

ONEENERGY RENEWABLES™

Making Clean Energy Work

OneEnergy Sunnee Bee Solar, LLC

Project Overview

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WHY IS THIS PROJECT BEING PROPOSED?

Maryland is a Renewable Energy Leader

Maryland has been a leader in the installation of solar on a number of fronts including growing numbers of residential, net metered and utility scale solar PV projects. In 2014, Maryland ranked #12 nationally in total solar power capacity, which represents the total wattage of solar panels, installed in the state.¹

Maryland has established one of the most aggressive renewable portfolio standard goals in the country, aiming for 20 percent of its power to be renewable by 2022, of which, 2 percent will be comprised of solar power.² In order to meet these goals Maryland needs not only small, residential rooftop installations, but also utility-scale facilities like the OneEnergy Renewables Sunnee Bee Solar, LLC project in Dorchester County.

Project Description

Located south of the intersection of MD Route 392 and Linkwood Rd. in East New Market, Maryland, the Sunnee Bee Solar farm would occupy approximately 180 acres of three larger properties totaling approximately 415-acres. The Project is being developed on portions of the properties that are currently utilized for agriculture. The site primarily consists of agricultural fields and does not contain forest cover or specimen and champion trees as defined by Maryland Natural Resources Article Section 5-1601. Accordingly, the Project will require minimal tree clearing and no areas that are considered priority for retention in accordance with Maryland Natural Resources Article Section 5-1607(c) will be affected. In addition to being setback from Linkwood Rd., OneEnergy will work with the County and adjacent landowners to develop a vegetation buffer around the perimeter of the Project to screen from view year-round.

All of the site is in zone "AC - Ag Conservation." The Dorchester County zoning code allows for alternative energy projects in agriculturally zoned areas provided that a BOA Special Exception is granted for the Project. Specifically, Dorchester County Code § 155-50, "solar energy systems, utility scale," are permitted in agriculturally zoned properties. OneEnergy will be submitting a Board of Appeals (BOA) Special Exception permit request in Fall 2016, followed by Site Plan approval request.

The Applicant anticipates some ground disturbance within the range required for the installation of the solar array and DPL interconnection facilities. The site topography has gentle slopes ranging from 0% to 10%. Piles will be installed on the existing grade. The applicant will work with Dorchester County officials to ensure all grading meets standard code for stormwater and sediment erosion control. The Project's limit of disturbance is anticipated to be approximately 180 acres and includes extra temporary staging areas, access roads, and interior access roads as part of the calculated area. These improvements and the individual racking systems that hold solar modules constitute the total area of disturbance for the site.

The Project will be enclosed with an eight (8) foot fence to provide security and safety. The fence will likely be a typical chain-link variety and fully compliant with Dorchester County zoning code. The Applicant will work with appropriate regulators to determine the least impactful access roads, both during construction and maintenance of the Project.

There will be no sewer or water requirements for the Project since there will be no on site operations and/or maintenance facilities. A temporary trailer will be required during construction, but no additional

building structures will be added to the site as the Project requires no full-time personnel. No water or sewer lines will be required for the temporary project trailer. The property contains several potable water wells that may be accessed for vegetation maintenance and cleaning of the solar facilities.

Community Outreach and Changes to Preliminary Layout

In May of 2016 OneEnergy Renewables began outreach to adjacent property owners and county officials about Sunnee Bee Solar. On June 1, 2016, two representatives from OneEnergy Renewables hosted a voluntary community meeting at the East New Market Volunteer Fire Department hall. In addition to representatives from OneEnergy Renewables were the company's contracted civil engineer, land surveyor, and landscape architect. The goal of the community meeting was to introduce preliminary Project plans and solicit feedback from adjacent property owners prior to submitting the project for any state or county permits. At this meeting, OneEnergy representatives provided informational materials about the company, general information on solar energy, Project specific details, and layouts of the Sunnee Bee Project. In addition, both OneEnergy representatives provided their direct contact information and encouraged meeting attendees to reach out with questions and/or comments.

