ATTACHMENT 38

Vineyard Solar 1, LLC & Vineyard Solar 2, LLC

OWNER'S MANUAL

1.0 Introduction

The solar facilities are located on 757 Vineyard Rd and 780 Vineyard Rd Crown Point, NY 12928

Parcel Number: 128.1-4-23.111

1.1 Overview

Vineyard Solar 1, LLC & Vineyard Solar 2, LLC (herein referred to as Vineyard Solar 1 & 2) provides operational support services throughout the lifetime of our systems, first through our comprehensive warranty and client services coverage, and then through optional extended service agreements. Under this optional coverage, we provide daily and periodic services, such as system status and performance monitoring, regular preventive maintenance site visits, and performance reports.

Vineyard Solar 1 & 2's staff of trained field technicians and solar electricity professionals is committed to the successful operation of our systems. These individuals are available to perform maintenance and repair services, and address questions and concerns regarding system operation, performance, and monitoring.

This manual provides detailed information about the following system aspects:

- Terminology
- System and site description
- Safety guidelines
- System operation
- Warranties, product certifications, and patents
- Data acquisition system (DAS)
- Supervisory control and data acquisition (SCADA)
- System specifications
- Construction drawings
- Vendor manuals
- Preventive maintenance
- Commissioning reports

Warning! Only qualified personnel may perform maintenance on the system, and may do so only after receiving adequate training, studying this manual and the associated equipment, and receiving written authorization from Vineyard Solar 1 & 2.

All warnings and safety precautions mentioned in this manual, and those associated with project sites and lethal high-voltage electrical systems must be strictly adhered to at all times. Vineyard Solar 1 & 2 reserves the right to add to, delete, or revise any of the procedures in this manual as necessary at any time.

1.2 Terminology

The following terms may be applicable to your particular system:

Term	Definition
AC wiring	The system wiring that routes from the inverters to the interconnection point.
array	A group of **modules** connected to a single inverter.
authorized person	An individual who has been granted permission by Vineyard Solar 1 & 2, the owner, or the site manager to work on or access the system.
block	For any **project,** a portion of that project consists of a group of **segments** which can be operated separately as an integrated whole.
column	the N–S oriented lines of **modules.**
controller	a component of the **drive unit** that measures the angle of the **modules** and actuates the drive motor so that the modules are oriented at the optimal angle throughout the day.
drive strut	the main E–W oriented connecting member between the **torque arms** and the **drive unit.**
drive unit	an assembly consisting of a drive pedestal, drive plate, drive motor, **jack screw, controller, torque tube, torque arm,** inclinometer, and GPS sensor; that controls the tilt angle of the **rows** or the **tracker units** .
feeder	The wires that route from the combiner boxes to the inverters; and from the recombiner boxes to the inverters.
foundation	the structures that support the **tracker units**; or that support the **rows** .
homerun	DC wires that transmit power from the **modules** to the combiner boxes. These wires electrically connect each **string** in the **array** to the combiner box.
jack screw	the **drive unit** extension that actuates the **drive strut** and **torque arms.**

Met Station	Meteorological Station; a pre-wired electrical enclosure that includes the following components: ● Anemometer – Measures wind speed and wind direction near the plane of the array. ● Reference cell – Measures irradiance in the plane of the modules. ● Pyranometer – Measures global horizontal irradiation on the array. ● Ambient temperature sensor – Measures ambient air temperature. ● Udometer (rain gauge) – Measures the amount of liquid precipitation over a set period of time on the array. ● Thermocouple – Senses temperature of the array.
module	An assembly that includes a photovoltaic glass panel, a robust frame, and two electrical connection leads.
panel	*See* **module.**
project	Any of the facilities listed in the *Vineyard Solar 1 & 2 Power System Owner's Manual.* Each project consists of the solar electric system to be constructed by the contractor for the owner at the relevant site consisting of the necessary photovoltaic equipment and the Balance of System.
PV	Photovoltaic: capable of producing a voltage when exposed to radiant energy, especially sunlight.
qualified person	Anyone who has had formal training on how to safely operate and maintain a piece of system equipment.
row	● oriented lines of modules. ● the **torque tube** and **modules** connected to the **drive strut** by a single **torque arm.** ● all of the **tracker units** connected to a single **drive unit.**
segment	A portion of a **project** including photovoltaic equipment of at least one (1) kWp as connected to one or more inverters and capable of functioning separately from other segments and delivering energy to the relevant interconnection point.
string	A specific number of **modules** electrically connected in series.
Vineyard Solar 1 & 2 personnel	Any Vineyard Solar 1 & 2 employee, subcontractor, consultant, or representative.
system	A portion of a **project** including any photovoltaic **array** or arrays connected to a single inverter, and recording output through a separate DAS energy meter.
torque arm	the connecting member between the **torque tube and** the **drive strut.**

