PROJECT SUMMARY

SOLAR FACILITY

466 YELLOW MILLS ROAD
FARMINGTON, NY 14522

Prepared for

Farmington Town Board and Planning Board

Planning Board Meeting September 5, 2018

Prepared by:
Delaware River Solar

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DRS DELAWARE RIVER SOLAR

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ACRONYMS

AC	Alternating Current
DC	Direct Current
kV	Kilovolt
MW	Megawatt
PV	Photovoltaic

1.0 INTRODUCTION

Delaware River Solar, LLC ("**DRS**" or "**Project Owner**") has prepared this preliminary project summary ("**Project Summary**") for the proposed development, installation and operation of three solar photovoltaic facilities (collectively the "**Solar Facility**") including 15 kilovolt (kV) interconnection lines (collectively the "**Interconnection Line**") to interconnect the Solar Facility to the Rochester Gas & Electric ("**RGE**" or "**Utility**") electrical grid. The proposed Solar Facility and Interconnection Lines are referred to collectively as the "**Project**".

The proposed site for the Solar Facility ("**Project Site**") will be on approximately 30-35 acres of undeveloped land located north of New York State Thruway Route 90 and west of the intersection of Yellow Mills Road and Fox Road, within the jurisdiction of the Town of Farmington ("**Town**").

The Solar Facility will have a total generation capacity of not more than approximately 7.0 MW AC. The final generation capacity will be determined based on final system design as approved by DRS and RGE.

Energy generated from the Solar Facility will be distributed to RGE for daily use by RGE'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 RGE rates to those enrolled. It is the goal of the Project Owner to afford the residences and businesses in the Town of Farmington the opportunity to enroll in the Community Solar Program prior to opening enrollment to additional locations.

Connection of the Solar Facility to the RGE electrical grid, including specific equipment, is part of a standard "**Interconnection Agreement**" executed between the Project Owner and RGE.

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;
- Minimal noise generated during solar power generation and no nighttime noise;
- 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 approximately nine feet in height to minimize visual effects;
- Vegetation pan to be implemented 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.

INFORMATION CONTAINED IN THIS PROJECT SUMMARY IS PRELIMINARY AND IS NOT INTENDED TO DESCRIBE ALL RELEVANT PROJECT INFORMATION. ALL INFORMATION CONTAINED HEREIN IS QUALIFIED IN ITS ENTIRETY BY THE FINAL APPLICATION, FINAL APPROVED SITE PLANS AND OTHER REQUIRMENTS OF THE APPLICABLE TOWN BOARDS.

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 the Utility 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 or municipal resources;
- Provide other important economic and environmental benefits to the Utility 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. Each of the three 2.338MW AC solar facilities will generate approximately 3,489,000 kWh/year, equivalent to the electricity consumption of 348 homes (1,044 total homes). The Project Owner's preference is for the residents and businesses of the Town of Farmington 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

Rank #	TASK	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
1	Site preparation and perimeter fence												
2	Mechanical works												
3	Inverter Station works												
4	Electrical & Civil works												
5	Modules placement												
6	Connection Works												
7	Test commissioning & Interconnection												
8	Planting												

2.0. PROJECT DESCRIPTION

2.1. Project Site and Control

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 Utility electrical grid;
- Availability, under a lease agreement with current landowner of Project Site;
- Avoiding sensitive areas, such as river, lakes, deep forest etc.;
- Minimizing visual impact by utilizing a site set back from public roads that will allow for the Solar Facility to be screened through the use of topography and landscaping; and
- Good highway access for construction, operation and maintenance activities.

The proposed Project Site is located in the Town of Farmington, Ontario County, New York, north of New York State Thruway Route 90 and west of the intersection of Yellow Mills Road and Fox Road (See Figure 1). Its nominal elevation is 560 feet above sea level (Figure 2). The latitude and longitude is 43.017843, -77.259895.

The Project Site will be approximately 30-35 acres. The Project Site will be leased from the property owner ("**Property Owner**") and is part of approximately 137 acres owned by the Property Owner (Figure 3). Project Site access is anticipated to be through Fox Road.

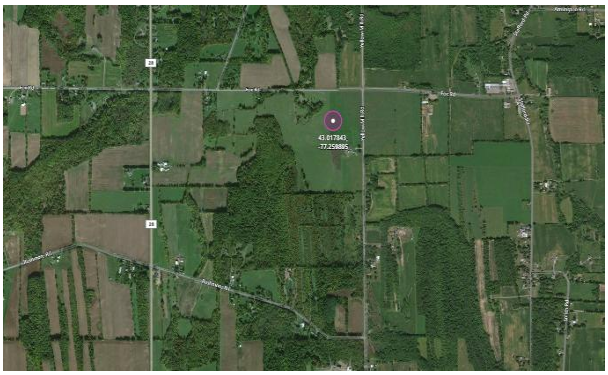

Figure 1. Project Location (source BING Maps)
(See also Plan 3 – P02 PROJECT LOCATION)

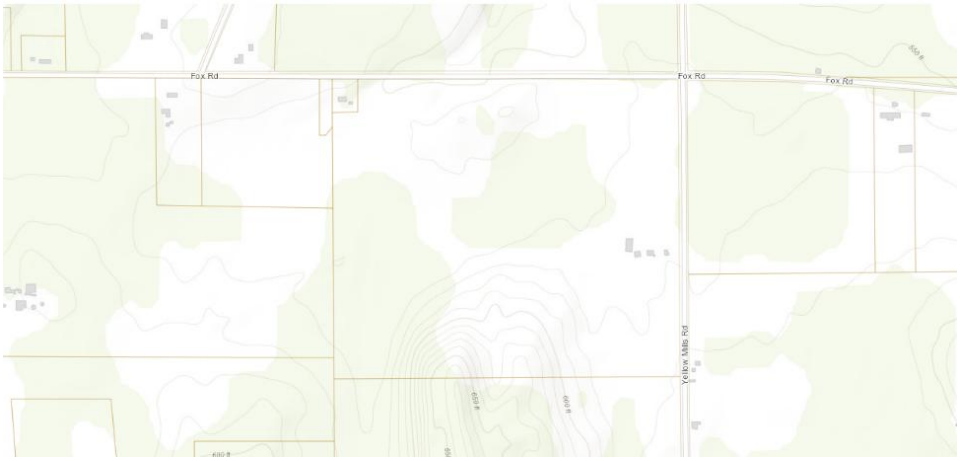

Figure 2. Topography

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 2.338 MW ac (per facility), with a ratio Ppk/Pn of approximately 1.027 (2.415 MW dc) for each of the three Projects.

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.

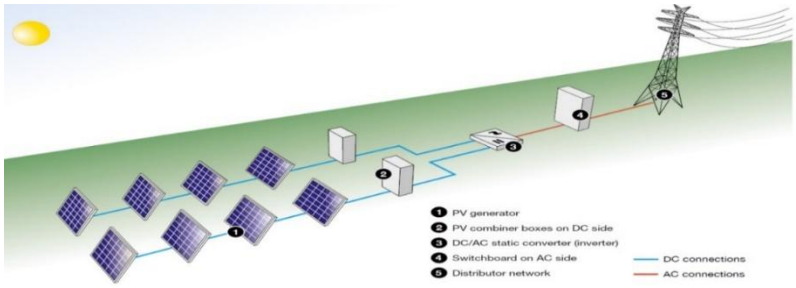

Figure 4. Diagram of a grid-connected photovoltaic plant

2.3. Acreage and General Dimensions of the Project Site

The total acreage of property owned by the Property Owner is 137.56 acres. The Project Site will be located on approximately 30-35 acres including approximately 0.36 acres for the Interconnection Line, which assumes a maximum of 20 ft. of temporary, and 2 ft. permanent wide, 1078.96 foot trench on first project; 1151.32 foot trench on second project; 1656.30 foot trench on third project. Table 2 below identifies significant structures and equipment, including dimensions.

Table 2- Summary of Land Area (Approximate Acres)

Description	Project 1	Project 2	Project 3	Total
Solar Facility	9.88	10.74	10.65	31.27
Modules Covered Area	3.15	3.15	3.15	9.45
Inverter Station Covered Area	0.005	0.005	0.005	0.015
Interconnection Line (Permanent) Covered Area	0.12	0.12	0.12	0.360

It is anticipated that the Project Site will be subdivided for (a) Utility interconnection requirements and (b) tax assessments / allocations for the Property Owner.

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

Modules will be distributed into arrays and mounted on a specific supporting structure.

Table 3- Solar Facility Summary

	Project (#1)	Project (#2)	Project (#3)
Peak power (MWpk)	2,415	2,415	2,415
Tilt & Azimut	25º/0º South	25º/0º South	25º/0º South
Module Disposition	4 Module Height-Landscape	4 Module Height-Landscape	4 Module Height-Landscape
Nominal power (MW)	2.338	2.338	2.338
Modules/String	28	28	28
Total Modules	7,000	7,000	7,000
Strings/DC BOX	24	24	24
DC BOX	11	11	11
Inverter Station	2.338 MW	2.338 MW	2.338 MW
Transformer	2.5 MVA	2.5 MVA	2.5 MVA

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 (approximately 19') 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 1956x990x40mm
- Cell type: Monocrystalline
- Efficiency up to 20.00 %
- 25 years power output warranty
- Electrical Characteristics STC
- Conform with IEC 61215:2005, IEC 61730: 2004, UL 1703 Solar Project Standards and other certificates
- Maximum System Voltage: 1500 Vdc (UL)
- Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000W/m^2, Cell Temperature 25º)

Table 4- STC Module Characteristics

Maximum Power Current (lmp)	8.68 A
Maximum Power Voltage (Vmp)	37.52 V
Short Circuit Current (lsc)	9.15 A
Open Circuit Voltage (Voc)	46.02 V

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 to be performed Following are several examples of a support structures considered for the Project.

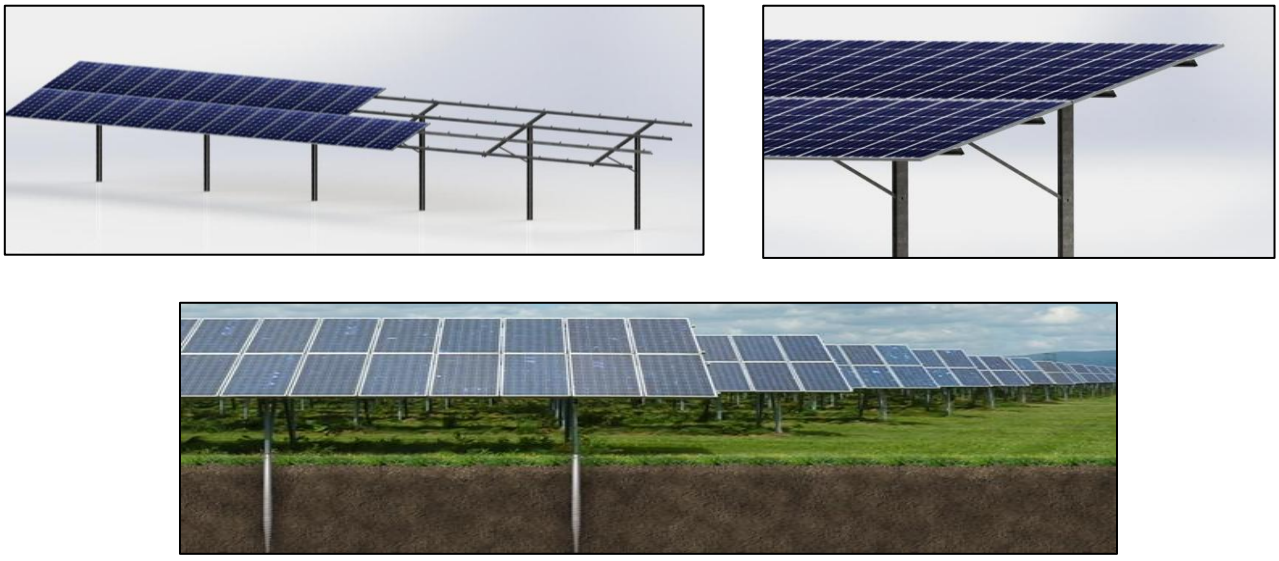

Figure 5. Supporting Structure Overview
(See also Plan 6 – P06 RACKING SYSTEM)

Key points of the Supporting Structure:

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

Table 5- Supporting Structure Summary Details (Approximate)

Module height above ground (low part)	3 ft.
Module height above ground (high part)	9.2 ft.
Length	45.6 ft.
Width	12.2 ft.
Angle	25º
Area	65.7 yd^2 approx.
Piling depth	TBD on site

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:

- UL Marked 1741
- IEEE-1547
- IEC 62116

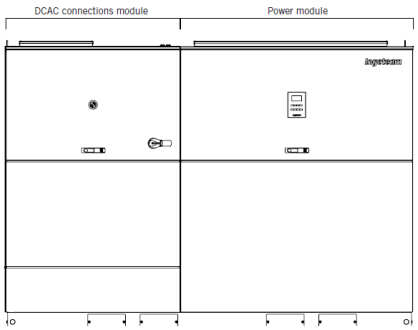

Figure 6. Inverter

(See also Plan 7 – P08 TRANSFORMER, INVERTER & AUX.EQUIPAMENT PAD)

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.

Figure 7. "All-in-one" Recombiner Box & Inverter & AC Cabinet &Transformer Station *(See also* Plan 7 – P08 TRANSFORMER, INVERTER & AUX.EQUIPAMENT PAD)

2.6. Electrical Installation

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

2.6.1. DC Electric Switchboards

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 are (TBD). The combiner boxes will have at least the following characteristics:

- Suitable for outdoor installation
- Designed for UV resistance
- Protection isolation
- Anti-condensation filter
- DC fuse in negative pole per string
- Grounding copper tape
- Mounting lugs and required nuts and bolts for installation
- Self-extinguishing and halogen-free materials
- Coverage of electrical items with methacrylate plate
- Fitted with surge protection Device, 3pole, 1500Vdc, 40kA
- Disconnecting isolators 1500VDC must comply with applicable standards
- Fully labeled and color coded wiring (as per project all strings)
- Appropriate number of string inputs and associated fuse sizing
- Cable glands for output DC cable (up to 4x1x300mm² Al XLPE cable; defined per project) and signaling cable input & output
- In case of armored cable, glands have to be able to earth the aluminum armor
- Cable glands for communication cable and grounding cable

Operational ambient conditions are to be as follows:

- Temperature:77.0°F to + 10.0 °F
- Relative humidity: 15 to 95 %

2.6.2. Wiring

Two types of wiring will be required in the Project, from modules to DC Box, and from DC Box to the general DC Disconnect Switch. Cables will meet the requirements of UL standard 4703, appropriate for solar photovoltaic applications.

Wiring will consist of single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 2000 V for interconnection wiring of grounded and ungrounded photovoltaic power systems with the following features:

- Rated 90°C wet and dry
- Rated for direct burial
- Resistant to most oils and chemicals
- UV/sunlight-resistant
- Increased flexibility
- Excellent resistance to crush and compression cuts
- Deformation-resistant at high temperatures
- Excellent moisture resistance, exceeds UL 44
- Meets cold bend and cold impact tests at -40°C
- Stable electrical properties over broad temperature range

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* allows this combined conductor to be terminated at the first panel board that has a grounding busbar with an attached GEC to a grounding electrode.

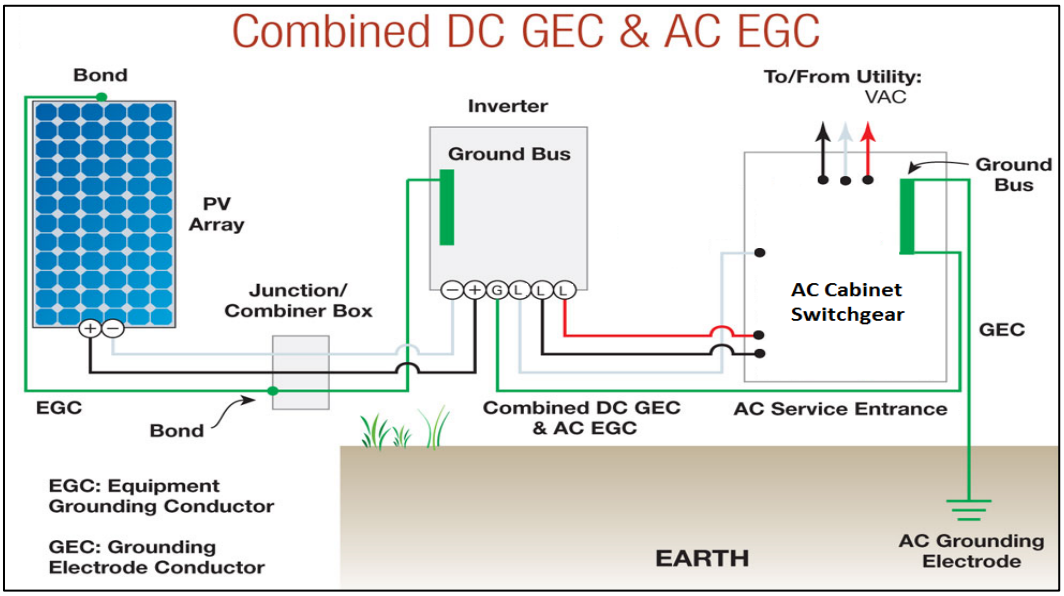

Figure 9. Combined EGC/GEC grounding routing Solar Facility

2.7. Monitoring

Sensors include:

- Combiner Box temperature
- Solar irradiation
- Panel temperature
- Ambient temperature
- 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
- Registers
- Fault history visualization
- Warning history visualization
- Status visualization
- Internal debug
- SI visualization menu
- Clearly visible external warning signals concerning voltage at the base of pad-mounted transformer and substation

2.8. Mid Voltage Connection

The Solar Facility will satisfy Utility 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
- Metering
- Operating requirements
- Dedicated transformer
- Disconnect switch
- Power quality
- Power factor
- Islanding
- Equipment certification
- Verification testing
- Interconnection inventory

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 North of the Solar Facility, on the Utility's 0168 Substation Circuit #5190 connecting to the Substation 0168 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

2.8.2. Point of Common Coupling (PCC)

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

Table 6. The PCC Configuration Summary

Line Voltage at PCC (kV)	12.47
PCC Line Type	3 phase
PCC Line Configuration	Wye-grounded

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 larger 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 Utility 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
- Provide for remote disconnect
- Act as a utility controlled redundant protection system

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 generally 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.