At the time the community meeting was held, OneEnergy proposed a 1.7 MW community solar project adjacent to the 20 MW Sunnee Bee wholesale solar project. While the wholesale Project will feed the generated energy directly into the grid, the community solar project would have allowed neighbors to purchase the renewable energy for their homes directly from the project. In the community meeting, neighbors did not express concern over the concept of a community solar project but rather concern over the proximity of the 1.7 MW community solar project to homes along Linkwood Rd (see Attachment 1). Over next several months OneEnergy incorporated this feedback into the layout by removing the community solar project from the original location and altering the newly adjusted design to accommodate the 20MW wholesale project with potential for a community solar project incorporated into the design. The new preliminary layout is included as Attachment 2. OneEnergy will continue to work closely with the County to determine the best location to construct the substation. Ultimately, the substation location will be decided by the utility, DPL. Additionally, OneEnergy is actively engaged with Mr. Patrick Wielgosz Jr. to find a mutually agreed upon solution to address concerns over the proximity of his home to the Project.

WHAT KEY ELEMENTS GO INTO PLANNING A SOLAR PROJECT?

What market conditions make it possible for solar in Maryland?

A number of criteria are examined in determining the viability of a solar project. First, general market conditions must accommodate small electric generators such as a solar farm. This includes a regional transmission organization (RTO) such as PJM to allow for small generators (20 MWac or less) to participate in the wholesale market. It also requires that state agencies support renewable energy and encourage installation of these kinds of facilities over, or at least as part of, the state energy supply.

What kind of site is best for solar?

As mentioned above, ideal sites for utility scale solar projects are relatively flat and are located in close proximity to the electrical grid, but also have minimal shading from trees, avoid impacts to wetlands, forests, and wildlife, and are located outside of floodplains. Additionally, the landowner must be interested in entering into a long-term lease agreement or purchase option. Yet another major factor is

the that the site needs to meet requirements set forth by the local zoning ordinance that qualify commercial solar as a permissible land use. In Dorchester County, for example, all of the Site is in zone AC – Ag Conservation, which allows for development of utility-scale solar systems as a special exception.

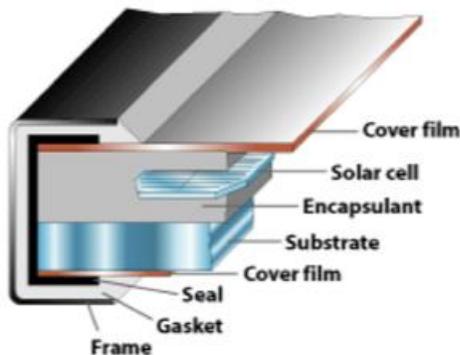
HOW DO PHOTOVOLTAIC SOLAR SYSTEMS WORK?

Solar energy is the direct production of electricity from sunlight. Light energy in the form of photons strikes the panels and creates a chemical electrical imbalance in the crystalline silicon in the panel, producing electricity. There are three main types of solar energy technologies: photovoltaic, concentrated photovoltaic and concentrated solar power generators. OneEnergy’s Sunnee Bee Solar project will utilize photovoltaic (or PV) technologies, which is the most common technology and what most individuals are familiar with seeing on rooftops and on small farms. PV systems can operate in both direct and indirect sunlight conditions, making PV systems suitable in a wide range of geographic areas, including Maryland.³

What are the main design components of a solar farm?

Modules

The fundamental building block of a PV system is the solar cell. Individual cells are connected together to form a module, which is encased in steel, glass and a cover film to protect the cells against environmental corrosion.³ The most common material used in these solar cells is a crystalline silicon material, which is often called a silicon wafer. In the United States, 80%-90% Photovoltaic (PV) System modules consists of this type of silicon wafer construction.³



Courtesy of the U.S. Department of Energy

Underneath the Modules

The panels will be arranged in rows spaced approximately 10 feet apart, and the entire Project site will be seeded with a combination of native low-growth grasses and pollinator friendly vegetation to increase species biodiversity and stormwater management at the site. This design approach will sufficiently address the Maryland Department of the Environment’s non-rooftop disconnection of stormwater requirement.