torque tube	the main N–S oriented support member of a **tracker unit**; or of a **row**.
tracker unit	the main assembly that includes the **torque tube,** saddles, **modules,** legs, **torque arm,** and any attachment hardware.

1.3 System and Site Description

***Note.** Some Vineyard Solar 1 & 2 power system components may change based on equipment availability.

Site Description	
Site Name	Vineyard Solar 1 & 2
Site Address	757 & 780 Vineyard Road Crown Point, NY 12928
Peak Rated DC power	14MW*
Rated AC power	10MW
Module Make and Model	JA 585W*
Number of Modules	24,076*
Inverter Make and Model	Chint 125k*
Number of Inverters	80

1.3.1 System Components

Note. Some Vineyard Solar 1 & 2 power systems may not include all of the components described in this section.

Component	Function
Photovoltaic Modules	Lightweight, UL-listed modules capture the energy from sunlight and convert it to electricity.
Combiner, Recombiner, and DC Disconnect Boxes	Combine electrical strings in parallel so that the strings can feed into the inverters. Strings are fused in these boxes.
Inverters	Convert DC solar array power to AC power to feed into the local grid.
Step-Up and Isolation Transformers (at Inverters)	Electrically isolate and step up the voltage at the inverters from the electrical interconnection.
AC Disconnect Boxes	Provide a safety switch near electrical output of the inverters.
Substation and Relay House	• Provide a demarcation point between the solar plant and the grid. • Provide breakers to protect the arrays and grid. • Steps up voltage to grid voltage.

Data Acquisition System (DAS)	Gathers data from the inverters, control room, and substation (as applicable); the DAS Met Station transmits this information to monitoring personnel.
Tracking and Mounting System	• **Tracker Drive Structure:** Photovoltaic modules mounted on steel torque tubes, incorporating proprietary technology to rotate toward and track the sun. • **Controller:** Controls the extension of the drive unit, which changes the rotation of the torque tubes and the position of the modules; programmed to optimize the angle of incidence between the sun and the modules • **Drive Unit:** Controller-equipped gear motor and actuator that changes the angle of the torque tubes and the position of the modules.

1.3.2 System Description

This section describes how your system's components function together.

Note. Some Vineyard Solar 1 & 2 power systems may not include all of the components described in this section.

1.3.2.1 Modules

The photovoltaic cells that comprise the modules convert photon energy into DC power. Depending on the module used in your system, there are 72, 96, or 128 cells connected in series in each module. A specific number of modules are connected together in series to form a string. Modules use weatherproof electrical quick-connects to electrically connect them to each other and to connect them to the combiner box. There are a specific number of strings fused and connected in parallel in each combiner box.

1.3.2.2 Combiner Boxes and Recombiner Boxes

Combiner boxes and recombiner boxes connect in parallel all the strings to increase the power at the inverter input. All of the combiner boxes and recombiner boxes are fused at their inputs to provide current protection.

The homerun cables travel from the array to DC-fused combiner boxes, where they are combined in parallel into a single cable pair at the recombiner box. The pairs are then combined again with pairs from several other combiners into a larger single cable pair. Next, the cables from the recombiner boxes are routed to a DC disconnect before they enter the inverter.

1.3.2.3 Inverters

Inverters convert the DC power into AC power. They also control the loading of the arrays, maximizing the output power.

1.3.2.4 Transformers (at Inverters)

These transformers combine together and step up the low-voltage, high-current output from two inverters. After the voltage is stepped up, the power is routed through the feeder cables to the substation. In addition, transformers isolate the DC and AC.