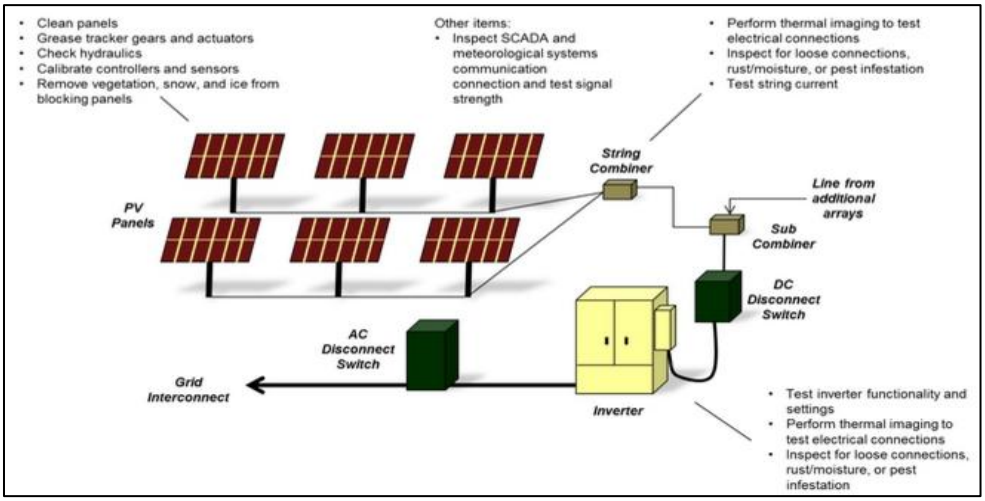

Figure 11. Highlights of the Solar Facility Maintenance

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. Both, Project 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.

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 or motion detector may be installed at locations along the Project Site

boundary. 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. Security lights, if any, will all be activated by motion sensors or turned on by a local switch.

2.11. Temporary Construction Facilities

Temporary construction staging areas will 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 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 minimum non-hazardous waste during operation. These waste items may include the materials listed in Table 7:

Table 7 - Waste and Hazardous Materials Management

Item	Description
PVC Cement	Adhesive used for underground PVC conduit and sleeve ground.
Cardboard	General packaging
Plastic	General packaging, wiring
Cold Galv	Anti-rust galvanizing spray used when cutting material to prevent rust.
Copper & Aluminum	Used wiring systems

Material Safety Data Sheets will be provided at the time of installation and will be kept at the Project Site as they are specific to the product purchased and all wastes shall be disposed according to what is specified in the related 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. 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 any 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. The local fire departments will be contacted to review the site plan and will also be provided a walk-through of the facility upon completion of construction to be shown the location of critical equipment and disconnect procedures.

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 approximately nine (9) feet in height and the minimum height in relation to the ground will be approximately 3 feet. All mechanical equipment will be completely enclosed by an approximately 8 foot high fence.

Alternating open areas will be designated as access points allowing occasional access for maintenance activities. Natural vegetation will be allowed to grow in the open areas not used as access points and these areas will remain undisturbed.

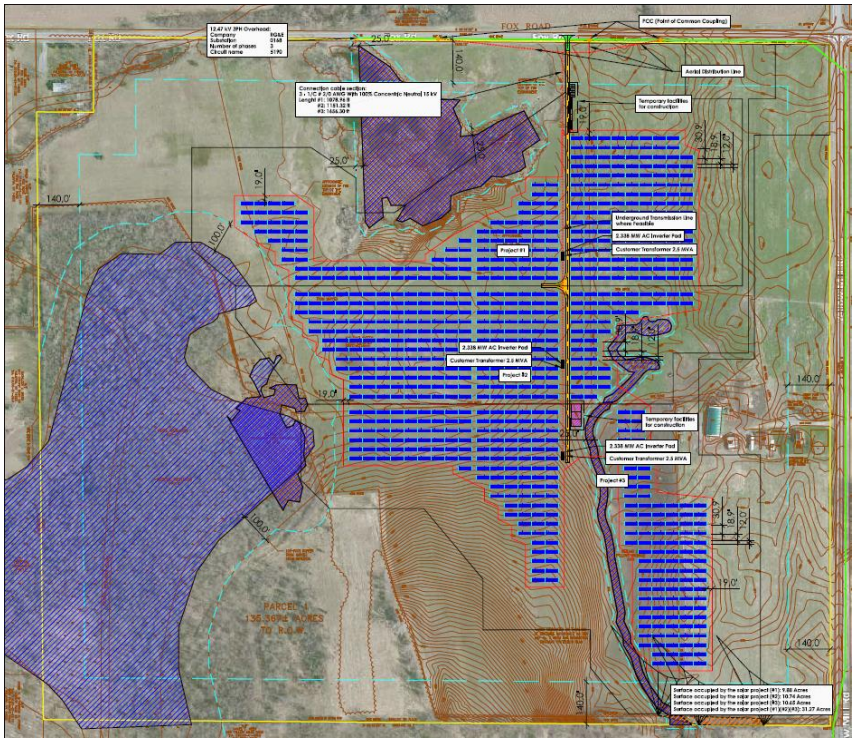

Figure 12 Site Layout
(See also Plan 5 – P04.1 GENERAL LAYOUT)

3.2. Access and Transportation System, Component Delivery, Worker Access

The Project Site access for employee and general construction traffic will be from Fox 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 8 - Solar Facility Construction Estimated Personnel and Equipment

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

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 has been performed to assist the engineering effort in establishing 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 any commencement of construction, will properly stake the Project Site physical boundaries and construction footprints. The survey team will additionally 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 in accordance with Town code.

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 proper operation and maintenance of the Solar Facility. The scope of work shall include, but not limited to, 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 associated costs 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 Solar Facility equipment, including periodic cleaning of 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 such 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. Also such 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.
5. Guaranties and warranties of manufacturers that arise, including without limitation any claims or remedies against any subcontractors or suppliers.
6. 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 Ontario 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. The NYSDEC Environmental Resource Mapper indicates the Project Site is not near a “Significant Natural Community or a Rare Plant or Animal”.

4.1.2. Visual

The current visual characteristics of the proposed Project Site consist mainly of open fields. On the West and North there are existing grove and tree barriers that would impede direct vision of the Solar Facility. To the East and South of the Project Site the Projects are expected to be setback behind agricultural areas providing some distance from road views.

The roads adjacent to the Project Site do not have complete natural barriers that prevent direct views of the Solar Facility so screening will be considered. The Project Owner will prepare a view shed analysis (in a separate document) showing the views and possible screening.

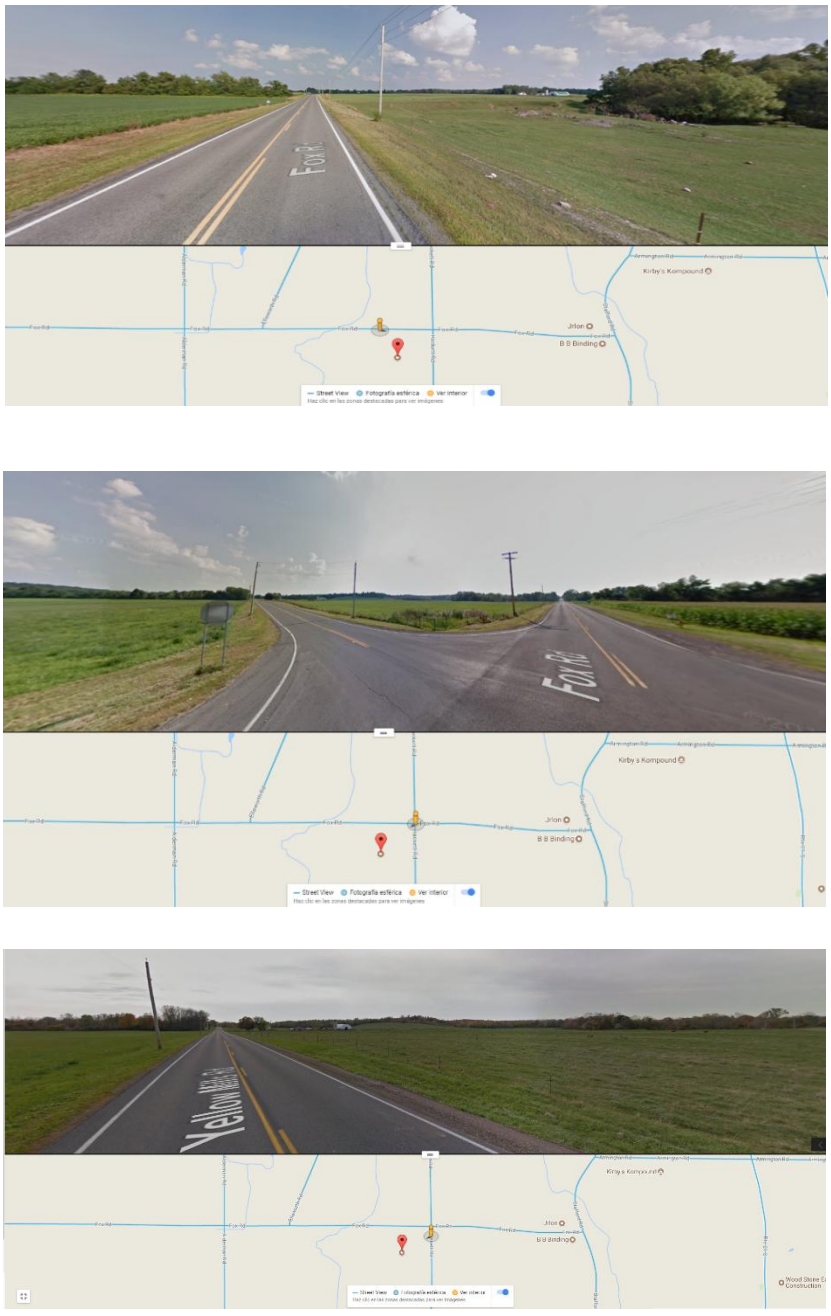

Figure 13. Buildings and Road View (from Fox Road and Yellow Mills)

The solar arrays will be constructed to a maximum height of approximately 9 feet. Part of the proposed solar arrays will not be seen from off-site due to their low vertical profile and perimeter fence boundary surrounding the Solar Facility.

The arrays may also be visible from residential properties situated at east and southeast of Project Site (red square in picture). A row of trees (added to the existing ones placed or along the existing roads) may be placed from visible areas to ensure that the views will be minimized. The decision of increasing the existing vegetation will be taken on-site, after an initial study.

The combination of a perimeter fence, natural barrier of trees, additional vegetation and set back of the Solar Facility from the roads will minimize views. 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 differences in 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.

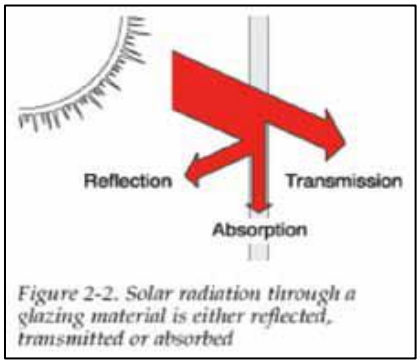

Figure 2-2. Solar radiation through a glazing material is either reflected, transmitted or absorbed

Table 9. Solar Radiation through a Glazing Material

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.

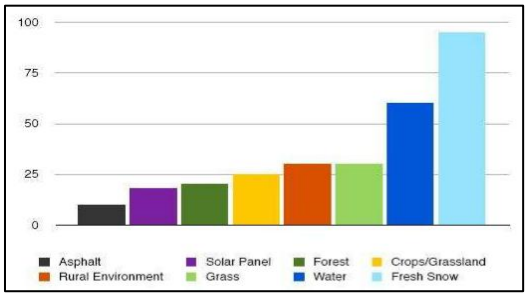

Table 10. Common Reflective Surfaces

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.

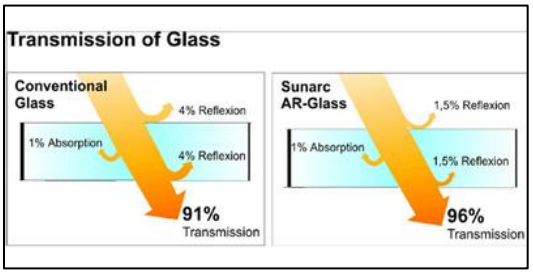

Table 11. Anti-Reflective Coating reflect a lower percentage of light than smooth water.

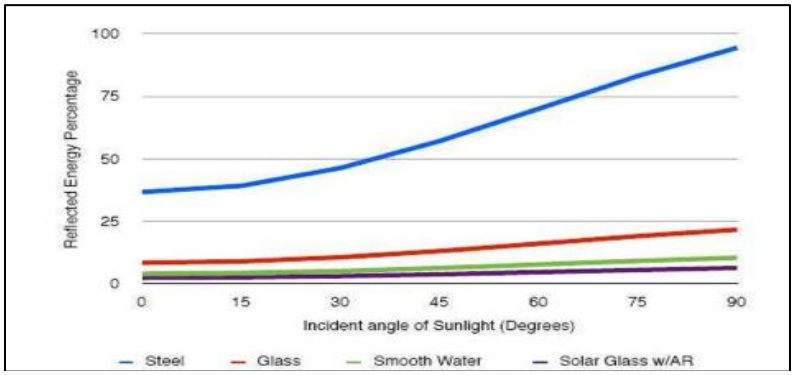

Table 12. Analysis of typical Material Reflectivity with sunlight angle (from normal).

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 any 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. Also the Solar Facility is arranged with sufficient distance between the modules to allow rainfall to infiltrate between each module and flow between arrays, allowing any runoff to naturally infiltrate and drain over all 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.

Figure 14. Module Spacing gaps

Elements of the Solar Facility that alter natural infiltration, such as steel poles driven into the ground, will always be 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.

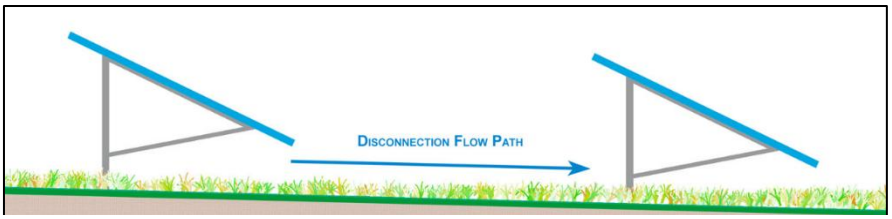

Figure 15. Array Spacing - disconnection flow path between arrays
Source. Maryland Department of the Environment

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 array layout, there will be a maximum of 11-17 feet of shading underneath each module (varies based on sun position). Within this area sunlight intensity will be reduced. Recordings made in similar conditions reduced the sunlight intensity to less than 600 Lx. 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 patters 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. When the solar array is decommissioned and removed the soil conditions will remain (i.e. there are no parking lots, roads or foundations, other than the inverter pads).

4.1.5. Noise

Fixed panels mean there are 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 on all sides by the solar panel arrays further distancing them from anyone who might happen to be nearby. At a distance of 1m, central inverters have a sound pressure level of less than 70dB. The noise generated by the inverters will be within existing ambient levels at the property lines. Furthermore, because solar panels produce power only when the sun is shining, inverters will be completely silent at night.

4.1.6. Dust and Waste

The tilt 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 Plan 8 – P12 PERIMETER FENCING & SILT FENCE in Drawings) will be installed and a

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 discussed with the applicable town boards 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. The NYSSHPO Cultural Resources Information System indicates there are no archaeological sensitive areas within the Project Site.

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.

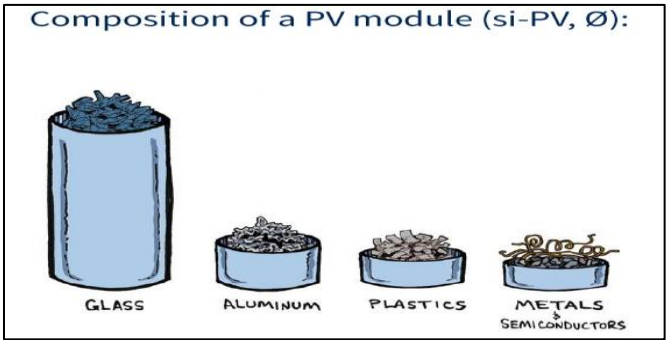

Figure 16. PV Module composition
Source: PV Cycle

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

A separate document containing additional information on decommissioning will be provided, however, in general:

- Unsafe, inoperable, and/or abandoned equipment shall be removed by the Project Owner. The Solar Facility shall be deemed abandoned when it fails to produce energy for at least one 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 the installation 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. Screening will be discussed with the town boards to minimize views of the Solar Facility.

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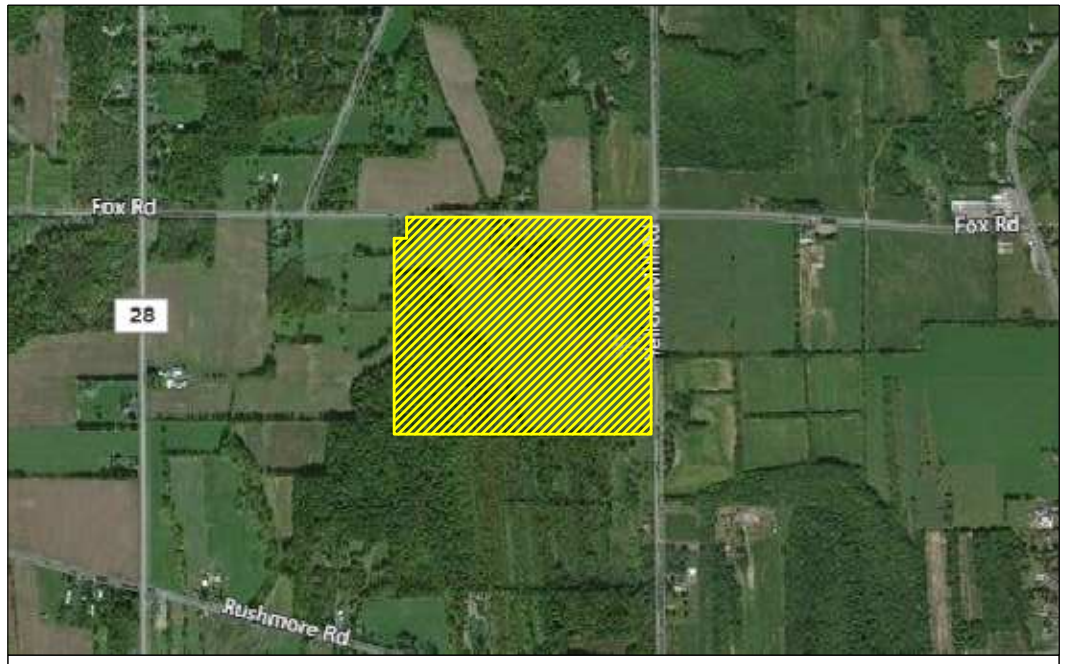
DRAWINGS



SUMMARY:

MODULE: CSUN - 72P

MODULE QUANTITY: 7,000 (345 Wp)(per plant).