Steel Piles

The PV modules would be secured on the racking system and supported by a single post (galvanized steel or aluminum) driven or screwed into the ground by a pile-driving machine to a depth of

approximately 6 to 8 feet. The spacing of the piles can range dramatically depending on the foundation installation methods. Generally, piles are expected to be placed between 10 and 30 feet apart.

Tracking System

The Sunnee Bee solar project will employ tracking technology. Tracking technology systems vary by manufacturer but generally consist of a series of mechanically linked horizontal steel support beams, known as torque tubes, with a motorized drive train system. Tracking technology allows the system to rotate from a 45° tilt to the East to a 45° tilt to the West over the course the day, following the path of the sun. Tracking systems can increase to the output of a solar project by 30-40percent.⁵

Inverters

The solar facility will include inverters to convert the variable direct current (DC) output of the solar panels into alternating current (AC) power that the utility uses throughout its system. Exact choices of inverter will be identified closer to construction.

Inverter Platforms

Each of the inverter platforms will be placed on a concrete slab. Typically, these concrete slabs are poured in place and are constructed to the frost line in order to hold up under cold weather conditions. Typically, the concrete pad required is twenty feet by twenty feet although exact dimensions will vary based on site conditions.

Perimeter Fence

At commencement of construction, an 8' high galvanized steel chain link fence or equivalent will be installed to protect the solar farm from vandalism and/or theft, as well as to prevent access to the site from unauthorized individuals and protect the safety of adjacent community members. In consultation with the county, adjacent landowners, and a landscape architect, OneEnergy will develop a vegetation buffer that will be planted outside of the fence, see Attachment 3 for examples of plant species. This vegetation buffer will reduce visibility of the Project and be in accordance with State and Local requirements.

Perimeter and internal access roads

In order to support maintenance of the facilities, perimeter gravel access roads with interior connectors will be constructed inside of the perimeter fence on the properties.

Sewer and Water

No sewer or water connections will be needed for the development of these solar farms. Solar farms require minimal water usage. The small amount of water that is required is for vegetation maintenance and occasional panel washing. If and when water resources are required, operation and maintenance crews will externally source water, using a water truck or equivalent.

WILL THE PROJECT INVOLVE GRADING OR PAVING?

The installation of the solar system will involve some grading and ground preparation of the site. While there is some grade change on the site that may need to be adjusted to support the efficient installation of the solar facility, the majority of the site will have minimal change in grade and the piles can be installed on the existing grades. The design and installation team will minimize the earthwork required for the construction of the concrete pads for the transformers and inverters.

WILL THE PROJECT HAVE IMPACTS ON WILDLIFE?

The farmed lands of the proposed Sunnee Bee Solar site have been intensely managed for agricultural use to date. As such, these sites have been subject to intensive plowing, fertilizer and herbicide use. These land management practices limit nesting by birds and occupancy by other wildlife, such as amphibians, reptiles, and small mammals. While transient species such as deer, eagles and squirrels may occasionally use the site, the proposed solar farm site currently provides little wildlife habitat. The US Fish and Wildlife Service, Chesapeake Bay Field Office and the Maryland Department of the Environment have reviewed these Project sites and provided review letters confirming this, which will be submitted to the County as part of the application documents. In comparison to the previous land uses for these properties, following the construction period the proposed solar facility will dramatically reduce the frequency of ground disturbances, likely making the solar farms prime habitat for ground nesting birds, with potential to decrease wildlife exposure to agricultural fertilizer and herbicides.

WILL THE PROJECT HAVE IMPACTS ON CULTURAL RESOURCES?

The Sunnee Bee Solar project has been reviewed by the Maryland Historical Trust (MHT) for potential impacts to cultural resources. MHT noted that no properties of historic importance exist on site and require no further review by the agency is required. OneEnergy will continue to work closely with Dorchester County and MHT to ensure impacts of historic viewsheds and byways are avoided.