1.3.2.5 Data Acquisition System (DAS)

The DAS measures and records net AC power production of the entire solar system, as well as site meteorological data. The DAS includes a DAS box and a Met Station.

1.3.2.6 Supervisory Control and Data Acquisition (SCADA)

The SCADA system gathers data from the following devices for system monitoring and reporting:

Component	Data
Met Stations	• Wind speed and direction • Temperature • Irradiance • Rainfall
Inverters	• Current energy production • Error codes • Efficiency
Substation and Relay House	• Site performance data • Breaker data

1.3.2.7 Substation

The substation includes the power transformer that steps up the voltage from the array's medium voltage to the grid's high voltage in order to interconnect. The substation also includes circuit protection in the form of breakers, surge arrestors, and relays.

1.3.2.8 Drive Unit

The drive unit's programmable controller controls the movement of the jack screw, which in turn moves the drive strut and rotates the attached torque tubes to optimally position the modules toward the sun.

The drive unit moves the modules from a "flat" position (zero degrees of rotation with respect to the torque tube) at sunrise, incrementally toward the sun—employing special backtracking technology to prevent the tracker units and rows from shading one another—and then keeps the modules facing toward the sun as it moves across the sky, finally positioning the modules flat again at sunset.

2.0 Safety Guidelines

Warning! Portions of the system involve risk of personal injury or loss of life, and the system should only ever be accessed by qualified, authorized personnel.

Failure to comply with these precautions or with specific warnings elsewhere in this manual may violate safety standards of design, manufacture, and intended use of the equipment. Vineyard Solar 1 & 2 assumes no liability for failure to comply with these requirements.

2.1 Site Safety

All personnel must adhere to the following safety procedures when performing work on the system, including inspection, installation, operation, service work, repair, and testing.

2.1.1 General Guidelines

These instructions are for use by qualified personnel only, and only pairs of authorized persons are hereby permitted work on the system. Site access is intended for authorized personnel only, and only authorized persons may shut down the system or open any system enclosure.

In addition:

- Always have an operational cell or standard telephone available for calling emergency personnel.
- Always wear suitable eye and head protection, as well as rubber insulating gloves rated for the appropriate voltage level, when working near live electrical equipment.
- Always follow applicable lockout and tagout procedures.
- Always allow a full 20 minutes for the energy storage devices in the inverters to safely discharge lethal voltages.
- Always have a fire extinguisher, first aid kit, and electrical hook or cane available when performing fieldwork on energized equipment.
- Always handle broken modules with extra caution: if the tempered glass on a module breaks, tiny shards of glass cover the surface. Use gloves at all times when handling broken modules.
- Always reference National Electrical Code (NEC) sections 250 and 690 for proper compliance when wiring and grounding the system.
- Always follow local, state, and federal guidelines and regulations.
- Never walk in the vicinity of the system, attempt service adjustments or perform these procedures unless another person capable of rendering first aid and cardiopulmonary resuscitation (CPR) is also present.
- Never attempt to install or service any portion of the system if you are not a qualified, trained electrician or technician familiar with power electronic equipment.
- Never disassemble any of the modules or remove any parts without specific consultation and written approval from Vineyard Solar 1 & 2.
- Never attempt to open the diode housing or junction box on the modules unless you are qualified to do so. There are no user-serviceable parts inside.

- Never connect or disconnect a module when the system is under load. Make sure that the string is an open circuit by opening the appropriate disconnects before connecting or disconnecting a module.
- Never open any fuses under load. Unless rated for load break, disconnect switches should only be opened under load in an emergency. All disconnect operations for maintenance purposes must be done under no-load conditions.
- Never disconnect the quick connects unless the system is an open circuit and has been checked for a short circuit. The electrical quick connects are not for current interrupt.
- Never direct artificially concentrated sunlight onto the modules.
- Never remove warning labels.

2.1.2 Hazardous Locations

This section describes locations that require specific safety measures when engaging in operations, maintenance, and testing work.