INVERTER: IS 1245TL U B480 (x2 per plant).

RACKING SYSTEM: 4 MODULE HEIGH - LANDSCAPE

SOLAR PROJECT ARRAY DISPOSITION: 25° TILT - AZIMUTH 180°

COMBINER BOX: TBD

UTILITY: ROCHESTER GAS ELECTRIC CORPORATION (RG&E)

PROJECT INFORMATION:

NAME: 466 Yellow Mills Rd #1 #2 #3 FARM

ADRESS: 466 Yellow Mills Rd, Farmington, NY 14522

OWNER:–

GENERAL CONTRACTOR:--

REGULATIONS IN FORCE:

NATIONAL ELECTRIC CODE 2017 EDITION

UL 1741 STANDARD FOR INVERTERS

UL1703 AND 2703 FOR BONDING AND GROUNDING

ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

2009 INTERNATIONAL BUILDING CODE

NY STATE STANDARDIZED INTERCONNECTION REQUIREMENTS AND APPLICATION PROCESS Feb 2017

NYSEG SP-1009 SPECIFICATIONS FOR CUSTOMER ELECTRIC SERVICE 2.4 KV TO 34.5 KV

466Yellow Mills Rd SOLAR PROJECT
7.245 MW DC / 7.014 MW AC

2.415 MW DC / 2.338 MW AC (Project #1)

2.415 MW DC / 2.338 MW AC (Project #2)

2.415 MW DC / 2.338 MW AC (Project #3)

GRID TIED UTILITY SCALE DISTRIBUTED GENERATION SYSTEM

DRAWING INDEX

DRAWING NO.	DESCRIPTION	REV.
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P03	TRANSPORT STATEMENT	1
P04	OVERALL LAYOUT	1
P06	RACKING SYSTEM	1
P08	TRANSFORMER, INVERTER& AUX. EQUIPMENT PAD	1
P12	PERIMETER FENCING & SILT FENCE	1
P17.1	LABELS	1
P17.2	LABELS	1
P21	FOOT PRINT LAYOUT	1

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DRAWING ISSUE

- [ ] PRELIMINARY
- [ ] CONSTRUCTION
- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

MODULE

MANUFACTURER:	CSUN
MODEL:	CSUN - 72P
MODULE OUTPUT POWER:	345 Wp
STRING SIZE:	28
NUMBER OF STRINGS:	250 (per plant)
MODULE QUANTITY:	7,000 (per plant)
PV SYSTEM OUTPUT:	2,415 KWp DC (per plant)

INVERTER

MANUFACTURER:	INGETEAM
MODEL:	IS 1245TL U B480
QUANTITY / RATING:	2 /1,247 kVA (#1)
	2/ 1,247 kVA (#2)
	2/ 1,247 kVA (#3)
PV SYSTEM OUTPUT:	2,338 kW AC (#1)
	2,338 kW AC(#2)
	2,338 kW AC(#3)
DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC / #1 #2 #3 (2.338 MW per plant) / 466 Yellow Mills Rd FARM

Site Adress: Yellow Mills Rd / Farmington, NY 14522 / 43.017843, -77.259895

Sheet Name: FRONT COVER

Scale: NS (ANSI B)

Project ID: #—

Plan No.: 00

GENERAL NOTES

-THESE DRAWINGS MATCH THE INSCRIPTION DRAWINGS SUBMITTED BUT NOT LIMITED TO THE CORRESPONDING MUNICIPALITY.

-THE TERM "WORK" SHALL MEAN ALL LABOR, TRANSPORTATION MATERIAL, EQUIPMENT, TOOLS, INSTALLATIONS, SYSTEMS, SUPERVISION AND ANY OTHER INCIDENTAL ITEMS OR SERVICES NECESSARY POR THE PROPER EXECUTION OF THE PROJECT. "WORK" SHALL ALSO INCLUDE ANY REPAIR OR IMPROVEMENT REQUIRED AS A PROCES OF THE CONSTRUCTION.

-THE TERM "PROVIDE" SHALL MEAN FURNISH AND INSTALL. MAKE ALL FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATION CONDITION.

-THE TERM "SUMMARY DOCUMENTS" SHALL MEAN ALL DRAWINGS AND SPECIFICATIONS OR CORRESPONDENCE ISSUED BY THE DESIGNER OR AUTHORIZES REPRESENTATIVES.

-ALL GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE EQUIPMENT OF MATERIAL MANUFACTURERS ARE MADE PART OF SUMMARY DOCUMENTS AND HAVE THE SAME EFFECT AS IF COMPLETELY REPRODUCED.

-THE TOWN SHALL REPORT ANY DISCREPANCES BETWEEN CURRENT CODE AND THE DRAWINGS OR SPECIFICATIONS TO THE DESIGNER PRIOR TO WORK.

-ALL WORKS SHALL BE IN ACCORDANCE WITH INDUSTRY STANDARDS. INDUSTRY STANDARDS SHALL BE DETERMINED BY MANUAL OR HANDBOOK OF THE PRIMARY ASSOCIATION OF EACH TRADE OR THE TOWN.

-AS-BUILT DRAWINGS SHALL INCLUDE ALL TRADES OR SPECIALTY DRAWINGS. THESE DRAWINGS SHALL BE UPDATED AS THE PROJECT PROGRESSES FOR READY REFERENCE.

-AS-BUILT DRAWINGS SHALL BE GIVEN TO THE OWNER AT SUBSTANTIAL COMPLETION. THESE DRAWINGS SHALL BE, STAMPED AND SIGNED BY CONTRACTOR AND PRIVATE ENGINEER INSPECTOR. FINAL PAYMENT TO THE CONTRACTOR SHALL NOT BE MADE UNTIL AS-BUILT DRAWINGS ARE RECEIVED.

-THE DRAWINGS, ARRANGEMENTS, ANNOTATIONS AND GRAPHICAL PRESENTATION ON THE SUMMARY DOCUMENTS ARE THE PROPERTY OF THE DESIGNER WHO RETAINS OWNERSHIP AND AUTHORSHIP OF THE DOCUMENTS IN ITS ENTIRETY. THE DOCUMENTS ARE INSTRUMENTS OF SERVICE AND ARE THE INTELLECTUAL AND PHYSICAL PROPERTY OF THE DESINGER. AUTHORIZED USE OF THE DOCUMENTS ARE GRANTED SOLE FOR THIS PROJECT.

-THE AUTHORITHY SHALL CAREFULLY EXAMINE ALL DOCUMENTS, SPECIALTY DRAWINGS AND MATERIAL SPECIFICATIONS. ANY DEVIATIONS OR INCONSISTENCES SHALL BE BROUGHT TO ATTENTION OF THE DESIGNER PRIOR TO CONTINUATION OF PROCESS.

-ALL DRAWINGS ARE DIAGRAMMATIC AND SCHEMATIC IN NATURE. WORK INCLUDES CERTAIN COMPONENTS, APPURTENANCES AND RELATED SPECIALTIES THAT MAY NOT BE SHOWN.

-CONSTRUCTION MEANS AND METHODS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE DESIGNER HAS ACCOUNTED FOR THE MOST COMMON OF TECHNIQUES USED IN THE DESIGN OF THIS PROJECT.

-ALL ELECTRICAL WORK TO BE PERFORMED BY A CERTIFIED LICENSED ELECTRICIANS BY THE SUPERVISION OF THE LICENSED CONTRACTOR.

-ALL FABRICATION AND MANUFACTURING SHALL BE PERFORMED BY CERTIFIED INDIVIDUALS IN APPROVED ASSEMBLY AND FABRICATION SHOPS.

-PRIOR STARTING ANY WORK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISAGREEMENT ABOUT SITE CONDITIONS, MANUFACTURER RECOMMENDATIONS OR AHJ.

-CONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN THE FORM OF A REQUEST FOR INFORMATION (RFI) FOR APROVAL. CHANGES ACCEPTED WILL DRAWING EDITION TO CONTROL THE APPROVED DESIGN.

-CONTRACTOR SHALL FOLLOW ALL EQUIPMENT MANUFACTURER'S MANUAL INSTRUCTIONS AND DATASHEET. ALL COMPONENT MANUALS ARE TO BE READ AND UNDERSTOOD PRIOR TO INSTALLATION.

-THE CONTRACTOR SHALL TURN ALL SWITCHES IN THE "OFF" POSITION AND FUSES REMOVED PRIOR TO INSTALLATION OF COMPONENTS.

-THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS ON THE DRAWINGS, INCLUDING EXISTING STRUCTURES, AND ADVISE OF ANY DISCREPANCY BEFORE STARTING THE WORK.

-THE CONTRACTOR SHALL FURNISH AND INSTALL ALL WORK AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS.

-THE CONTRACTOR SHALL COORDINATE ALL OPERATIONS WITH THE OWNER.

-THE CONTRACTOR SHALL COORDINATE ALL OPERATIONS WITH ANY EQUIPMENT AND ITS INSTALLER.

-PROVIDE ALL WORKING CLEARANCES AT NEW AND EXISTING EQUIPMENT PER NEC 110.26.

-ALL DISCONNECTING SWITCH AT COMBINER BOX SHALL BE SECURED FROM UNAUTHORIZED PERSONNEL BY LOCK .

CONDUITS AND CABLES SHALL NOT ENTER THE TOP OF ANY OUTDOOR ENCLOSURE WITHOUT WRITTEN APPROVAL FROM PROJECT ENGINEER.

SOW SUMMARY

-THE PROJECT CONSISTS IN THE INSTALLATION OF A 7.014 MW AC SOLAR PROJECT SYSTEM DISTRIBUTED IN 3 PROJECTS WITH 2.338 MW AC PER PLANT. THE SOLAR PROJECT SYSTEM WILL OPERATE WITH CRYSTALINE MODULES INSTALLED ON GROUND MOUNT FIXED TILT RACKING SYSTEM. PV DIRECT CURRENT POWER WILL BE TURNED TO AC POWER BY MEANS OF GRID TIED INVERTER.

-INVERTER OUTPUT TO BE STEPPED TO UTILITY VOLTAGE VIA CUSTOMER OWNED TRASNFORMER AT EQUIPMENT PAD.

RACKING SYSTEM ISSUES

-PV MODULES WILL BE SUPPORTED BY A FIXED STRUCTURE.

-THE FIXED STRUCTURE SHALL MEET THE DEAD LOAD, WIND LOAD AND SEISMIC STANDARDS. STRUCTURAL STABILITY AND THE MEANS OF ATTACHMENT WILL BE CERTIFIED BY A LICENSED ENGINEER.

-SEE RACKING DRAWINGS FOR MORE DETAILS AND SPECIFICATIONS.

SIGNS AND LABELING

-ACCORDING TO NEC ARTICLE 690.56, GRID-TIED SYSTEMS ARE REQUIRED TO HAVE PERMANENT PLAQUES OR DIRECTORIES.

-THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z535 SERIES AND OSHA STANDARD 1910.145 OFFER THE LABELLING GUIDELINES FOR A PV SYSTEM.

-REQUIRED SAFETY SIGNS AND LABELS SHALL BE ETCHED PLACARDS PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS. LABELS SHALL COMPLY WITH ARTICLE 690 OF THE NEC OR OTHER APPLICABLE STATE AND LOCAL CODES. SEE LABELS AND MARKING DRAWINGS FOR MORE INFORMATION.

-ALL INTERACTIVE SYSTEM POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS.

-A PERMANENT ETCHED PLAQUE OR DIRECTORY SHALL BE PROVIDED IDENTIFYING THE LOCATION OF THE SERVICE DISCONNECTION MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS, IF NOT LOCATED AT THE SAME LOCATION.

-ALL REQUIRED EQUIPMENT SHALL BE NRTL LISTED AND LABELED ACCORDINGLY.

WIRING SPECIFICATIONS

-ALL WIRING DESIGN AND INSTALLATION PROCEDURES SHALL BE NATIONAL ELECTRIC CODE COMPLIANT, LOCAL STATE CODES, AND OTHER APPLICABLE LOCAL CODES.

-All WIRING OF A PV SYSTEM SHOULD BE DONE BY A PROFESSIONAL ELECTRICIAN WHO KNOWS HOW TO INSTALL THE VARIOUS WIRING METODS ALLOWED TO USE WITH A PV SYSTEM.

-ALL CONDUCTORS SHALL BE COPPER OR ALUMINUM INSULATED SINGLE CONDUCTOR, SUNLIGHT-RESISTANT, DIRECT BURIAL PHOTOVOLTAIC WIRE WET OR DRY, FOR INTERCONNECTION WIRING OF GROUNDED AND UNGROUNDED PHOTOVOLTAIC POWER SYSTEMS AS DESCRIBED IN SECTION 690.31(A) AND OTHER APPLICABLE PARTS OF THE NATIONAL ELECTRICAL CODE (NEC), NFPA 70.

-WIRING SHALL MEET ALL THE INDUSTRY COMPLIANCES, TESTS AND EPA AND OSHA REGULATIONS.

-EXPOSED PV SOLAR MODULE WIRING WILL BE PV WIRE OR APPROVED EQUIVALENT, 90 DEGREE C, WET RATED AND UV RESISTANT.

-DC WRING SHALL BE FLAME-RETARDANT CROSS-LINKED POLYETHYLENE (XLPE)

-ALL EXPOSED CABLES, SUCH AS MODULE LEADS SHALL BE SECURED BY CORROSION AND SUNLIGHT RESISTANT MECHANICAL MEANS APPROPRIATE FOR THE SITE CONDITIONS. THE USE OF PLASTIC ZIP TIES IS NOT AN APPROVED METHOD SUPPORT OR ATTACH WIRE TO A STRUCTURE.

-WIRING COLOR SPECIFICATIONS:

DC CONDUCTORS	
POLE/LINE	COLOR CODE
POSITIVE	
NEGATIVE	
EARTH	

AC CONDUCTORS 120/208 V	
POLE/LINE	COLOR CODE
L1	
L2	
L3	
NEUTRAL	
EARTH	

AC CONDUCTORS 277/480 V	
POLE/LINE	COLOR CODE
L1	
L2	
L3	
NEUTRAL	
EARTH	

DISCONNECTING MANNERS

-DISCONNECTION OF ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS EXISTING CONDUCTORS SHALL BE POSSIBLE.

-GROUND-MOUNTED PV ARRAYS WITH NOT MORE THAN TWO PARALLELED SOURCE CIRCUITS AND WITH ALL DC SOURCE AND DC OUTPUT CIRCUITS ISOLATED FROM BUILDINGS SHALL BE PERMITTED WITHOUT GROUND-FAULT PROTECTION.

-WHERE A CIRCUIT GROUNDING CONNECTION IS NOT DESIGNED TO BE AUTOMATICALLY INTERRUPTED AS PART OF THE GROUND-FAULT PROTECTION SYSTEM REQUIRED BY SECTION 690.5, A SWITCH OR CIRCUIT BREAKER USED AS A DISCONNECTING MEANS SHALL NOT HAVE A POLE IN THE GROUNDED CONDUCTOR.

-THE GROUNDED CONDUCTOR MAY HAVE A BOLTED OR TERMINAL DISCONNECTING MEANS TO ALLOW MAINTENANCE OR TROUBLESHOOTING BY QUALIFIED PERSONNEL.

-UNLESS DISCONNECT IS SERVICING A LINE-SIDE TAP, THE DISCONNECTING MEANS SHALL NOT BE REQUIRED TO BE SUITABLE AS SERVICE EQUIPMENT AND SHALL BE RATED IN ACCORDANCE WITH SECTION 690.17.

-EQUIPMENT FOR PHOTOVOLTAIC DC CIRCUITS ARE OVER CURRENT DEVICES SUCH AS FUSES OR CIRCUIT BREAKERS.

-MEANS SHALL BE PROVIDED TO DISCONNECT EQUIPMENT SUCH AS INVERTERS AND THE LIKE FROM ALL UNGROUNDED CONDUCTORS OF ALL SOURCES. IF THE EQUIPMENT IS ENERGIZED FROM MORE THAN ONE SOURCE, THE DISCONNECTING MEANS SHALL BE GROUPED AND IDENTIFIED.

-A SINGLE DISCONNECTING MEANS SHALL BE PERMITTED FOR THE COMBINED AC OUTPUT OF ONE OR MORE INVERTERS IN AN INTERACTIVE SYSTEM - PROVIDED EACH INVERTER ASSOCIATED WITH THE DISCONNECT HAS ITS OWN INTERNAL AC DISCONNECT.

-ALL DISCONNECTS AND COMBINERS SHALL BE SECURED FROM UNAUTHORIZED AND UNQUALIFIED PERSONNEL BY EITHER LOCK OR LOCATION.

SYSTEM INTERCONNECTION REQUIREMENTS

-THIS PROPOSED PV SYSTEM WILL OPERATE IN PARALLEL WITH THE UTILITY SERVICE PROVIDER POWER DISTRIBUTION CIRCUIT LINES.

-THIS PV SYSTEM WILL CONNECT WITH THE EXISTING ELECTRICAL SYSTEM AT ONE LOCATION SPECIFIED BY THE LOCAL UTILITY NAMED POINT OF COMMON COUPLING (PCC).

-INTERCONNECTION IS UTILITY DIRECT TIE IN AT PONE ADJACENT TO THE SOLAR ARRAY.

-PERMISSION TO OPERATE THE SYSTEM IS NOT AUTHORIZED UNTIL THE FINAL INSPECTIONS AND APPROVALS ARE OBTAINED FROM THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) AND THE LOCAL UTILITY SERVICE PROVIDER (NYSEG).

-ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION FOR TESTING AND ISOLATION.

-PV STRING HOME RUNS SHALL BE LABELED ON BOTH ENDS, AT ARRAY, BETWEEN ARRAY AND PARALLEL HARNESS AND AT COMBINER. COMBINER OUTPUT CONDUCTORS SHALL BE LABELED AT BOTH ENDS, AT COMBINER AND AT DISCONNECT.

-PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS SHALL NOT BE CONTAINED IN THE SAME RACEWAY CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS FEEDERS OR BRANCH CIRCUITS OF OTHER SYSTEMS UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION OR ARE CONNECTED TOGETHER.