ARE THERE RISKS OF CHEMICAL EXPOSURE?

What chemicals are inside a solar panel? Can they be exposed?

In order to provide electrical insulation and protection against environmental corrosion, the solar cells are encased in a transparent material referred to as an encapsulate (typically ethylene vinyl acetate, which is nontoxic). To provide structural integrity the solar cells are mounted on top of a rigid flat surface or substrate (typically polyvinyl fluoride, which is nontoxic). A transparent cover film, commonly glass, further protects these components from the elements.³ Because these materials are enclosed, and do not mix with water or vaporize into the air, there is little if any risk for the release of chemicals to the environment.⁶

The solar panels proposed for use in this Project will most likely feature polycrystalline silicon modules. Crystalline silica is the primary raw material input in these modules. Crystalline silica, which is nontoxic, is found in the environment primarily as sand or quartz. Crystalline silicon semiconductors are also utilized in the manufacture of integrated circuits and microchips used on personal computers, cellular telephones and other modern electronics.

Does solar produce air emissions of any kind?

Solar PV facilities utilize a non-combustion process relying on the direct conversion of solar energy into electrical energy, therefore, the operation of a solar PV facility does not produce air emissions. This differs drastically from conventional fossil-fired electric power plants. Electricity generated by solar PV facilities represents a way of meeting Maryland's growing demand for electric power without emitting combustion-related air pollutants.⁷

The only sources of emissions from the Project will be those associated with construction activities, including site clearing, grading, and the use of construction equipment, which will be for a temporary period.

WILL THE PROJECT CREATE NOISE?

The low level operational noise created by the Project is limited to daytime hours and would occur within the Project site, with limited spillover into adjacent properties. The Project noise level is not expected to result in adverse permanent increases to ambient noise levels. Studies conducted on other solar PV projects have concluded that daytime project noise level increases from solar PV project would not exceed 3 dB above the ambient noise level. In general, a difference of 3 dBA or less is not a perceptible change in environmental noise.⁸

Outdoor ambient noise in rural and urban areas comes from transportation, construction, industrial, and human and animal sources, with road traffic being the major source of most noise. Noise can be highly variable and it is common that Day-Night sound (defined by the U.S. Environmental Protection Agency as an equivalent sound level for a 24-hour period) may vary by 50 dB. For example, outdoor ambient noise is generally 85-90 dB in urban areas and may be as low as 30-40 dB in the certain wilderness areas.⁹

Ambient noise in the vicinity of the Project, among other rural and suburban daily noise, includes agricultural noise and traffic noise from both Maryland Route 392 (East New Market Bypass) and from Linkwood Rd., a designated truck route.

Solar panels, themselves, do not make noise. However, the inverters, which convert solar energy into a form the electrical grid can use, can produce a low buzzing noise comparable in volume to a normal conversation taking place three to five feet away from you, and is inaudible at 50 to 150 feet from the boundary of the project (Table 1). This is the same case with the minimal noise created by the substation switching gears.

The noise associated with the inverters and transformers occurs during the daytime when solar arrays are generating electricity and are silent when the sun is below the horizon.¹⁰

