the electricity distribution system in cities and towns. Modern transformers typically use non-toxic coolants, such as mineral oils. Potential releases from transformers using these coolants at solar installations are not expected to present a risk to human health. Release of any toxic materials from solid state inverters is also unlikely provided appropriate electrical and installation requirements are followed.

4.1.11 Decommissioning Plan

In general:

- Unsafe, inoperable, and/or abandoned equipment shall be removed by Project Owner. The Solar Facility shall be deemed abandoned when it fails to produce energy for at least one (1) year.

- The Project Owner shall submit a decommissioning plan for review and approval. The decommissioning plan shall identify the anticipated life of the Project, method and process for removing all components and returning the Project Site to substantially its pre-existing condition. The decommissioning plan shall also include estimated decommissioning costs, including any salvage value.

Site decommissioning and equipment removal can take a month or more. Therefore, access roads, fencing, electrical power, and other facilities will temporarily remain in place for use by the decommissioning workers until no longer needed. Demolition debris will be placed in a temporary onsite storage area pending final transportation and disposal and/or recycling according to...
procedures. No hazardous materials or waste will be used during operation of the Solar Facility; disposal of hazardous materials or waste will not be required at decommissioning.

The piling for support structures is without concrete foundation, so removing piles will not be onerous. The diameter of the holes in the ground are small in terms impacted area and will be refilled accordingly. Excavations will be backfilled and restored with native onsite material. No significant grading or rework of the site will be performed.

Module manufacturers are required to pay an amount (for recycling modules at the end of its useful life) when they sell the modules, so the main component of Solar Facility has covered its costs of recycling. Most materials of the Solar Facility have value: steel, copper, aluminum, and others.

The quantity and value of recycled and reusable materials could vary according to markets value, facility conditions and lifespan.

4.1.12. Other Environmental Considerations

Visual resources in the area of the Project have been affected by past and present actions including highway/roadway construction, utility power lines, sewage, utility water pipes and limited commercial and residential development.
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28 MODULES STRUCTURE

FRONT

LEFT SIDE

PV PANEL CLAMPS POSITION

PLANT
The fences must allow badgers, reptiles and other fauna access into the site (whilst retaining grazing sheep) if required to do so in the ecological report.

It is advised a gap to allow small mammals and reptiles access is left around the entire base of the fence, with larger gaps or gates for badgers at suitable intervals.

Around the perimeter fence, place signs indicating warning signs concerning voltage.

Picture of a fence and details of gate, door, and corner sections.