-PVC CONDUIT INSTALLED IN DIRECT SUNLIGHT SHALL BE MARKED AS UV RESISTANT SCH 80 WILL BE USED FOR ABOVE GROUND PVC CONDUIT.

-LONG STRAIGHT EXPOSED CONDUIT RUNS, 100 FEET OR MORE, SHALL HAVE EXPANSION FITTINGS INSTALLED PER NEC 300.7(B). EXPANSION FITTINGS SHALL ALSO BE USED WHEN CONDUIT SPANS AN EXPANSION JOINT.

-FUSES AND WIRES SUBJECT TO TRANSFORMER INRUSH CURRENT SHALL BE SIZED ACCORDINGLY.

-WHEN TRANSITIONING UNDERGROUND PVC CONDUIT TO ABOVE GROUND RMC, IMC OR EMT CONDUIT, USE 20 MIL PIPE WRAP TAPE HALF-LAPPED FROM 6" PAST TRANSITION POINT ON PVC TO 6" ABOVE GROUND CONDUIT. AN EXPANSION JOINT SHALL BE USED IN THE TRANSITION TO ABOVE GROUND CONDUIT WHERE REQUIRED BY NEC 300.5(J).

-ANY METAL SHAVINGS RESULTING FROM SITE WORK SHALL BE CLEANED FROM ENCLOSURE INTERIORS, TOP SURFACES OF ENCLOSURE, ROOF SURFACE, AND ANY ADDITIONAL AREAS WHERE OXIDATION OR CONDUCTIVE METAL SHAVINGS MAY CAUSE RUST, ELECTRICAL SHORT CIRCUIT OR OTHER DAMAGE.

-WHEN TRANSITIONING FROM FREE AIR TO CONDUCTORS IN CONDUIT A LISTED FITTING SHALL BE USED TO PREVENT THE ENTRY OF MOISTURE.

-ALL COPPER TERMINATION AC AND DC SHALL HAVE KOPR-SHIELD APPLIE, IN CASE OF ALUMINUM TERMINATION ALMA-SHIELD (OR SIMILAR) SHALL BE USED.D.

-INSULATION RESISTANCE TESTING WILL BE PERFORMED AT 1500 VDC FOR DC CIRCUITS IN 1500 VDC SYSTEMS. A MINIMUM OF 1 MEGOHMS RESISTANCE TO GROUND IS REQUIRED.

-BENDS SHALL NOT DAMAGE THE RACEWAY OR SIGNIFICANTLY CHANGE THE INTERNAL DIAMETER OF RACEWAY

-SUPPORT CONDUCTORS IN VERTICAL CONDUITS IN ACCORDANCE WITH THE REQUIREMENTS OF NEC 300.19

-CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. CONNECTORS ARE TO BE MARKED WITH PREEMINENT MARKING PAINT, AFTER TORQUING.

-SPLICES/CONNECTORS AND PARALLEL HARNESS SHALL BE INSULATED AND WILL REQUIRE PROJECT ENGINEER APPROVAL.

-NRTL LISTED ELECTRICAL TAPE ALONE IS NOT SUITABLE AS THE ONLY INSULATION MEANS. FOLLOW MANUFACTURERS INSTRUCTIONS FOR INSTALLATION, AND APPLICATION OF INSULATING PRODUCT.

-ALL LV AC WIRING SHALL BE TYPE XHHW-2 RATED AT 90 DEGREES C. THIS NOTE WILL BE SUPERCEDED BY ANY INVERTER SPECIFICATIONS REQUIRING LV AC WIRE TO MEET HIGHER VOLTAGE OR INSULATION STANDARDS.

-USE MYERS (OR EQUIVALENT) HUB LISTED TO PROVIDE MOISTURE PROTECTION FOR CONDUIT ENTRANCES IN ALL APPLICABLE DAMP OR WET LOCATIONS AS REQUIRED BY NEC 314.15.

-PROTECT WIRE FROM SHARP EDGES WITH UV RATED SPIRAL WRAP, EDGEGUARD, OR SPLIT LOOM.

-MODULE LEAD CONNECTORS SHALL BE INSTALLED SUCH THAT THEY ARE EASILY ACCESSIBLE AND PROTECTED FROM EXPOSURE TO DIRECT SUNLIGHT OR RAIN. THEY SHALL NOT BE INSTALLED WITHIN TUBING, CONDUIT OR MODULE GAPS

-MV WIRING SHALL BE ALUMINUM. VOLTAGE RATING SHALL BE EQUAL OR HIGHER THAN THE OPERATING VOLTAGE OF THE CIRCUIT LINE. NEC, UL, IEEE AND OTHER COMPLIANCES ARE NEEDED. AT LEAST RATED 90° FOR CONTINUOUS OPERATION AND SUNLIGHT RESISTANDT. PRIMARY DISTRIBUTION CABLES ARE SUITABLE FOR USE ABOVE GROUND IN OPEN AIR, IN CABLE TRAY, IN CONDUIT IN AIR, AND EITHER DIRECTLY BURIED OR IN DUCT.

-FOR MV WIRING GROUND CODUCTOR (IF NEEDED) SHALL BE SIZED ACCORDING TO PHASE CONDUCTORS.

INVERTER NOTES

-OPEN SKID PLATFFORM INTEGRATES ALL THE COMPONENTS IN A COMPACT OUTDOOR ASSEMBLY.

-RECOMBINER BOX CONFIGURATION AND FUSES DEPENDS ON THE DC OUTPUT CIRCUITS PARAMETERS.

-CONDUITS AND CONDUCTORS: ALL INTERCONNECT WIRING AND POWER CONDUCTORS INTERFACING THE UNIT MUST BE IN ACCORDANCE WITH THE NEC ANSI/NFPA 70 AND ANY APPLICABLE LOCAL CODES. LARGE GAUGE WIRE MUST CONFORM TO THE MINIMUM BEND RADIUS SPECIFIED IN THE NEC, ARTICLE 300.34, NINTH EDITION.

-KEEP ALL WIRE BUNDLES AWAY FROM ANY SHARP EDGES TO AVOID DAMAGE TO WIRE INSULATION. ALL CONDUCTORS SHOULD BE RATED FOR 90 DEGREE C MINIMUM.

-FOR OUTDOOR INSTALLATIONS, ALL INTERCONNECT CONDUITS AND FITTINGS MUST BE NEMA-4 RATED AS REQUIRED BY THE NEC. FOR WIRE GAUGE, BOLT SIZE, AND TORQUE VALUES FOR THE DC & AC TERMINALS, SEE THE INSTALLATION MANUAL.

-OPERATOR INTERFACE CONTROLS: OPERATOR INTERFACE CONTROLS ARE LOCATED ON THE FRONT OF THE MAIN INVERTER ENCLOSURE. CONSULT THE OPERATIONS AND MAINTENANCE MANUAL FOR INSTRUCTIONS AND CODE REFERENCES.

-INVERTER COMES WITH INTERNAL AC DISCONNECTING UNIT AND A DC DISCONNECTING UNIT. THESE DISCONNECT SWITCHES ARE TO BE USED FOR ISOLATING THE SOLAR ARRAY PANELS FROM THE UNIT FOR MAINTENANCE PURPOSES.

-INVERTERS ARE EQUIPPED WITH ANTI-ISLANDING CIRCUITRY. THE ANTI-ISLANDING TRIP TIME IS LESS THAN TWO (2) SECONDS AS PER UL 1741 STANDARDS. THE INVERTER UNIT WILL AUTOMATICALLY SHUT DOWN WHEN LOSS OF GRID POWER IS DETECTED.

-THE MV PADMOUNT TRASNFORMER INCLUDES MV SWITCHGEAR ENCLOSURE FOR THE MV OUTPUT TO UTILITY.

-THE PV SYSTEM SHOULD BE SOLIDLY SYSTEM-GROUNDED. TO ACHIEVE THAT THE NEGATIVE CONDUCTOR IS GROUNDED VIA THE GFDI IN THE PV INVERTER DC ENTRANCE. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH DC GROUND FAULT PROTECTION TO REDUCE FIRE HAZARDS.

EQUIPMENT LISTINGS

-ELECTRICAL EQUIPMENT USED IN THE PV SYSTEM SHALL BE LISTED BY A RECOGNIZED NRTL. ELECTRICAL COMPONENTS AND MATERIALS SHALL BE LISTED FOR ITS PURPOSE AND PROPERLY INSTALLED.

-EQUIPMENT SHALL ACHIEVE THE NEMA 3R OR HIGHER VALUE.

GROUNDING SPECIFICATIONS

-GROUNDING METHOD: A GROUND RING THROUGH TRENCH THE SYSTEM, IN DIRECT CONTACT WITH THE EARTH, CONSISTING OF AT LEAST HUNDRED METERS OF BARE COPPER CONDUCTOR NOT SMALLER THAN 1/0 AWG. SEE ELECTRICAL DIAGRAM AND ELECTRICAL DETAILS FOR MORE GROUNDING INFORMATION.

-EARTH RESISTANCE VALUE DEPENDS ON THE SURFACE RESISTIVITY AND THE GROUNDING METHOD USED. THE FINAL VALUE MUST BE < 5 OHMS AND CHECKED BY THE FALL OF POTENTIAL TEST METHOD.

-SYSTEM TO BE BONDED AND GROUNDED IN ACCORDANCE WITH ARTICLES 250 AND 690 OF NEC.

-EQUIPMENT GROUNDING CONDUCTORS (EGC) SMALLER THAN #4 AWG SHALL BE BARE OR HAVE CONTINUOUS GREEN INSULATION. EGC'S LARGER THAN OR EQUAL TO #4 AWG SHALL BE MARKED AS EGC (GREEN) WHEREVER ACCESSIBLE.

-EQUIPMENT GROUNDING CONDUCTORS (EGC) SHALL BE SIZED ACCORDING TO 250.122

-AC AND DC GROUNDING CIRCUIT SHALL BE REFERENCED TO THE SAME POINT.

-EQUIPMENT GROUNDING CONDUCTORS AND SYSTEM GROUNDING CONDUCTORS WILL HAVE THE SHORTEST DISTANCE TO GROUND AS POSSIBLE AND A MINIMUM NUMBER OF TURNS.

-NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER GROUNDING; NOTING THAT TERMINAL LUGS BOLTED ON AN ENCLOSURE'S FINISHED SURFACE MAY BE INSULATED BECAUSE OF PAINT/FINISH. PAINT/FINISH AT POINT OF CONTACT SHALL BE PROPERLY REMOVED.

-RACKING COMPONENTS AND STRUCTURAL SUPPORTS MUST BE ELECTRICALLY BONDED TOGETHER BY AN ACCEPTABLE MEANS FOR UL 2703 COMPLIANCE. MODULES SHALL BE GROUNDED WITH EQUIPMENT GROUNDING CONDUCTORS BONDED TO A LOCATION APPROVED BY THE MANUFACTURER WITH A MEANS OF BONDING LISTED FOR THIS PURPOSE.

-THE CONNECTION TO THE MODULE OR PANEL OF THIS PROPOSED SOLAR ELECTRIC SYSTEM SHALL BE SO ARRANGED THAT REMOVAL OF A MODULE OR A PANEL FROM THE PHOTOVOLTAIC SOURCE CIRCUIT DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER PHOTOVOLTAIC SOURCE CIRCUIT.

-GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, INCLUDING BUT NOT LIMITED TO GROUND RODS, GROUNDING LUGS, GROUNDING CLAMPS, ECT.

-ALL GROUNDING CONNECTIONS SHALL BE RATED FOR DIRECT BURIAL (DB RATED), CONTRACTOR IS TO SUPPLY DOCUMENTATION PROVING THIS DURING PRODUCT SUBMITTALS

-ALL EQUIPMENT GROUNDING CONDUCTORS INSTALLED SHALL BE COPPER ONLY.

HEALTH AND SAFETY ISSUES

-THE CONTRACTOR SHALL MAKE EFFORT TO PRODUCE AS LITTLE DISTURBANCE TO THE FACILITY DURING CONSTRUCTION. AFFECTED AREAS SHALL BE RETURNED TO THEIR PRE-CONSTRUCTION CONDITION.

-CONTRACTORS MUST COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS RELATED TO THE ENVIRONMENT.

-ALL WORK MUST COMPLY WITH THEIR SAFETY MANUALS, OSHA REQUIREMENTS AND STANDARDS.

-THE CONTRACTOR IS RESPONSIBLE FOR THE SAFETY OF ON-SITE PERSONNEL.
AN UNSAFE CONDITION IS A REASON FOR STOPPING THE WORK
ACCIDENT REPORT FORMS (OSHA FORM 301 OR 300) WILL BE SUBMITTED FOR EACH REPORTABLE OCCUPATIONAL INJURY, ILLNESS, OR LOST TIME ACCIDENT. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING OSHA IN THE EVENT OF A SERIOUS EMPLOYEE ILLNESS OR INJURY.

-ALL CONDUCTORS AND EQUIPMENT SHALL BE CONSIDERED ENERGIZED UNLESS CHECKED, TAGGED, GROUNDED, AND CHECKED AGAIN.

-THE CONTRACTOR SHALL APPLY JOB SAFETY MEETINGS COVERING THE PERSONAL PROTECTIVE EQUIPMENT (PEE), ACCESS AND CLEANLINESS OF THE SITE, ELECTRICAL SAFETY, POTENCIAL HAZARDS RECOGNITION AND MINIMIZATION.

-THE CONTRACTOR SHALL CONDUCT THE FUELING AND LUBRICATING OF EQUIPMENT AND MOTOR VEHICLES IN A MANNER THAT PROTECTS AGAINST SPILLS AND EVAPORATION. ALL USED OIL GENERATED ON SITE WILL BE MANAGED IN ACCORDANCE WITH 40CFR 279.

-THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT RELEASES/SPILLS OF OIL AND HAZARDOUS MATERIALS. IN THE EVENT OF ANY RELEASES NOTIFY THE LOCAL FIRE DEPARTMENT. THE CONTRACTOR SHALL COLLECT AND PROVIDE INFORMATION AND WRITTEN NOTIFICATIONS AS NEEDED BY THE INVESTIGATING AUTHORITY. CONTRACTON SHALL CONTAIN AND CLEAN UP THESE SPILLS WITHOUT COST TO THE OWNER.

-AN EMERGENCY ACTION PLAN SHOULD BE CREATED THAT INCLUDES AN INITIAL SITE SPECIFIC COMMUNICATION ASSESSMENT TO ENSURE THAT ADEQUATE RADIO OR CELLPHONE RECEPTION IS AVAILABLE ACROSS THE ENTIRE SITE.

-ELECTRICAL APPLICABLE SAFETY REGULATIONS SUCH AS OSHA 1910.269, THE NESC, AND NFPA 70E ARE USED AT PV FACILITIES TO PROVIDE GUIDANCE IN DEVELOPING SAFETY POLICIES AND PROCEDURES.

-TO ENSURE THE SAFETY OF WORKERS AT A PV FACILITY, A ROBUST SYSTEM OF SAFETY TRAINING, POLICIES AND PROCEDURES MUST BE ESTABLISHED. TRAINING CLASSES INCLUDE OSHA STANDARDS, NESC AND NFPA 70E ELECTRICAL AND ARC FLASH SAFETY, LOCKOUT/TAGOUT, FIRST AID AND CPR, HUMAN PERFORMANCE IMPROVEMENT AND PROJECT-SPECIFIC SAFE WORK RULES.

-ADDITIONALLY, EQUIPMENT TECHNICAL TRAINING SHOULD ALSO BE CONDUCTED TO ENSURE THAT WORKERS HAVE A THOROUGH UNDERSTANDING OF THE OPERATIONS, MAINTENANCE AND SAFETY HAZARDS ASSOCIATED WITH EACH PIECE OF EQUIPMENT THEY WORK WITH.

DAMAGE AVOIDANCE

-THE ELECTRICAL CONTRACTOR SHALL CONSIDER THE WEATHERING OF EQUIPMENT OVER TIME AND ELIMINATE THE POSSIBILITY OF DEGRADATION DUE TO CORROSION, WATER ENTRY AND UV EXPOSURE. AS A RESULT, THE USE OF UNISTRUT OR SIMILAR MOUNTING SYSTEMS IS REQUIRED TO MOUNT ENCLOSURES, PULL BOXES, LOAD CENTERS, FUSE BOXES, OR OTHER EQUIPMENT.

-WIRING SHALL RUN IN CONDUIT ENSURING LIFESPAN OF THE SYSTEM.

-ALL NEMA 4 BOXES SHALL BE EQUIPPED WITH LISTED DRAIN PLUGS INSTALLED TO ALLOW WATER TO DRAIN. ANY MODIFICATION TO AS-MANUFACTURED EQUIPMENT SHOULD BE DONE IN SUCH A WAY AS TO MAINTAIN ALL LISTED RATINGS.

-ALL ELECTRICAL CONDUIT, EQUIPMENT AND COMPONENTS MUST BE ADEQUATELY PROTECTED FROM DAMAGE AND VANDALISM BY THE USE OF BOLLARDS, SHIELDS, GUARDS OR OTHER ACCEPTABLE MEANS.

-ALL CIRCUIT BREAKERS INSTALLED THAT ARE SUBJECT TO REVERSE POWER FLOW SHALL BE LISTED AS BACKFEED COMPATIBLE.

-PADLOCK PROVISIONS ON ENCLOSURE DOOR SHALL BE CONSIDERED.

-SKID INVERTER STATION SHALL BE FENCED AVOIDING VANDALISM AND OTHER POSSIBLE DAMAGE OR ADVERSE CONDITIONS.