2.1.2.1 Electrical

- Photovoltaic array
- Drive unit
- Field wiring
- Electrical terminal boxes
- Combiner boxes and recombiner boxes
- Inverters and disconnects (for hazardous locations within the inverter, refer to the inverter manufacturer's documentation in Section 8.1)
- Transformers
- Current transducers
- Meters
- Supervisory Control and Data Acquisition System (SCADA)
- Utility lockable safety switches
- Control room and control yard

2.1.2.2 Mechanical

- Drive unit
- Mechanical interlocks for air switches
- High-voltage breakers and medium-voltage breakers

3.0 System Operations

Warning! The installation, adjustment, repairs, and testing of the system involves possible contact with potentially lethal voltages and currents. No attempt to install, adjust, repair or test should be made by anyone who is not a qualified, trained, and authorized person.

Always open disconnect devices, and perform lockout and tagout procedures on AC and DC power sources prior to servicing.

In addition:

- These instructions are for use by authorized personnel only.
- Equipment access is intended for authorized personnel only.
- Special safety lockouts are required because modules cannot be “turned off” and power is supplied from both directions on some devices.
- The inverters contain energy storage devices that require 20 minutes to safely discharge lethal voltages.

Any work performed on the system must be approved in writing by Vineyard Solar 1 & 2 and performed only by authorized, qualified, trained personnel, otherwise the warranty and service agreements may be voided.

To work on the DC side of the system when the system is functioning properly, or to reset the inverter, perform the inverter-specific procedures in Section 3.1 to reset, shut down, and restart the system.

Warning! Section 3.1 and Section 3.2 contain only generic, simplified versions of the procedures and should *never* be used as the sole resource for performing an inverter reset. For the specific inverter reset, shutdown, and start/restart procedures, refer to the manufacturer’s inverter operation manual in Section 8.1 of this manual for the particular inverter model at your site.

3.1 System Shutdown Safety Protocols

Approved lockout and tagout procedures must be followed whenever the system is shut down. Appropriate protective equipment should be worn at all times, including but not limited to rubber insulating gloves and safety glasses.

In general, the following steps must be performed in sequential order:

1. Shut down the inverter according to the inverter manufacturer’s shutdown procedure.
2. Turn off (open) the DC side of the inverter and lockout the switch.
3. Turn off (open) the AC side of the inverter and lockout the switch.
4. Turn off (open) the transformer disconnect (breaker or switch) for the PV circuit.
5. Wait 20 minutes for the residual energy in the inverter to dissipate.
6. If performing work on the DC side of the inverter, remove all fuses from the combiner boxes. Close the combiner box and place a lock on it. If there is no specific place to secure a lock, perform an alternate method to secure the box and tag it clearly.

Warning! The combiner box may still be energized even with all the fuses open.

7. Place a tag on each lock indicating who locked it, for what reason, the date it was locked, and the danger associated with removing the lock.
8. Disconnect and lockout the utility lockable safety switches to prevent electricity flow from the utility side. Ensure that the lock is closed and secured so that the switch cannot be turned on.

Warning! Even after locking out the components, there is still a potential for electrical shock when working on the array and the wiring. Always wear appropriate rubber insulating gloves.

3.2 System Start and Restart

To start or restart the system:

1. Ensure that the work area is clear of all nonessential items (such as tools and debris); and that all of the equipment components are operationally intact.
2. Perform the appropriate procedures to remove the locks and tags from the locked-out components.
3. Ensure that all involved personnel are safely positioned. Notify them that the locks have been removed and that startup is imminent.
4. When the authorized person who affixed the locks is confident that the preceding steps have been performed and that the situation is safe, that person must then remove the locks and tags and affix any remaining devices (such as regular locks) that are required for normal operation.
5. Turn on (close) the utility breaker switch for the PV circuit.
6. Turn on (close) the AC side of the inverter.
7. Turn on (close) the DC side of the inverter.
8. Turn on the inverter according to the inverter manufacturer's startup procedure (Section 8.1).

Warning! Even after locking out the components, there is still a potential for electrical shock when working on the array and the wiring. Always wear appropriate rubber insulating gloves.

4.0 Warranties & Product Certifications

4.1 Warranties

This section contains:

- A summary of the system and component warranties.
- Excerpts from component manufacturers' warranty documentation.
- Product certifications.
- Product patent information.