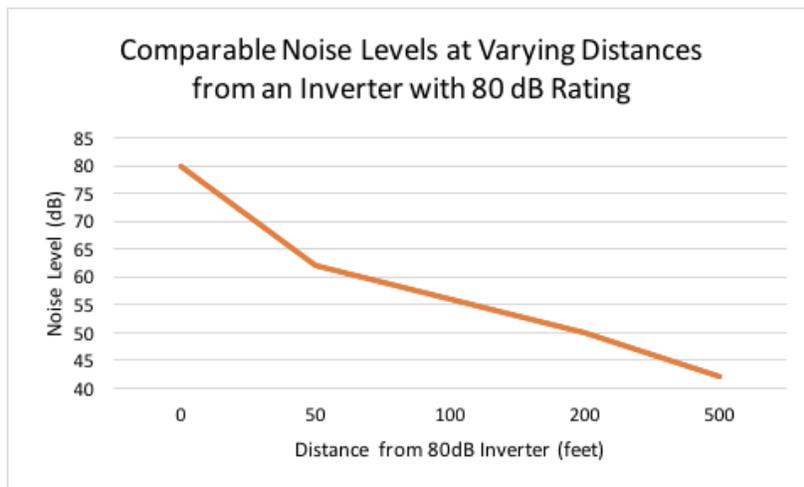
The below graphic illustrates how a decibel rating of 80dB is influenced over distance (Table 1 and Figure 1). Noise reduction occurs at 6dB per doubling of distance. Specific to the Project, the noise produced by the inverter at the source of generation will be equal that of a household appliance such as a vacuum cleaner or coffee grinder. The decibel level decreases across distance. During the construction phase, intermittent noise levels will not exceed the daytime allowable use of 90dB as mandated by Maryland State law (COMAR 26.02.03.02).

Table 1. Inverter Noise Across Distance

Distance from Inverter (ft)	Noise Level (dB)	Comparable Noise Levels ¹¹
0	80	Vacuum cleaner, coffee grinder, dial tone
50	62	Normal conversation, dishwasher
100	56	Office environment, quiet suburb
200	50	Window air conditioning unit, rainfall

500	42	Library, bird calls, computer, whispering
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Figure 1. Decibel Level of Inverter at Varying Distances



WILL THE PROJECT CREATE ELECTROMAGNETIC FIELDS?

Solar PV projects like Sunnee Bee generate low level electromagnetic fields (EMFs) through two specific components of the project: the inverters, which convert the energy generated by the sun through the solar panels from DC current to a form that can connect to the electrical grid (AC current); and the interconnection points on the electrical poles outside the property—this is the point where the power from the project is connected to the electrical grid. EMFs are only generated during daylight hours when the sun is shining and they are not produced at night when the project is not generating electricity via the sun’s rays.

EMFs created by the Sunnee Bee Project, even if standing directly next to an inverter, will measure drastically below the minimum thresholds established by the most rigorous exposure guidelines to date (see below ICNIRP guidelines). Exposure to EMFs when standing just outside the fence of the Sunnee Bee project, would be the same as standing a full mile away from an individual’s personal cell phone, according a study completed by the U.S. Naval Facilities Engineering Command.¹²

Based upon county setbacks and solar array designs at Sunnee Bee Solar, inverter placement will be a significant distance from any public access point and EMF measurements at the fenced boundary of the Project will measure at less than one-tenth of one percent of the safe exposure limit to the general public.¹⁰

While there are no federal, state or local regulatory exposure limits in the U.S. for EMFs applicable to solar farms, EMFs from utility-scale solar projects have undergone extensive formal scientific study, including by the U.S. Department of Energy, the Federal Aviation Administration and others. These studies have shown that EMFs are measured between 0.2 to 0.4 milli-Gauss (mG) at the perimeter of the project. When measured at 50 to 150 feet from the fence line of a project, EMFs were not elevated above background levels (background levels are the base standard levels of EMF in any regular environment). The Sunnee Bee solar farm will be no different and will comply with all applicable regulatory standards.^{12 10}

To put these measurements in perspective, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has a recommended exposure limit to EMFs of 833 mG for the general public. The ICNIRP is an organization of 15,000 scientists in 40 nations and their recommendations are routinely used in EMF exposure studies.¹³

Examples of average EMF values found in everyday life can be found below.¹⁴

	(in mG) Mid-point 1 ft.	(in mG) Mid-point 3 ft.		(in mG) Mid-point 1 ft.	(in mG) Mid-point 3 ft.
Clothes Dryer	15	<1	Blender	11.1	1
Clothes Washer	1.9	<1	TV	10.2	<1
Coffee Maker	1.05	<1	Fluorescent		
Toaster	3.8	<1	Desk Lamp	13	1.15
Can Opener	115.5	3.75	Microwave	60	5.5
Mixer	52.5	1.08	Electric Range	22	3.55
Refrigerator	1.5	<1			

WHAT ARE THE VISUAL IMPACTS FROM THE PROJECT AND HOW WILL THEY BE ADDRESSED?