ABBREVIATIONS/ACRONYMS

A, AMP: AMPERE
AC: ALTERNATING CURRENT
AL: ALUMINUM
APPX: APPENDIX
AR: ARRAY
AWG: AMERICAN WIRE GAUGE
CONST: CONSTRUCTION
CU: COPPER
D: DEPTH
DAS: DATA ACQUISITION SYSTEM
DC: DIRECT CURRENT
DEG: DEGREE
DIA: DIAMETER
DSN: DESIGN
EGC: EQUIPMENT GROUNDING CONDUCTOR
ELEC: ELECTRICAL, ELECTRIC
ENCL: ENCLOSURE
EPR: ETHYLENE PROPYLENE
EQUIV: EQUIVALENT
F/A: FAST-ACTING
FL: FLOOR
FT: FOOT
GEC: GROUNDING ELECTRODE CONDUCTOR
GND: GROUND
H: HEIGHT
IN: INCH
KCMIL: KILO CIRCULAR MILS
kV: KILOVOLT
kVA: KILOVOLT - AMPERE
kW: KILOWATTS
kWh: KILOWATTS HOUR
L1: LINE 1
L2: LINE 2
L3: LINE 3
LV: LOW VOLTAG
MAX: MAXIMUM
MDP: MAIN DISTRIBUTION PANEL
MFR: MANUFACTURER
MIN: MINIMUM
MISC: MISCELLANEOUS
MSB: MAIN SWITCHBOARD
MV: MID VOLTAGE
N: NEUTRAL
N: NEW
NO, #: NUMBER
NRTL: NATIONALY RECOGNIZED TESTING LABORATORY
NTS: NOT TO SCALE
NYC: NEW YORK CITY
OEM: ORIGINAL EQUIPMENT MANUFACTURER
PE: PROFESSIONAL ENGINEER
PF: POWER FACTOR
PH: PHASE
PRI: PRIMARY
PV: PHOTOVOLTAIC
PVC: POLYVINYL CHLORIDE
PVI: PHOTOVOLTAIC INVERTER
SCH: SCHEDULE
SEC: SECONDARY
SLA: SHADE LIMITING ANGLE
SLD: SINGLE LINE DIAGRAM
SOW: SCOPE OF WORS
SS: STAINLESS STEEL
STC: STANDARD TEST CONDITIONS
STD: STANDARD
STR: STRING
SWBD: SWITCHBOARD
SWGR: SWITCHGEAR
TYP: TYPICAL
UL: UNDERWRITERS LABORATORY
W, WD: WIDTH
Wp: WATTS PEAK

LEGEND

- CARDINAL ARROW
- INDICATED SITE BOUNDARY
- MAIN ACCESS PATH
- SECONDARY ACCESS PATH
- SOLAR MODULES
- INVERTER & TRANSFORMER STATION SKID
- POLE
- DISTRIBUTION CIRCUIT LINE
- MV TRENCH
- LV TRENCH
- DEER FENCE
- SILT FENCE
- INVx . x . xx — COMBINER BOX
- TEMPORAL CONSTRUCTION PATH
- ACCESS ROADS
- COMPOUND AREA
- WETLAND
- DOWNLOAD / STORAGE / WASTE
- PARKING
- CANTEEN
- DRESSING ROOM
- WASH ROOM
- OFFICE
- PATH POSTER
- ACCESS
- 1/0 AWG COPPER BARE WIRE
- 10 AWG ISOLATED COPPER CABLE
- 2 AWG ISOLATED COPPER CABLE
- DUMMY NEUTRAL 1/0 AWG
- 1/0 AWG ISOLATED COPPER CABLE
- 4 AWG COPPER BARE WIRE
- 12 AWG ISOLATED COPPER CABLE
- COPPER LUG TERMINAL
- CRIMP JOINT
- GROUND CLAMPS
- EARTH ROD(s)
- SHADOW PROJECTION
- TREE REMOVAL AREA

DRS DELAWARE RIVER SOLAR

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DRAWING ISSUE

- [ ] PRELIMINARY
- [ ] CONSTRUCTION
- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [x] PERMITTING
- [ ] OTHER: ____________

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

MODULE

MANUFACTURER:	CSUN
MODEL:	CSUN - 72P
MODULE OUTPUT POWER:	345 Wp
STRING SIZE:	28
NUMBER OF STRINGS:	250 (per plant)
MODULE QUANTITY:	7,000 (per plant)
PV SYSTEM OUTPUT:	2,415 KWp DC (per plant)

INVERTER

MANUFACTURER:	INGETEAM
MODEL:	IS 1245TL U B480
QUANTITY / RATING:	2 /1,247 kVA (#1) 2/ 1,247 kVA (#2) 2/ 1,247 kVA (#3)
PV SYSTEM OUTPUT:	2,338 kW AC (#1) 2,338 kW AC(#2) 2,338 kW AC(#3)
DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name:
SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

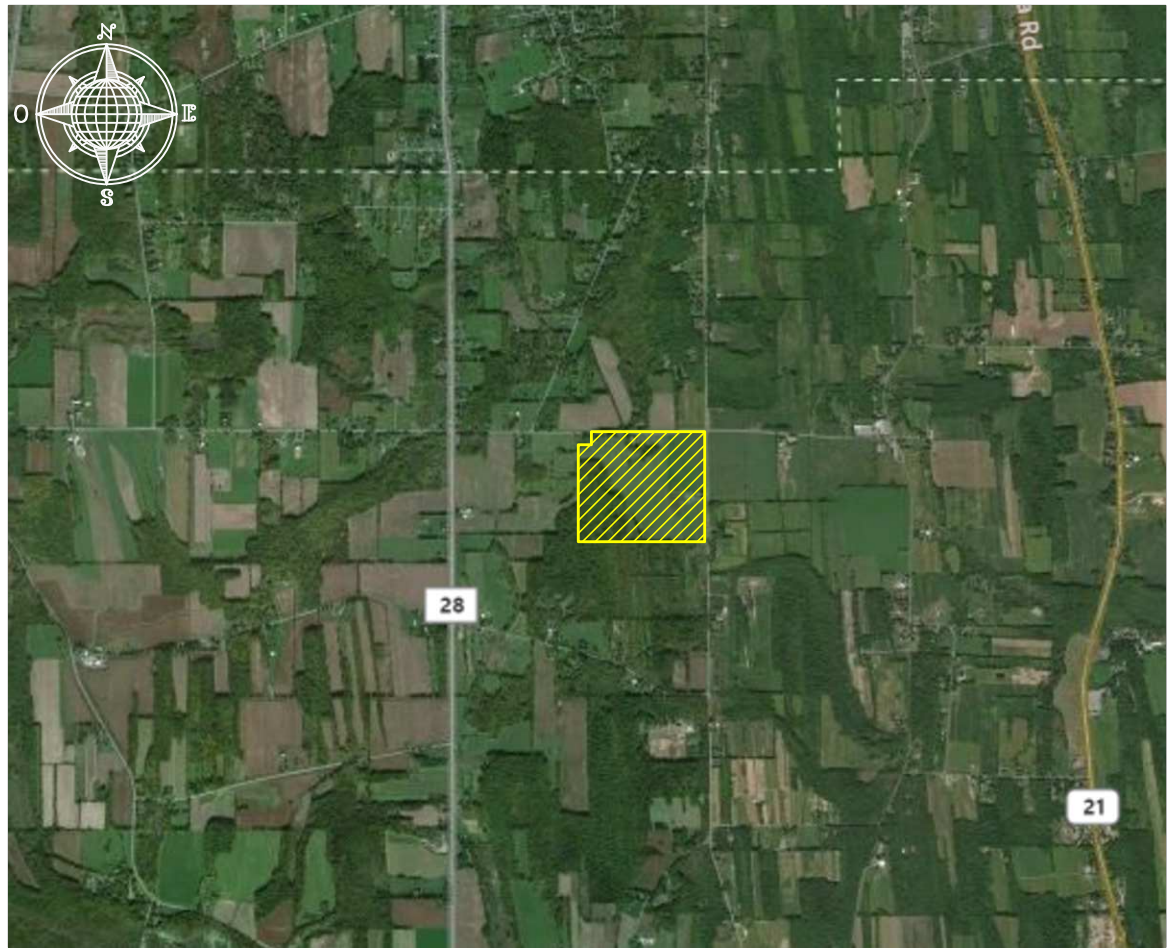
Site Adress:
Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: GENERAL NOTES

Scale: NS (ANSI B)

Project ID: #---

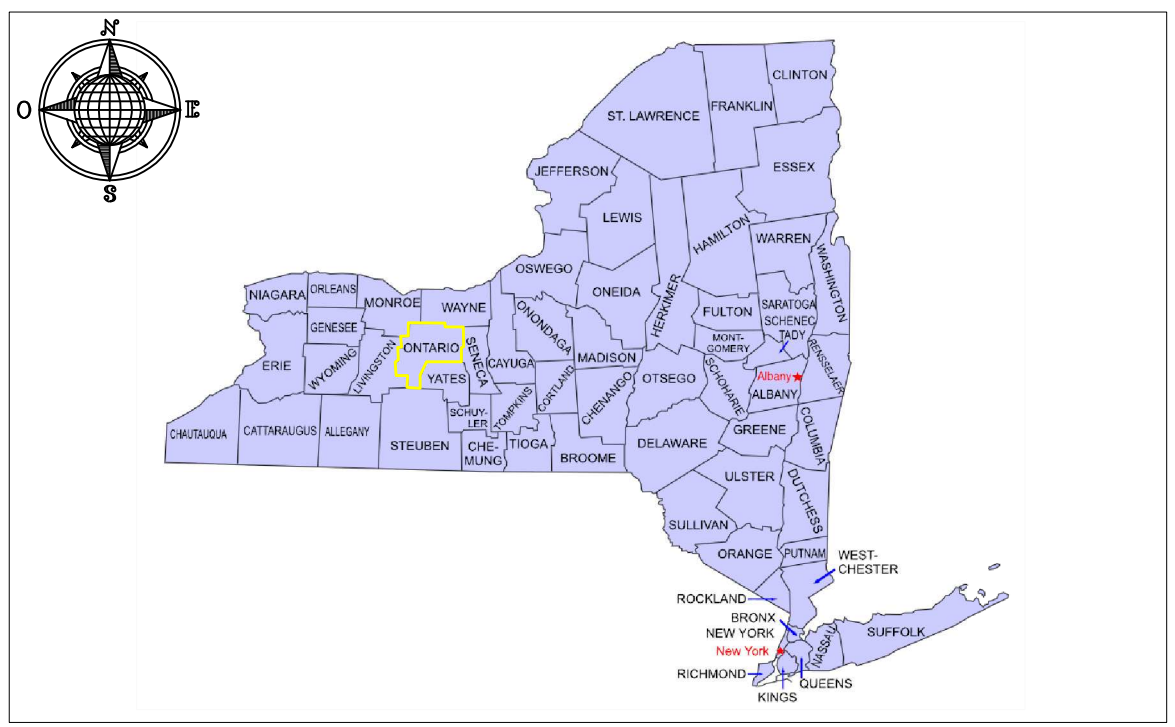
Plan No.: 01



Scale: 1" : 4000'

Scale: 1" : 1000'

Scale: NS



Scale: NS

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DRAWING ISSUE

- [ ] PRELIMINARY
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- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
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1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

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DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

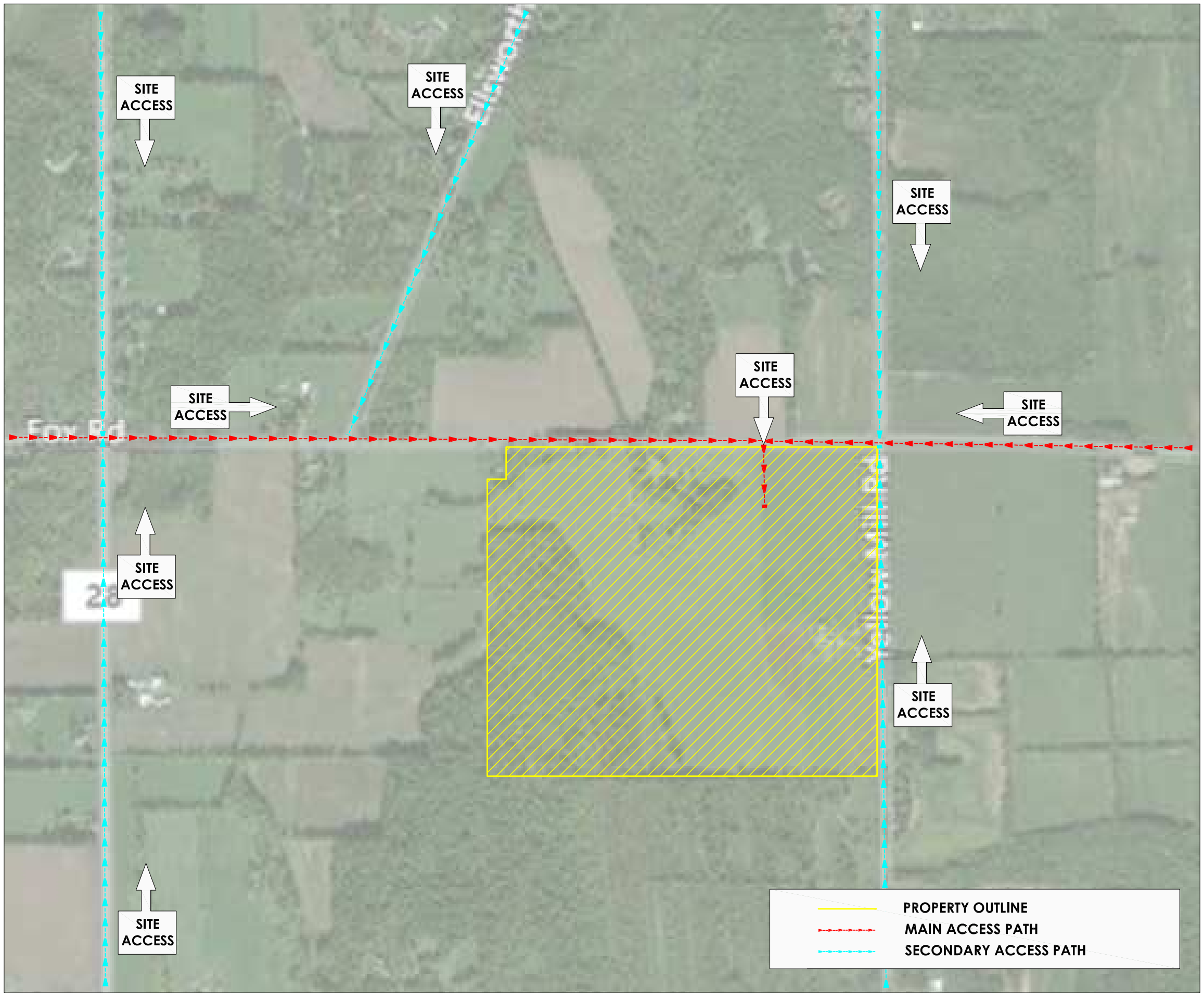
Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: PROJECT LOCATION

Scale: Various (ANSI B)

Project ID: #—

Plan No.: 02



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DRAWING ISSUE

- [ ] PRELIMINARY
- [ ] CONSTRUCTION
- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

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DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

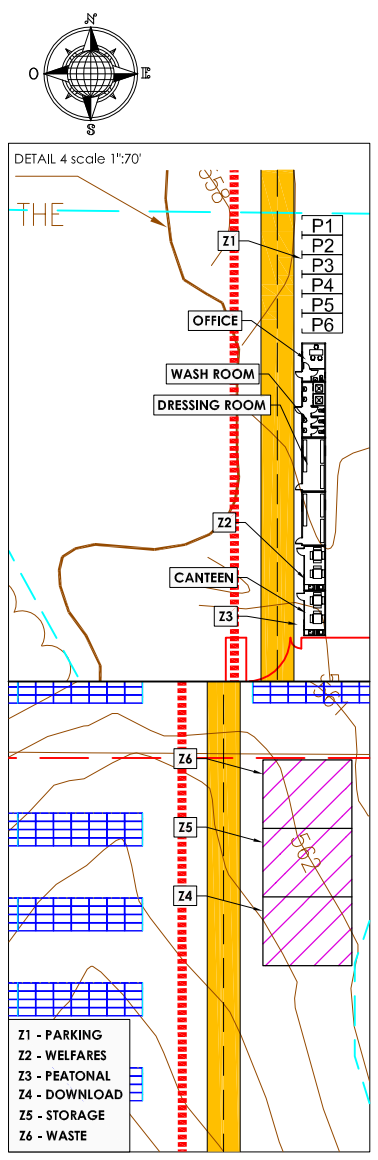
Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

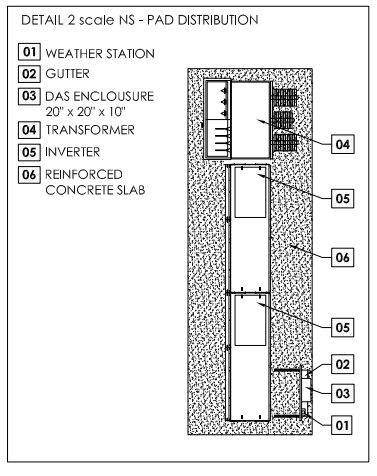
Sheet Name:
TRANSPORT STATEMENT

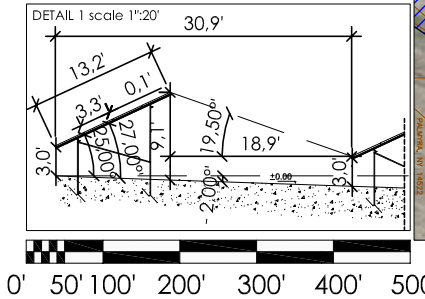
Scale: 1": 700' (ANSI B)