4.1.1 System and Component Warranty Summary

Important! Where applicable, the terms and conditions of the warranty and service coverage for the project are detailed in the EPC agreement.

In accordance with a typical module manufacturer warranty, the warranty is transferable when product remains installed in its original location at the time of product warranty registration. Vineyard Solar 1 & 2 will serve as the Owner's intermediary with the module manufacturer to address warranty issues for the term of the Vineyard Solar 1 & 2 warranty and any Service Agreement.

Note. Some Vineyard Solar 1 & 2 power systems may not include all of the components described in this section.

The following tables summarize the manufacturers' warranties for the system and for the major system components:

Major Component Manufacturer Warranties				
	Warrantor	**Length**	**Start Definition**	**Start Date**
Inverters	**TBD**	5 Years	System startup date, or 6 months after ship date	**TBD**
Modules	**TBD**	Output: 25 years	Manufacturer's ship date	**TBD**
Wind Speed/Direction Sensor	**TBD**	1 Year	Ship date	**TBD**
Rain Gauge	**TBD**	1 Year	Ship date	**TBD**
Pyranometer	**TBD**	1 Year	Ship date	**TBD**
Tracking structure	**TBD**	5 Years	System startup date or 6 months after ship date	**TBD**
Jack screw	***TBD***	**TBD**	**TBD**	**TBD**
Substation Power Transformer	**TBD**	2 Years	Initial energization or 30 months from ship date	**TBD**
Potential Transformers	**TBD**	3 Years	Ship date	**TBD**

Major Component Manufacturer Warranties				
Surge Arrestors	**TBD**	1 Year	Ship date	**TBD**
Disconnect Switches	**TBD**	5 Years	Ship date	**TBD**
Riser Pole Disconnect Switches	**TBD**	2 Years	Ship date	**TBD**
Substation Relay House	**TBD**	1 Year	Initial energization (not more than 18 months from ship date)	**TBD**

4.1.2 Component Manufacturer Warranties

This section contains warranty information for the following major system components:

- Modules
- Inverters
- Wind speed/direction sensor
- Rain gauge
- Pyranometer
- Disconnect switches
- Tracker structures
- Jack screw
- Transformers (step up and grounding)
- Circuit breaker and vacuum circuit breaker
- Substation power transformer
- Potential transformers
- Surge arrestors
- Riser pole disconnect switches
- Substation relay house

4.1.2.1 Modules

TBD

4.1.2.2 Inverters

TBD

4.1.2.3 Wind Speed/Direction Sensor

TBD

4.1.2.4 Rain Gauge

TBD

4.1.2.5 Pyranometer

TBD

4.1.2.6 Disconnect Switches

TBD

4.1.2.7 Tracking Structures

TBD

4.1.2.8 Jack Screw

TBD

4.1.2.9 Transformers (Step Up and Grounding)

TBD

4.1.2.10 Circuit Breaker and Vacuum Circuit Breaker

TBD

4.1.2.11 Substation Power Transformer

TBD

4.1.2.12 Potential Transformers

TBD

4.1.2.13 Surge Arrestors

TBD

4.1.2.14 Riser Pole Disconnect Switches

TBD

4.1.2.15 Substation Relay House

TBD

4.2 Product Certifications

4.2.1 Underwriters Laboratories (UL)

One of the primary certifications for safety in the United States is the one earned from Underwriters Laboratories. Products are tested to rigorous UL standards and, after listing, are subjected to quarterly follow-up inspections.

The UL standards relevant to Vineyard Solar 1 & 2 products include the following:

- UL 1703 – Photovoltaic Modules and Panels
- UL 790 – Tests for Fire Resistance of Roof Covering Materials
- UL 1741 – Inverters, Converters, and Controllers for Use in Independent Power Systems

Note. Products listed under UL 1703 and 790 include a UL Fire Rating.

5.0 Data Acquisition System (DAS)

Note. Some Vineyard Solar 1 & 2 power systems may not include a DAS.

The DAS employs a Met Station installed near the array to measure ambient weather conditions that affect system energy production. The DAS records the Met Station measurements so system performance can be accurately reconciled with weather conditions. The DAS also incorporates devices that enable Vineyard Solar 1 & 2 to communicate with the DAS and to access system performance data remotely through a TCP/IP connection over a local area network (LAN), a dedicated business-class DSL Internet connection, or a wireless cellular connection.