Glare

PV panels are designed to absorb, not reflect, sunlight. Current solar panel technologies utilize a layer of anti-reflective material that allows sunlight to pass through while minimizing reflection and also include an anti-reflective material on the outer glass surface to further limit reflections. Solar panels are constructed of dark-colored (blue or black) materials. Solar panels absorb 98% of sunlight, meaning they reflect as little as 2% of incoming sunlight.¹⁵ This 2% is about the same as water, and less than soil or wood shingles. As a result, a number of solar projects have been successfully sited at or near several major US airports, including Boston, New York, San Francisco and Denver.¹⁶

When designing a solar farm, OneEnergy uses the publicly available Solar Glare Hazard Analysis Tool (SGHAT) developed by the Sandia National Laboratory (available at www.sandia.gov/glare) to determine if nearby houses and roads will experience any glare. This tool uses an interactive Google Maps interface that enables the user to outline the extent of PV panels for any given site and then prompts the user to identify observation points for which the model will evaluate glare. The user is able to place these observation points anywhere an evaluation is needed, including at various heights to simulate the views

from multi-story homes. SGHAT is widely used tool within the solar industry and is required by the FAA for solar energy projects proposed at federally obligated airports.

Visual buffers/landscaping plan

OneEnergy will work with Dorchester County to design a suitable year-round vegetative buffer necessary to block the projects from views.

Typical vegetative screens include a mix of evergreen shrubs to screen the Project year-round. Tall, fast-growing shrubs that usually grow to an ultimate height of approximately eight feet, instead of trees, are commonly used to block views while also ensuring the vegetative screen does not shade out the solar facility and reduce total project performance. Examples of plant species that may be incorporated into the vegetation screen are included in Attachment 3.

WHAT WILL HAPPEN DURING CONSTRUCTION?

Erosion and Sediment Control

Strict adherence to all Dorchester County Erosion and Sediment Control ordinances will be maintained at all times, as well as compliance with any and all state environmental mandates. Site construction activities leading up to Project operation are anticipated to take approximately one to three months. No special housing, healthcare, or food facilities will be required as part of the Project's activities.

Construction Materials

Construction materials will generally consist of wood, concrete, aggregate and metal. To the extent possible, these materials will be procured from local and/or regional sources where they are available in sufficient quantity at competitive prices.

Construction Activity

Construction activities will include trenching of underground electrical cables, construction pads for the inverters, transporting materials, and assembling, erecting and wiring of the solar panels.

Transportation During Construction

Major material and equipment will be delivered by tractor-trailers and offloaded by construction vehicles (lulls, tracked vehicles, and front loading equipment). A staging area will be utilized for unloading of equipment and materials. Daily construction traffic will include cars, pickup trucks, and other personnel vehicles.

WHAT WILL HAPPEN ONCE THE PROJECT BECOMES OPERATIONAL?

Transportation During Operation

There will be limited traffic to and from the solar array during operation. Traffic will mostly be limited to maintenance crews for mowing and vegetation maintenance which will be seasonably dependent. Quarterly to yearly maintenance on the solar array components will most likely occur, along with any occasional site visits for any operational issues that may arise during normal operation. During operation

traffic will likely include cars, pickup trucks, and other personnel vehicles, but no heavy construction vehicles.