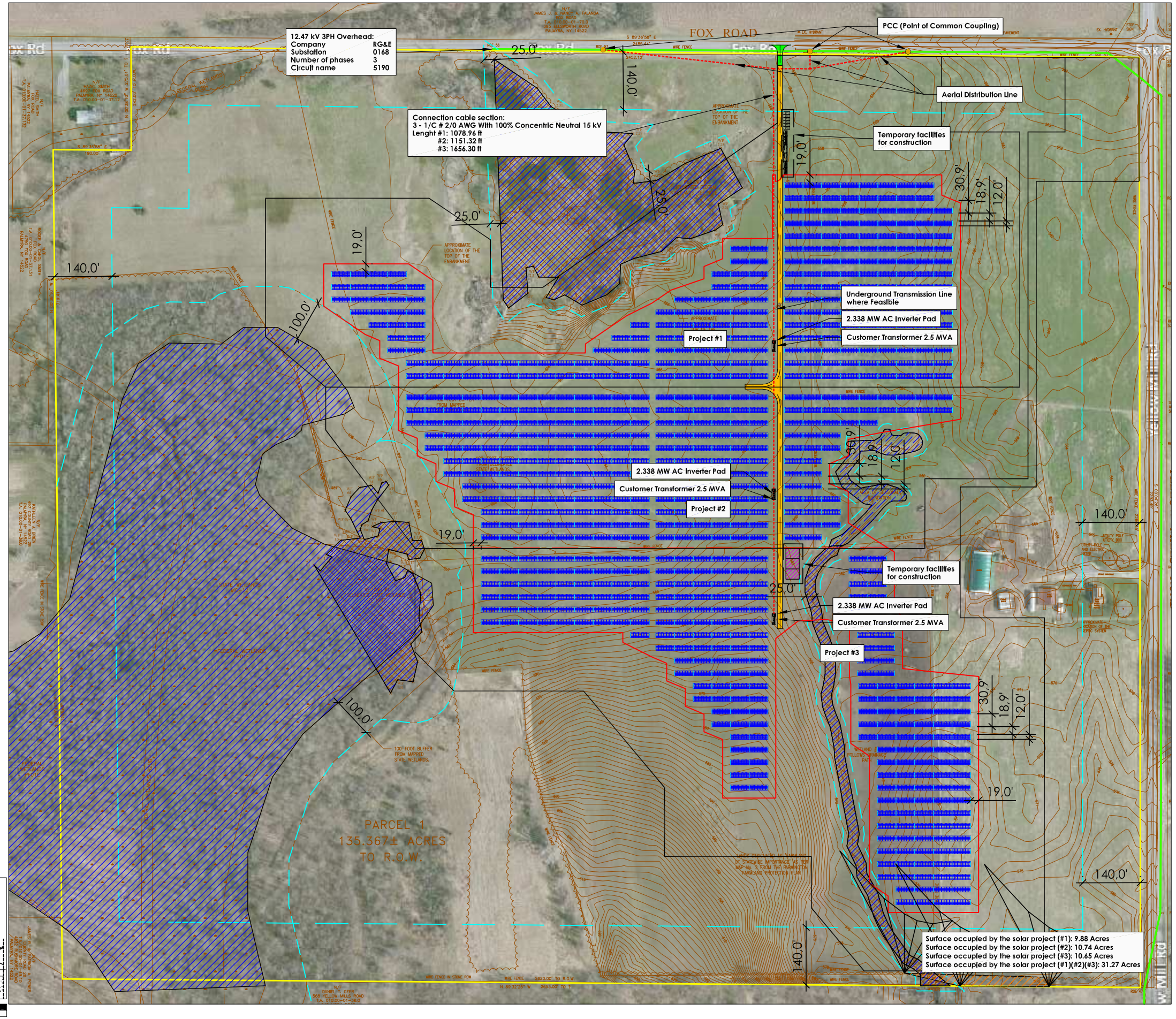
Project ID: #—

Plan No.: 03









0' 50' 100' 200' 300' 400' 500'

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DRAWING ISSUE

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- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

LEGEND

- SOLAR MODULES
- DISTRIBUTION POWER LINE
- MV TRENCH
- LV TRENCH
- PROPERTY OUTLINE
- PROJECT OUTLINE
- DEER FENCE
- LOT AREA
- POLE
- INVERTER & TRANSFORMER STATION SKID
- TEMPORAL CONSTRUCTION PATH
- ACCESS ROADS
- COMPOUND AREA
- WETLAND
- TREE CLEARING AREA: 0.16Acres
- FARMLAND OF STATEWIDE IMPORTANCE

SYSTEM SUMMARY

MODULE

MANUFACTURER:	CSUN
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DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

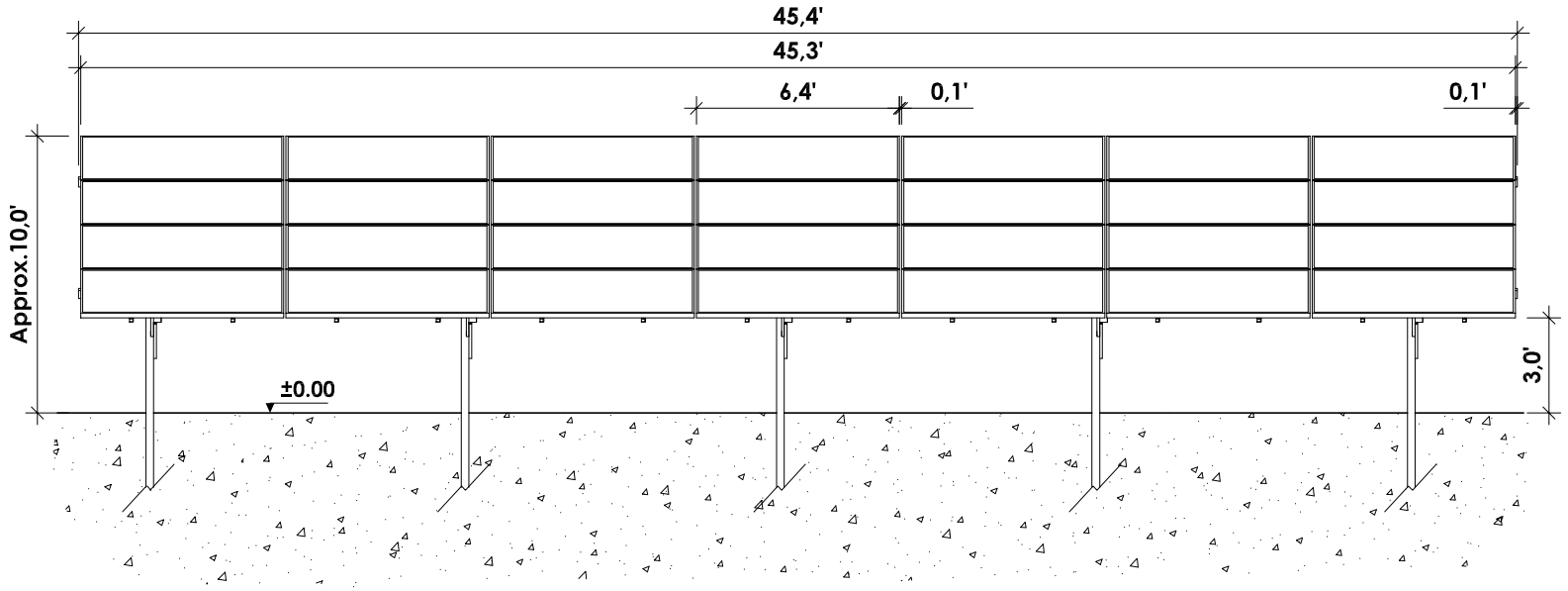
Sheet Name: OVERALL LAYOUT

Scale: 1":250' (ANSI B)

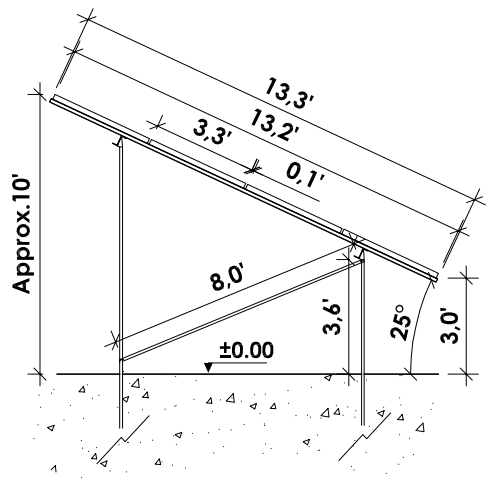
Project ID: #—

Plan No.: 04

28 MODULES STRUCTURE



FRONT



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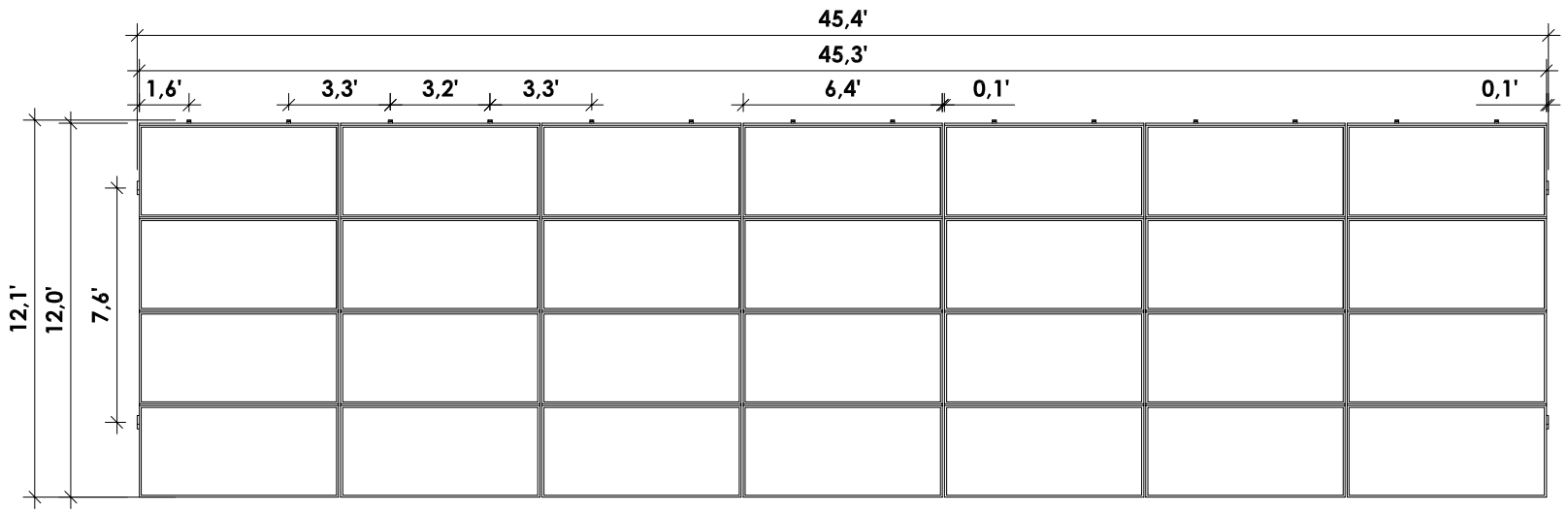
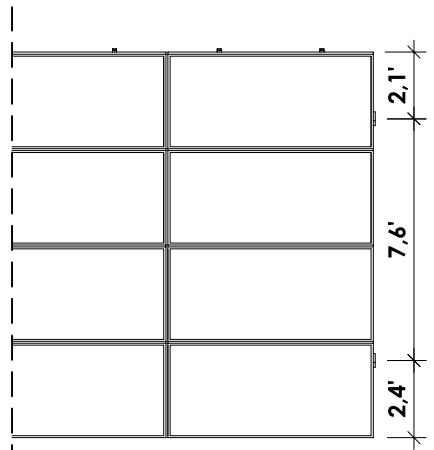


PLANT



PV PANEL CLAMPS POSITION

NOTES:

-TYPICAL INSTALLATION DIMENSIONS; MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
-FINAL DESIGN AND ENGINEERING PLANS IN DETAIL WILL BE PERFORMED BY RACKING MANUFACTURER

FEATURES:
- 4 MODULE HEIGH - 25° - LANDSCAPE
- ETL CLASSIFIED TO UL2703
- CUSTOM ENGINEERED TO EXCEED APPLICABLE ASCE 7-10, IBC, AND UL STANDARDS
- ELECTRICALLY BONDED SYSTEM
- 30 AMP MAXIMUM FUSE RATING

DRS DELAWARE RIVER SOLAR

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DRAWING ISSUE

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- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

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INVERTER

MANUFACTURER:	INGETEAM
MODEL:	IS 1245TL U B480
QUANTITY / RATING:	2 /1,247 kVA (#1) 2/ 1,247 kVA (#2) 2/ 1,247 kVA (#3)
PV SYSTEM OUTPUT:	2,338 kW AC (#1) 2,338 kW AC(#2) 2,338 kW AC(#3)
DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

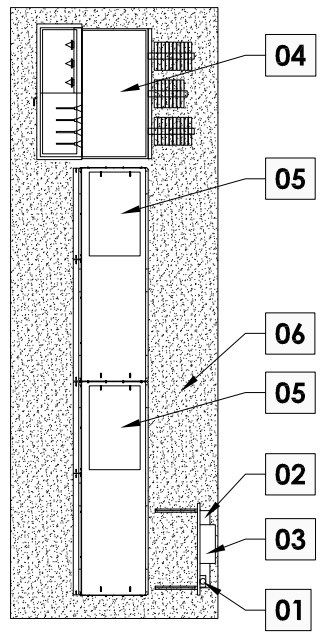
Sheet Name:
RACKING SYSTEM

Scale: 1":6' (ANSI B)