If a network, DSL, or cellular connection is not available, a modem takes the place of the cellular router and the DAS communications occur over a standard telephone line.

In very large systems, the DAS communicates with the SCADA system.

6.0 Supervisory Control and Data Acquisition (SCADA)

Note. Some Vineyard Solar 1 & 2 power systems may not include a SCADA system.

The SCADA system consists of information-gathering and system control equipment located in the control room and the inverter cabinets. In the control room, the SCADA system consists of up to three physical computer servers and related network equipment. These servers are installed in a server rack and may have a workstation computer.

The servers are typically configured as follows:

- The primary SCADA server collects and manages data from site equipment and functions as the repository for the SCADA programming.
- The backup SCADA server performs all the same functions as the primary server and provides redundancy so the SCADA functions are maintained in the event of a failure of the primary server.
- The third server functions as a host for several virtual machines. The primary virtual machine contains the site SCADA historian, which records site operation data. This server also provides for data storage for at least three years of site operations. Other hosted services are PLC programming and remote access by outside vendors.

Some of the software used on these servers may include:

- Wonderware® Systems Platform
- Wonderware® Historian
- InTouch® view applications
- Other third-party software

In addition to the control room equipment at each inverter pad, there is a SCADA equipment enclosure. This enclosure may contain network communication equipment, a programmable logic controller (PLC), and various communications gateways. The equipment in the SCADA enclosure collects data from the meters, inverters, switchgear, auxiliary panels, transformers, and other cabinet equipment as available, and communicates this data to the SCADA application in the control room.

7.0 System Specifications

7.1 Modules

TBD

7.2 Inverters

TBD

7.3 Controller

TBD

8.0 As-Built Construction Drawings

TBD

9.0 Vendor Documentation

For all of the following equipment, refer to the manual or other documentation from the specific manufacturer. All equipment specs are TBD and based on available supply. Proper documentation will be provided once the final list of equipment manufacturers and models are determined.

9.1 Modules

TBD

9.2 Combiner Boxes

TBD

9.3 Disconnects

TBD

9.4 Inverters

TBD

9.5 Met Stations

TBD

- Reference Cell
- Pyranometer
- Anemometer
- Udometer

9.6 Transformers

TBD

- Substation Transformer
- Inverter Step-Up Transformers and Grounding Transformers

9.7 Jack Screw

TBD

9.8 Recombiner Boxes

TBD

9.9 Substation and Relay House

TBD

- Relay House
- 38 kV Breaker
- 70 kV Breaker
- Air Switches
- 34.5 kV Riser Pole Disconnect Switches
- Horizontal 38 kV Air Switch
- Vertical 123 kV Air Switch
- Potential Transformers
- Surge Arrestors

9.10 Container Thermostat

TBD

10.0 Preventive Maintenance

This section is intended to be a general preventive maintenance overview only. For detailed procedures refer to the respective manufacturer's preventive maintenance procedures (Section 8.0).

10.1.1 Vegetation & Long-Term Vegetative Mainenace Plan

A key component of preventive maintenance is the control of vegetation. The site must receive vegetation management 2-3 times per year or on as-needed basis as required by local site conditions, in order to prevent modules from becoming significantly shaded due to the presence of tall grass, shrubs, and trees; remove any plant material that may contact any system components; to minimize the fire hazard; and to maintain access to the site by removing any vegetation along the roadways that prevent access to the site.

Vegetation inside and outside of the fenceline will be managed on a regular basis several times per year to prevent overgrowth and maintain access to the on-site road, solar panels, and electrical equipment. Mowing will occur only between November 1 - May 1 per Agency regulations.

Establish Clear Zones: Define and establish clear zones around the solar array to prevent shading as proposed in the landscaping plan and tree clearing plan. These zones should be free from tall vegetation and trees that could obstruct sunlight from reaching the solar panels.

Mowing and Trimming: Regularly mow and trim grass and low-lying vegetation within the defined clear zones. Set a mowing schedule based on the growth rate of the vegetation, typically requiring periodic maintenance throughout the growing season. Ensure that mowing equipment is properly adjusted to prevent damage to the solar panels and minimize the dispersion of cuttings.

Invasive Species Management: Identify, monitor, and control invasive species within and around the solar array site. Collaborate with local experts or agencies specializing in invasive species management to create an effective plan. Regularly monitor the site for new infestations and promptly implement appropriate control measures such as manual removal or targeted physical methods.

Tree and Vegetation Pruning: Inspect and prune trees and larger vegetation surrounding the solar array to maintain appropriate clearance distances and prevent shading. Schedule regular pruning activities to manage tree growth patterns and remove any dead or damaged vegetation that poses a risk to the array's performance.

Soil Erosion and Sediment Control: Implement erosion and sediment control measures to prevent soil erosion, particularly during construction or when disturbances occur around the solar array site. Utilize erosion control blankets, sediment fences, or similar strategies as deemed necessary. Monitor these measures regularly and perform maintenance or repairs as needed.

Monitoring and Documentation: Establish a system for ongoing monitoring and documentation of vegetation maintenance activities. Keep records of mowing schedules, pruning, invasive species management, and any other maintenance performed. Regularly review these records to assess the effectiveness of the maintenance plan and make necessary adjustments for continuous improvement.

Stakeholder Communication: Maintain open lines of communication with relevant stakeholders, including the Town of Amherst and local authorities. Share information about the vegetative maintenance plan, including its goals, activities, and anticipated outcomes. Address any concerns or queries raised by stakeholders promptly and transparently.

Periodic Plan Review: Schedule periodic reviews of the vegetative maintenance plan to ensure its relevance and effectiveness. Consider factors such as changes in vegetation patterns, emerging invasive species, technological advancements, and community feedback. Revise the plan as necessary to adapt to evolving circumstances and optimize vegetation management practices.

By following this long-term vegetative maintenance plan, the community solar array in Upstate New York can maintain optimal performance, minimize shading, and ensure a visually appealing environment for all stakeholders involved.

10.1.2 Environmental Practices

All employees are bound by law to comply with applicable Workplace Health and Safety Legislation. Employees will be given training on environmental responsibilities. The employees are expected to use these environmental processes as part of their work practice and will be held accountable for their performance.

Environmental inspections will be incorporated into the routine solar facility inspections. These environmental inspections will include but are not limited to; inspection of electrical equipment for oil leaks, debris or unusual erosion. Proper action shall be taken to prevent oil from reaching the ground. Any oil leaks shall be recorded in the station log and documented in the work management system. A record of the inspections should be kept on file and summarized in the report as required.

Periodic inspections of the site and the storm water infiltration/retention basin will be performed to ensure existing drainage patterns are maintained and no sediment loading is occurring.

Reports to Governmental Authorities including those required as part of environmental or other permits should be performed and tracked using the Maintenance Management System or equivalent.

All required Environment Inspections will be scheduled, performed, completed and documented.

10.1.3 Road Maintenance

Inspections of the roadway leading to the solar site, electrical poles and within each solar site will be inspected on an annual basis to ensure roadways are in good condition. In the event that a roadway has been damaged due to environmental conditions, vehicle traffic for routine maintenance, or other factors, Vineyard Solar 1 & 2 will be responsible for all road improvements so that access to the site is maintained. In the case of heavy snowfall (greater than 3” of accumulation) Vineyard Solar 1 & 2 will remove snow in a timely manner to allow for access to the solar site and all equipment via the roadways.

10.2 Modules

Visually inspect modules for the following:

- Broken glass
- Mounting
- Insect invasion

- Discoloration of modules or junction boxes
- Cables and connectors
- Soiling or dirt buildup
- Optional: rinse off dirt

Visually inspect the combiner and recombiner boxes as follows:

- Inspect all boxes for physical damage
- Inspect all fuse holders
- Inspect all cables
- Inspect for insect invasion

In addition, verify each string's current.

10.3 Tracking Structures

A general inspection and walkthrough Tracker systems should be conducted routinely to verify that the system is properly maintained in accordance with industry practice, standards, codes, and operational requirements.