Project ID: #—

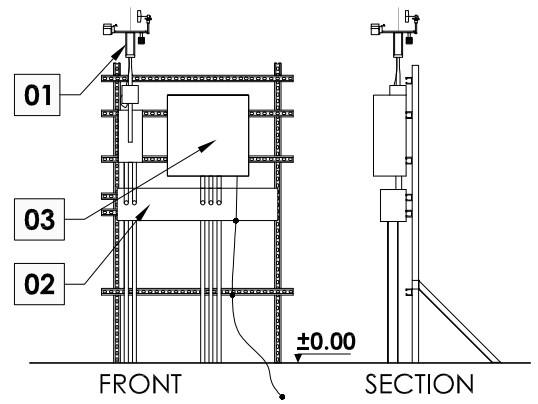
Plan No.: 06

DETAIL 1 scale NS - PAD DISTRIBUTION

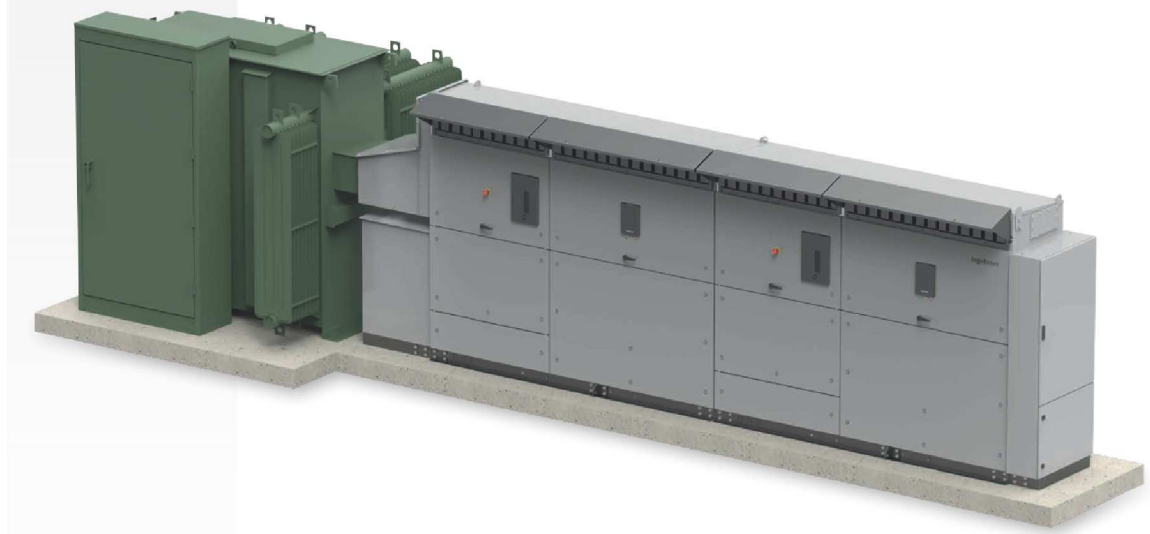


01 WEATHER STATION
02 GUTTER
03 DAS ENCLOSURE 20" x 20" x 10"
04 TRANSFORMER
05 INVERTER
06 REINFORCED CONCRETE SLAB

DETAIL 2 scale 1":4' AUXILIARY EQUIPMENT RACK

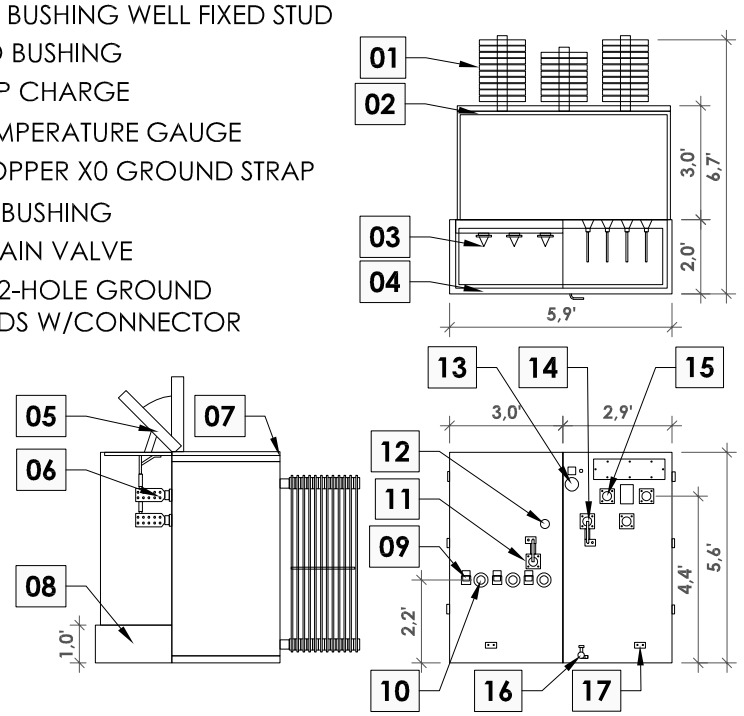


01 WEATHER STATION
02 GUTTER
03 DAS ENCLOSURE 20" x 20" x 10"

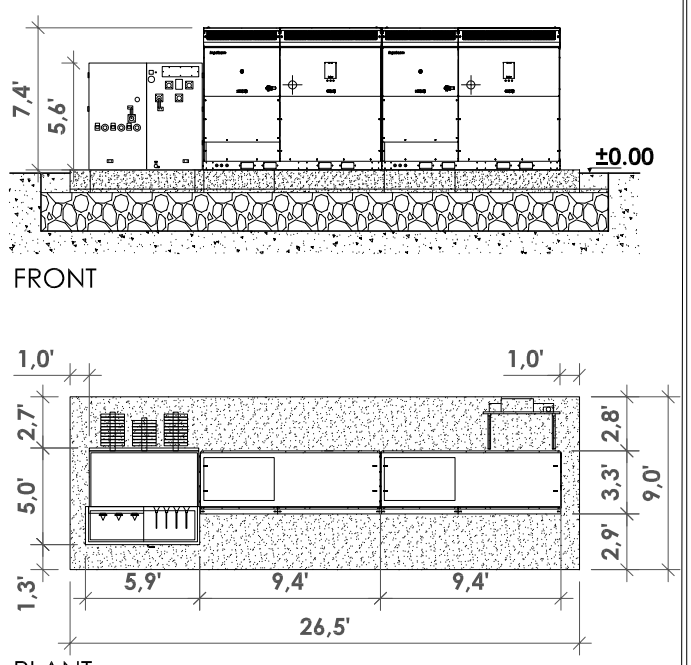


DETAIL 3 scale 1":4' - TRANSFORMER

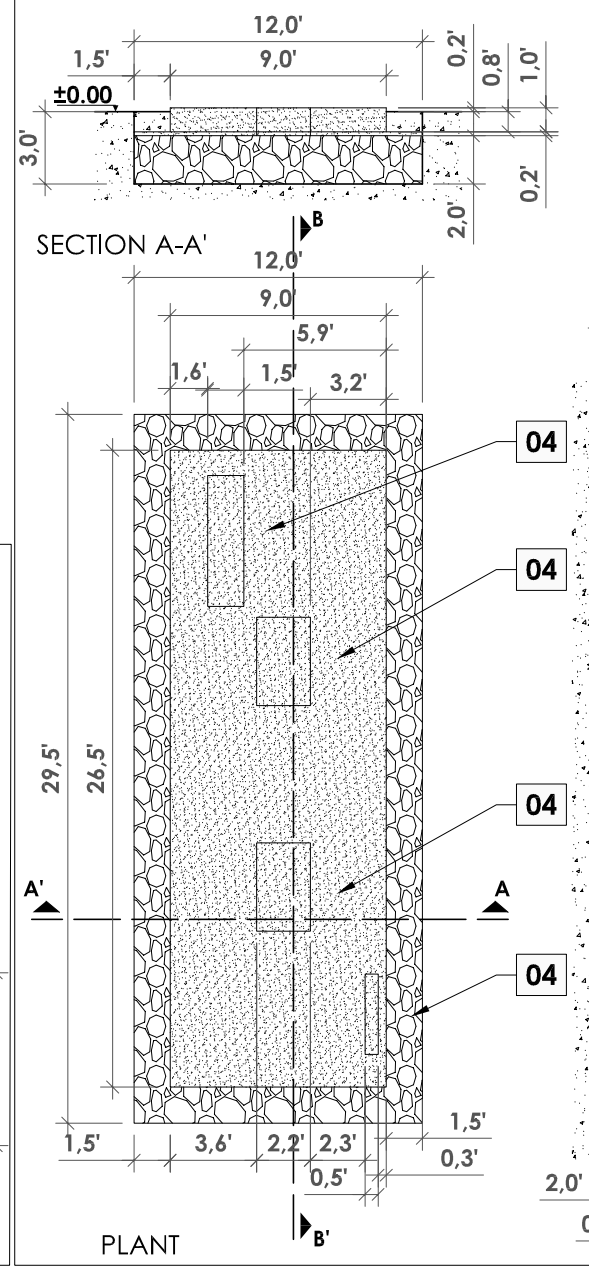
01 RADIATORS
02 BOLTER COVER
03 LOADBREAK INSERT
04 CABINET SIDE DOORS W/SECURITY LATCH
05 HINGED TOP CABINET W/REMOVABLE COVER
06 HOLE INTEGRAL SPADE W/SUPPORTS
07 REMOVABLE TAMPER GUARD FOR COVER
08 LOADBREAK INSERT
09 PARKING STAD W/STANDOFF
10 HV BUSHING WELL FIXED STUD
11 HO BUSHING
12 TAP CHARGE
13 TEMPERATURE GAUGE
14 COPPER X0 GROUND STRAP
15 LV BUSHING
16 DRAIN VALVE
17 SS 2-HOLE GROUND PADS W/CONNECTOR



DETAIL 4 scale 1":10'



DETAIL 5 scale 1":8' TRANSFORMER, INVERTER & AUXILIARY EQUIPMENT PAD



01 REINFORCED CONCRETE SLAB
02 BLINDING CONCRETE
03 COMPACTED GRADDED AGGREGATES
04 ESTIMATED LOCATION FOR CONDUITS OUTPUT

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- [ ] CUSTOMER APPROVAL
- [ ] AS-BUILT
- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	--	Initial Layout	07/09/18
1	CB	--	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

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DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: TRANSFORMER, INVERTER & AUX. EQUIPMENT PAD

Scale: Various (ANSI B)

Project ID: #—

Plan No.: 08

AROUND THE PERIMETER FENCE PLACED SIGNS INDICATING WARNING SING CONCERNING VOLTAGE.

THE FENCING MUST ALLOW BADGERS, REPTILES AND OTHER FAUNA ACCESS INTO THE SITE (WHILST RETAINING GRAZING SHEEP) IF REQUIRED TO DO SO IN THE ECOLOGICAL REPORT.

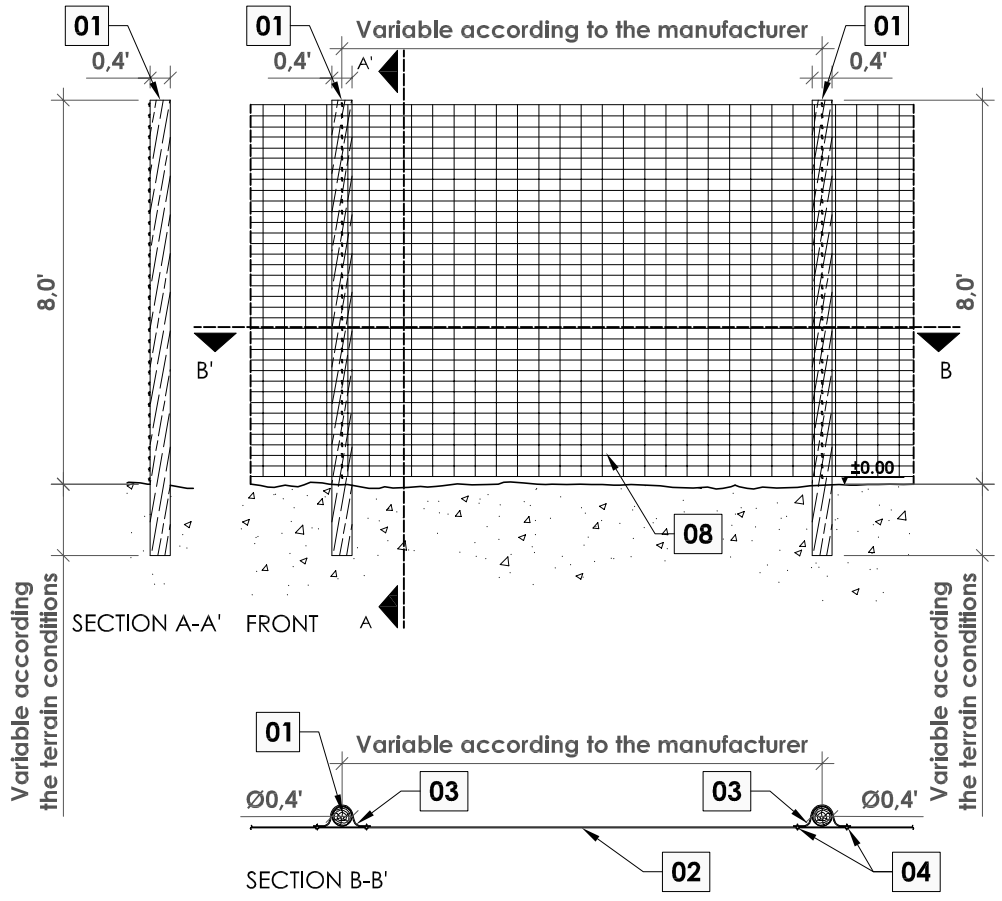
IT IS ADVISED A GAP TO ALLOW SMALL MAMMALS AND REPTILES ACCESS IS LEFT AROUND THE ENTIRE BASE OF THE FENCE, WITH LARGER GAPS OR GATES FOR BADGERS AT SUITABLE INTERVALS

FENCE CONTINUITY MUST BE ENSURED.

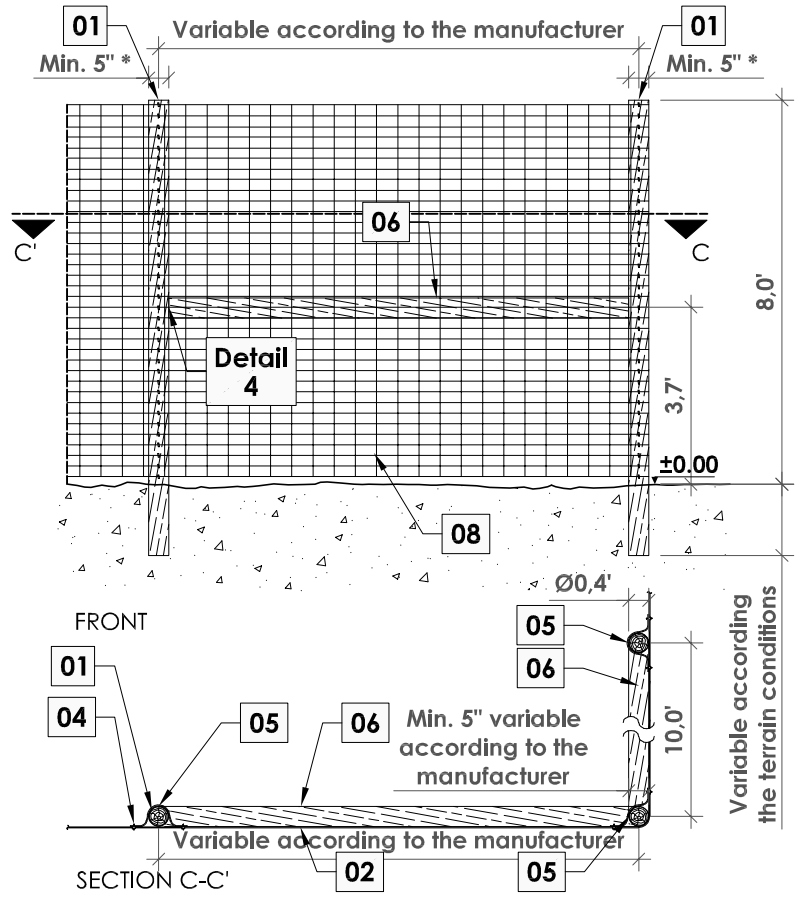
01 TERMINAL POST 5" Ø x 8 ft SYP PRESSRE TREATED *
02 WIRE ROPE Ø1/2"
03 ROUND CORNERS
04 WIRE ROPE CLAMPS
05 MORTISE & SPIKE AT JUNTURES OF POST & BRACES
06 5" BRACES POST TYP. *
07 HORIZONTAL BRACE ASSEMBLY
08 5" x 3" GA. GALV. FIXED-KNOTWAVEN WIRE STAPLED AT EACH POST WITH 2 in. GALV. STAPLES
09 36" MIN. FENCE POSTS, DRIVEN MIN 16" INTO GROUND
10 SELF LOCKING GATE GAUGE W/MAX. 6" MESH SPACING
11 STABILINKA T140N, FILTER X OR MIRAFI 100X PREFABRICATED SILT FENCE WITH POSTS OR APPROVED EQUIVALENT
12 36" Min. FENCE POST
13 EXCAVATED TRENCH
14 VEHICLES ACCESS
15 PEOPLE ACCESS

* See note

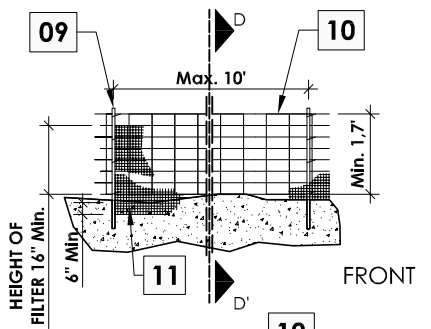
DETAIL 1 scale 1":4' - LINE POST



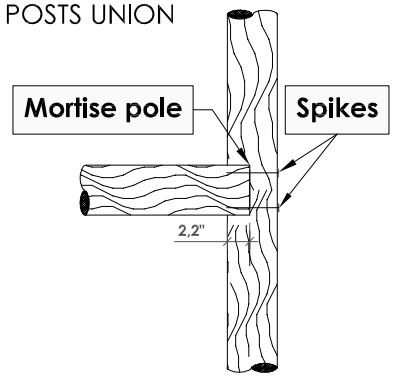
DETAIL 2 scale 1":4' - CORNER POST



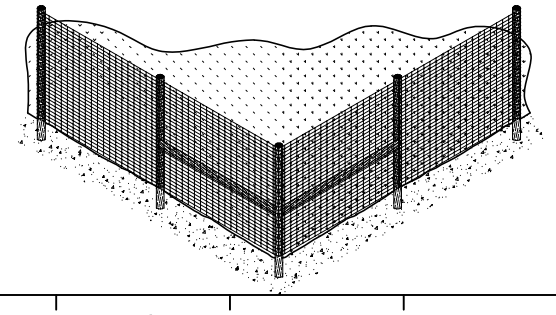
Detail 5 scale NS - SILT FENCE



DETAIL 4 scale NS
POSTS UNION

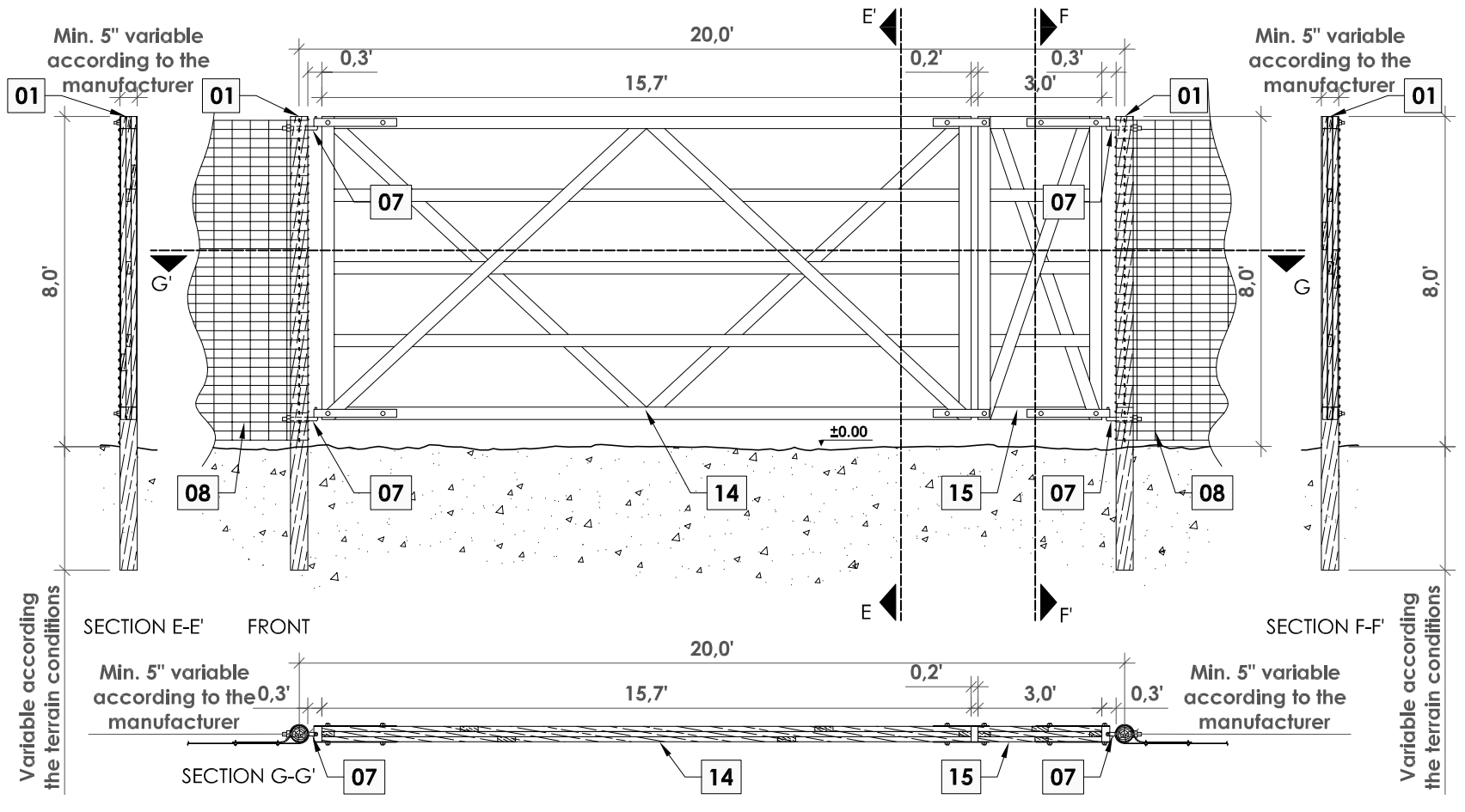


DETAIL 6 scale NS - DEER FENCE



NOTE:
The dimensions and specifications may vary depending on the manufacturer and possible consensual variations in the execution of the works.

DETAIL 3 scale 1":4' - ACCESS DOOR



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DRAWING ISSUE

- [ ] PRELIMINARY
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- [ ] CUSTOMER APPROVAL
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- [V] PERMITTING
- [ ] OTHER: _____

REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	–	Initial Layout	07/09/18
1	CB	–	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

MODULE

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MODEL:	CSUN - 72P
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STRING SIZE:	28
NUMBER OF STRINGS:	250 (per plant)
MODULE QUANTITY:	7,000 (per plant)
PV SYSTEM OUTPUT:	2,415 KWp DC (per plant)

INVERTER

MANUFACTURER:	INGETEAM
MODEL:	IS 1245TL U B480
QUANTITY / RATING:	2 /1,247 kVA (#1) 2/ 1,247 kVA (#2) 2/ 1,247 kVA (#3)
PV SYSTEM OUTPUT:	2,338 kW AC (#1) 2,338 kW AC(#2) 2,338 kW AC(#3)
DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name:
PERIMETER FENCING & SILT FENCE

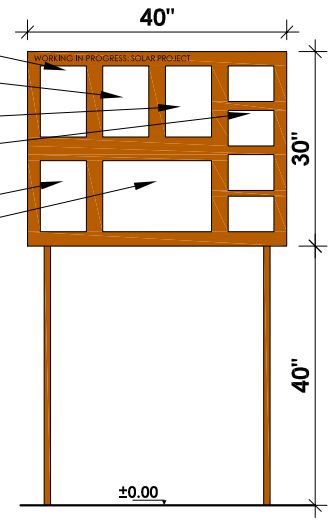
Scale: Various (ANSI B)

Project ID: #---

Plan No.: 12

ENTRANCE SIGN

- Building Permit
- Owner & General Contractor Information
- Posted Private Property
- Danger Signs
- Emergency Phone Number
- Emergency Plan



RACKING

ROW XX

6" x 3"

RACKING PLACARDS (QTY --)
TWO PLACARDS PER ROW, ONE AT THE BEGINNING AND ONE AT THE END.
REPLACE XX WITH APPROPIATE VALUES, SEE 4.1 FOR NUMBERING REFERENCE.

FENCE GATE

THIS PROTECTIVE EQUIPMENT
HARD HATS · SAFETY SHOES · HI-VIS VEST · SAFETY GLOVES
MUST BE WORN ON THIS SITE

18" x 12"

DANGER
AUTHORIZED PERSONNEL —ONLY—

10" x 14"

PERIMETER FENCING

DANGER
SOLAR ELECTRIC HIGH VOLTAGE

* One label every 100 ft and gate

14" x 10"

DANGER
NO SMOKING
NO MATCHES
NO OPEN FLAMES

10" x 14"

Assembly point

FIRE EXTINGUISHER

14" x 10"

RISK CATEGORY A

WARNING
ARC FLASH HAZARD
A) 54 inches - Arc Flash Protection Boundary
B) 10.5 cal/cm² - Incident Energy Flash Risk at 18 inches
C)
SHOCK RISKS
D)
E) 1 kV - Shock Risk Covers/Doors Open
F) 1 - Glove Class 1 Voltage Gloves
G) 42 inches - Limited Approach Boundary
H) 12 inches - Restricted Approach Boundary
I)
J)
CATEGORY 3
APPROPRIATE PPE REQUIRED FOR BOTH ARC FLASH AND SHOCK RISKS
Arc-rated long sleeve shirt and pants or coverall. Arc-rated coverall. Arc-rated arc flash suit jacket, pants and hood. Arc-rated gloves. Arc-rated jacket, parka, rain-wear, or hard hat liner. Face shield and safety glasses or safety goggles. Hearing protection - ear canal inserts. Leather work shoes
LOCATION: (K)
Created 4/20/16

7" x 5"

ARC FLASH QUANTITY AND DATA: TBD

GENERAL

DANGER
ARC FLASH AND SHOCK HAZARD
FOLLOW ALL REQUIREMENTS IN NFPA 70E FOR SAFE WORK PRACTICES AND FOR PERSONAL PROTECTIVE EQUIPMENT

4" X 4"

RISK CATEGORY B

DANGER
Arc Flash & Shock Hazard Present
Appropriate PPE Required
ARC FLASH HAZARD PROTECTION
Nominal System Voltage:
Incident Energy:
at Working Distance of:
ARC Flash Hazard:
ARC Shock Hazard:
PPE LIST:
SHOCK PROTECTION BOUNDARIES
Limited Approach Boundary:
Restricted Approach Boundary:
EQUIPMENT NAME: XXXXXXXXX
Date of Arc Flash Risk Assessment: XX/XX/XXXX

6" x 4"

TRANSFORMER, AUXILIARY EQUIPMENT AND INTERCONNECTION EQUIPMENT

CUSTOMER - OWNED TRANSFORMER #2
2000 kVA
480 V Y / 4800 V D
CONNECTED TO INVERTER 1 - 2

10" x 4"

UTILITY AUXILIARY POLE TRANSFORMER

6" x 3"

WARNING
THIS EQUIPMENT IS FED BY BOTH UTILITY AND A SOLAR PHOTOVOLTAIC SOURCES. ACCESS RESTRICTED TO ONLY QUALIFIED PERSONNEL.

6" x 3"

UTILITY RECLOSER

6" x 1½"

FUSE CUT-OUTS

6" x 1½"

UTILITY MAIN METER

6" x 1½"

CUSTOMER AUXILIARY TRANSFORMER

6" x 3"

WEATHER STATION ENCLOSURE

6" x 3"

MAIN DAS ENCLOSURE

6" x 1½"

UTILITY DEMARCATION BOX

6" x 1½"

UTILITY POLE METERING SECTION

6" x 3"

CUSTOMER MAIN METER

6" x 1½"

DANGER
HIGH VOLTAGE
AUTHORIZED PERSONNEL ONLY

6" x 4"

DANGER
DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

10" x 4"

PV SYSTEM DISCONNECT FOR UTILITY OPERATION

6" X 1¼"

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 230 A
NOMINAL OPERATING AC VOLTAGE 4800 V

4" X 2"

COMBINER BOX TOTAL QUANTITY: 12

COMBINER BOX - 02 - 06 (1)

PHOTOVOLTAIC SYSTEM
DC DISCONNECT
RATED MPP CURRENT 90.9 AMPS
RATED MPP VOLTAGE 1062.04 VOLTS
MPP=MAX POWER POINT
MAX SYSTEM VOLTAGE 1498.2 VDC
MAX CIRCUIT CURRENT 120.5 AMPS

4" X 3"

OTHER COMBINER BOX (11)

PHOTOVOLTAIC SYSTEM
DC DISCONNECT
RATED MPP CURRENT 199.98 AMPS
RATED MPP VOLTAGE 1062.04 VOLTS
MPP=MAX POWER POINT
MAX SYSTEM VOLTAGE 1498.2 VDC
MAX CIRCUIT CURRENT 265.1 AMPS

4" X 3"

WARNING
ELECTRIC SHOCK HAZARD
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

4" X 3"

COMBINER BOX - 01 - 01
COMBINER BOX - 01 - 02
COMBINER BOX - 01 - 03
COMBINER BOX - 01 - 04
COMBINER BOX - 01 - 05
COMBINER BOX - 01 - 06

WARNING
PHOTOVOLTAIC POWER SOURCE

4" X 2"

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
PHOTOVOLTAIC MODULES PRODUCE DC VOLTAGE WHENEVER THEY ARE EXPOSED TO SUNLIGHT

4" X 3"

PHOTOVOLTAIC MODULES PRODUCE DC VOLTAGE WHENEVER THEY ARE EXPOSED TO SUNLIGHT

4" X 2"

COMBINER BOX - 02 - 01
COMBINER BOX - 02 - 02
COMBINER BOX - 02 - 03
COMBINER BOX - 02 - 04
COMBINER BOX - 02 - 05
COMBINER BOX - 02 - 06

6" x 1½"

INVERTER QUANTITY: 2

INVERTER - #1- 910 kW
INPUT RATINGS
MPP CURRENT: 1199.88 ADC
MPP VOLTAGE: 1062.04 VDC
MAX SISTEM VOLTAGE: 1498.2 VDC
SHORT CIRCUIT CURRENT: 1590.6 ADC
OUTPUT RATINGS
OPERATING CURRENT: 1094.56 AAC
OPERATING VOLTAGE: 480 VAC

INVERTER - #2 - 820 kW
INPUT RATINGS
MPP CURRENT: 1090.80 ADC
MPP VOLTAGE: 1062.04 VDC
MAX SISTEM VOLTAGE: 1498.2 VDC
SHORT CIRCUIT CURRENT: 1446 ADC
OUTPUT RATINGS
OPERATING CURRENT: 986.31 AAC
OPERATING VOLTAGE: 480 VAC

4" x 3"

INVERTER DC DISCONNECT - 01

6" x 3"

INVERTER DC DISCONNECT - 02

6" x 3"

WARNING
THIS EQUIPMENT IS FED BY BOTH UTILITY AND A SOLAR PHOTOVOLTAIC SOURCES. ACCESS RESTRICTED TO ONLY QUALIFIED PERSONNEL.

6" x 3"

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

4" X 2"

WARNING
INVERTER INPUT CIRCUIT

4" X 1"

CAUTION
INVERTER OUTPUT CIRCUIT

4" X 1"

CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED

5 ¾" X 1 ⅛"

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
PHOTOVOLTAIC MODULES PRODUCE DC VOLTAGE WHENEVER THEY ARE EXPOSED TO SUNLIGHT

4" X 3"

INVERTER AC DISCONNECT- 01

6" x 3"

INVERTER AC DISCONNECT- 02

6" x 3"

WARNING
ELECTRIC SHOCK HAZARD
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

4" X 3"

NOTES:
-THIS LABELING PLAN IS A DRAFT
-PLACARDS AND METAL SIGNS ARE CONSIDERED FOR LABELING

DRS DELAWARE RIVER SOLAR
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DRAWING ISSUE

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- [ ] CUSTOMER APPROVAL
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- [V] PERMITTING
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REVISIONS

REV	BY	APP	DESCRIPTION	DATE
0	AP	–	Initial Layout	07/09/18
1	CB	–	Reviewed and Modified	08/22/18

SYSTEM SUMMARY

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MODEL:	CSUN - 72P
MODULE OUTPUT POWER:	345 Wp
STRING SIZE:	28
NUMBER OF STRINGS:	250 (per plant)
MODULE QUANTITY:	7,000 (per plant)
PV SYSTEM OUTPUT:	2,415 KWp DC (per plant)

INVERTER

MANUFACTURER:	INGETEAM
MODEL:	IS 1245TL U B480
QUANTITY / RATING:	2 /1,247 kVA (#1) 2/ 1,247 kVA (#2) 2/ 1,247 kVA (#3)
PV SYSTEM OUTPUT:	2,338 kW AC (#1) 2,338 kW AC(#2) 2,338 kW AC(#3)
DC SYSTEM VOLTAGE:	1,500 V

RACKING

MANUFACTURER:	TBD
CONFIGURATION :	4 Module Heigh - Landscape
TILT:	25°
AZIMUTH:	180°

BOS

CB QTY / FUSES (QTY / I):	TBD
TRANSFORMER QTY / RATING:	1 / 2,500 kVA (per plant)
INTERCON. VOLTAGE:	12.47 kV

Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

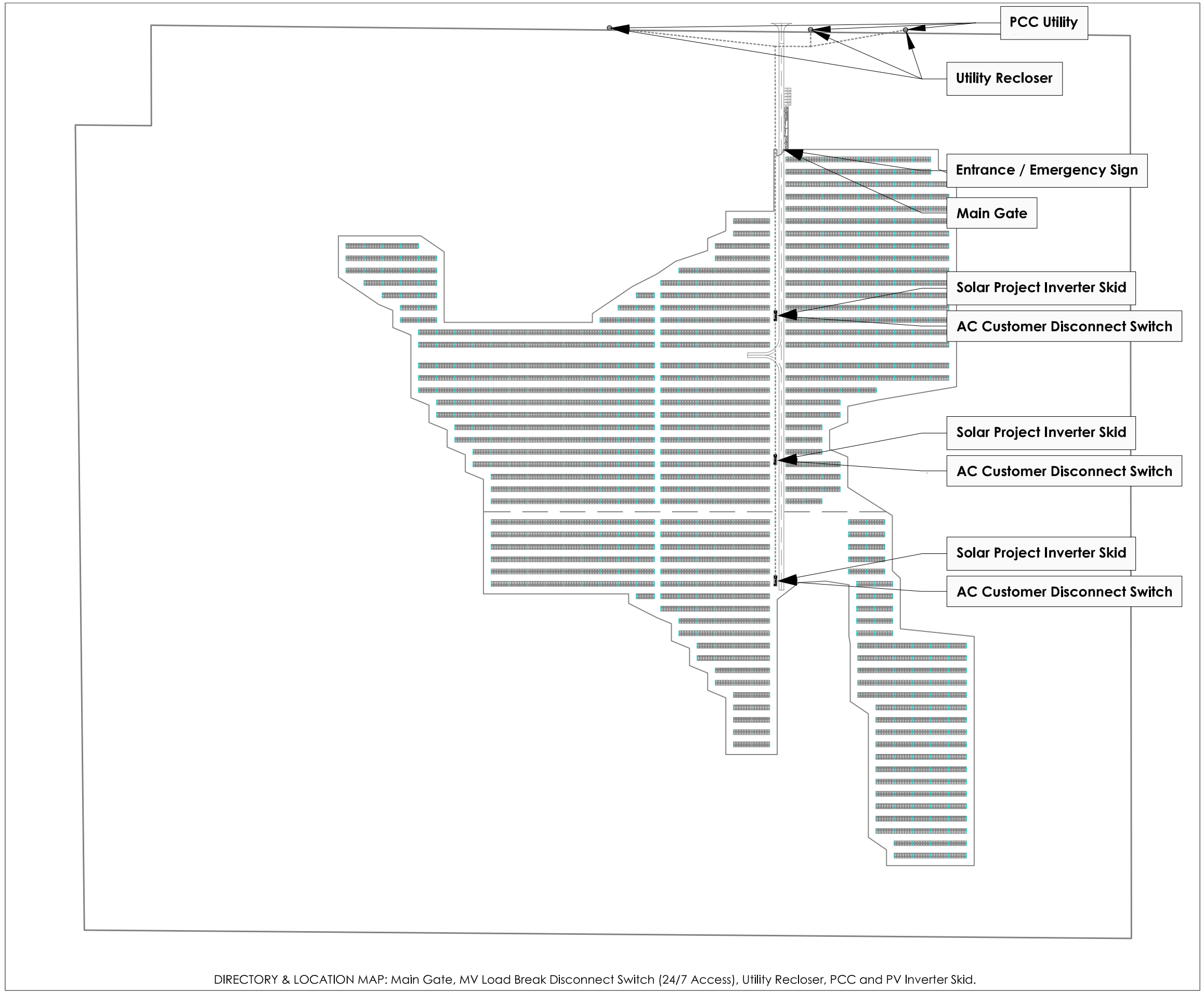
Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: LABELS

Scale: NS (ANSI B)

Project ID: #—

Plan No.: 17.1



DIRECTORY & LOCATION MAP: Main Gate, MV Load Break Disconnect Switch (24/7 Access), Utility Recloser, PCC and PV Inverter Skid.

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Project Name: SOLAR PROJECT 7.014 MW AC
#1 #2 #3 (2.338 MW per plant)
466 Yellow Mills Rd FARM

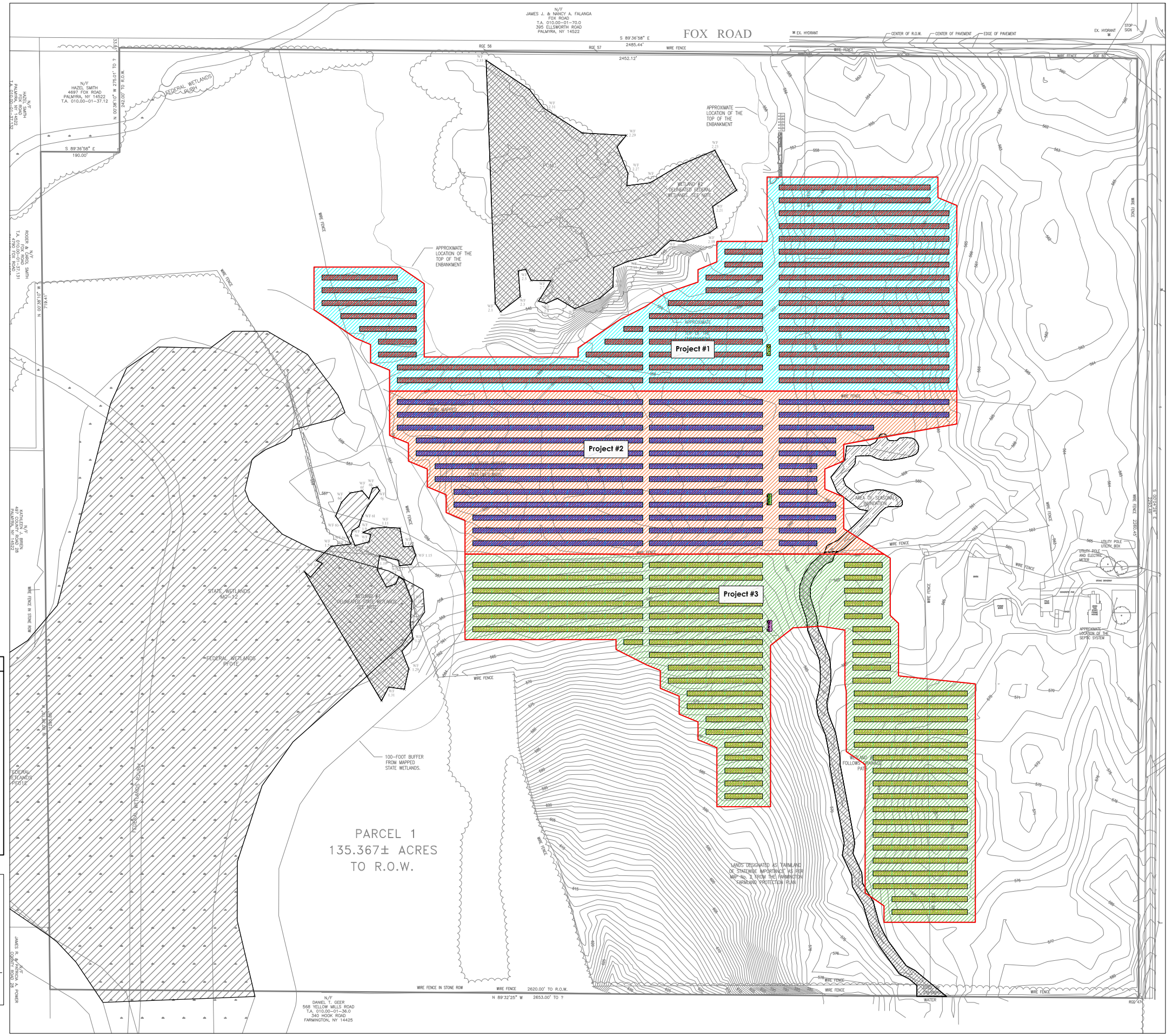
Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: LABELS

Scale: NS (ANSI B)

Project ID: #—

Plan No.: 17.2

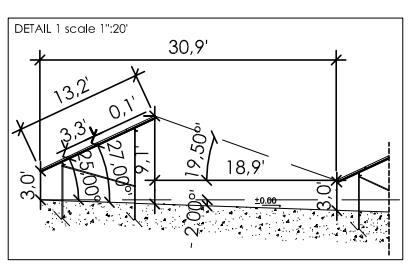


LEGEND

- AREA FOR SOLAR FARM #1: 9.88 Acres
- SURFACE MODULES AREA #1: 3.15 Acres
- INVERTER STATION AREA #1: 0.005 Acres
- AREA FOR SOLAR FARM #2: 10.74 Acres
- SURFACE MODULES AREA #2: 3.15 Acres
- INVERTER STATION AREA #2: 0.005 Acres
- AREA FOR SOLAR FARM #3: 10.65 Acres
- SURFACE MODULES AREA #3: 3.15 Acres
- INVERTER STATION AREA #3: 0.005 Acres

TOTAL AREA OF THE PLOT: 135.85 Acres

DETAIL 1 scale 1":20'



0' 50' 100' 200' 300' 400'

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Site Adress: Yellow Mills Rd
Farmington, NY 14522
43.017843, -77.259895

Sheet Name: FOOT PRINT LAYOUT

Scale: 1": 250' (ANSI B)

Project ID: #—

Plan No.: 21