The inspection should at a minimum include:

- Inspect foundations and structural members to verify that there is no damage to concrete foundations and no substantive distortion or corrosion of structural members.
- Inspect field-welded joints for signs of corrosion. If corrosion is present, apply cold galvanizing paint.
- Inspect for any distortion, twisting, or other structural damage that has resulted from severe wind or storms.
- Inspect for damage to any support structures.
- Identify any accelerated weathering or degradation of the foundations.
- Inspect for any evidence of rodents, birds, or insects nesting on or within array components; or casting shadows upon or soiling the modules.
- Inspect for signs of erosion, and identify any differential settling of structure foundations.

In addition, to maintain optimal performance drive units require specific jack screw inspection and maintenance as described in the Joyce/Dayton operation and maintenance manual. (Refer to Section 8.0.)

10.4 Inverters

Note. Not all of the following procedures are applicable to all inverter models. Refer in addition to the specific inverter manufacturer's maintenance recommendations.

Perform preventive maintenance annually as follows:

- Read long-term data and error memory from inverter display.
- Clean filter pads; replace if necessary.
- Clean insect guards.

- Inspect the switch cabinet interior for dust, dirt, and moisture.
- Inspect all power cable connections.
- Inspect the coil terminations for discoloration and dust collection.
- Verify that signage is intact.
- Verify that fans and thermocouples are functional.
- Verify and test that heaters are functional.
- Inspect protective equipment and test where appropriate.
- Inspect all fuses and disconnects.
- Verify that overvoltage protectors are functional.
- Verify that the control and auxiliary voltages are within acceptable range.
- Check overheating functionality.
- Test emergency stop function and switches.

Inspect door contacts and locks.

10.5 Met Station

- The Met Station requires inspection and cleaning semi-annually.
- Reference cells require cleaning and calibration annually.

In addition, visually inspect all cables, connectors, cable tie points, and cabinets for dirt buildup and insect infestation.

10.6 Switchgear

10.6.1 38 kV Breaker

Annually inspect:

- Insulators
- Connectors
- Mechanical operators
- Contacts
- Breakers

10.6.2 70 kV Breaker

Check SF6 gas pressure gauge for evidence of pressure monthly.

Annually inspect:

- Insulators
- Connectors
- Mechanical operators
- Contacts

In addition, operate breaker in all modes.

10.7 Disconnect Switches

Annually inspect:

- Alignment
- Lubrication

Annually check mechanical operations:

- Mechanical interlocks
- Infrared inspection of connections and terminations

Insulators and surge arrestors

10.8 Transformers

10.8.1 Step-Up Transformers at Inverters

Inspect the transformers annually. Inspect all exposed surfaces for any evidence of the following:

- Tampering
- Battered metal
- Gouges, dents, and deformations

Inspect the following aspects of the terminal compartment interior:

- Gauges
- Drain cocks and plugs
- Fuse mountings
- Switches
- Fluid levels
- Connectors for heat and oxidation
- Overall visual inspection

Perform the following annually for the first two years, and then every five years thereafter:

- Transformer oil sampling and dissolved gas analysis

10.8.2 Substation Transformer

Inspect, verify, or perform the following annually:

- Verify that the oil level in the transformer tank is within the acceptable range as indicated on the liquid level gauge.
- Take oil sample and have it tested for dielectric strength and dissolved gas analysis (DGA).
- Verify that the temperature gauge indicates that the transformer is within the acceptable range.
- Verify that the pressure gauge indicates that the pressure is within the acceptable range.
- Verify any other internal indicators for parameters in an acceptable range.
- Inspect temperature gauge drag pointer for evidence of past excessive loading.
- Inspect paint on tank and accessories and repaint as necessary.
- Perform megohmmeter (“megger”) test on winding insulation.
- Perform power factor test to check for degradation of winding insulation, and compare with previous checks.
- Clean fan blade and verify fan operation.
- Clean all bushings for dirt buildup, and inspect porcelain surfaces for cracks.

11.0 Commissioning Reports

If applicable, refer to the test reports for each piece of equipment. All equipment specs are TBD and based on available supply. Proper documentation will be provided once final list of equipment manufacturers and models are determined.

Note. Not all of the commissioning aspects described in this section are applicable to all Vineyard Solar 1 & 2 power systems.

*Specifications included in this document are subject to change without notice.