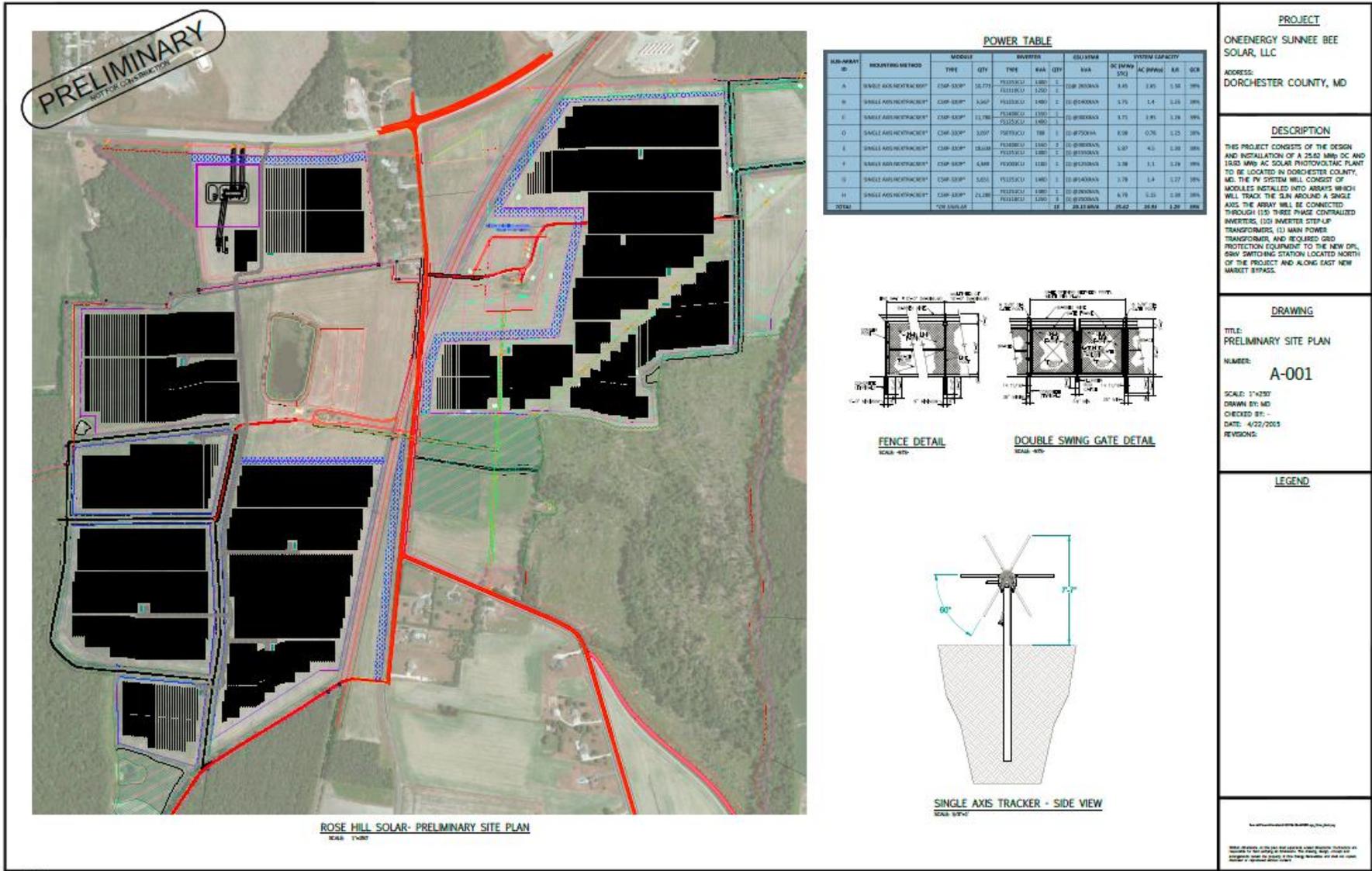
WHAT WILL HAPPEN WHEN THE PROJECT REACHES THE END OF ITS LIFE CYCLE?

At the end of its useful life, the Project is decommissioned and the land returned to a farmable state. In order to ensure the land is returned to conditions equivalent to those prior to construction and operation of the Project, OneEnergy develops a facility Decommissioning and Site Restoration plan, which is provided to local counties or similar governing bodies.

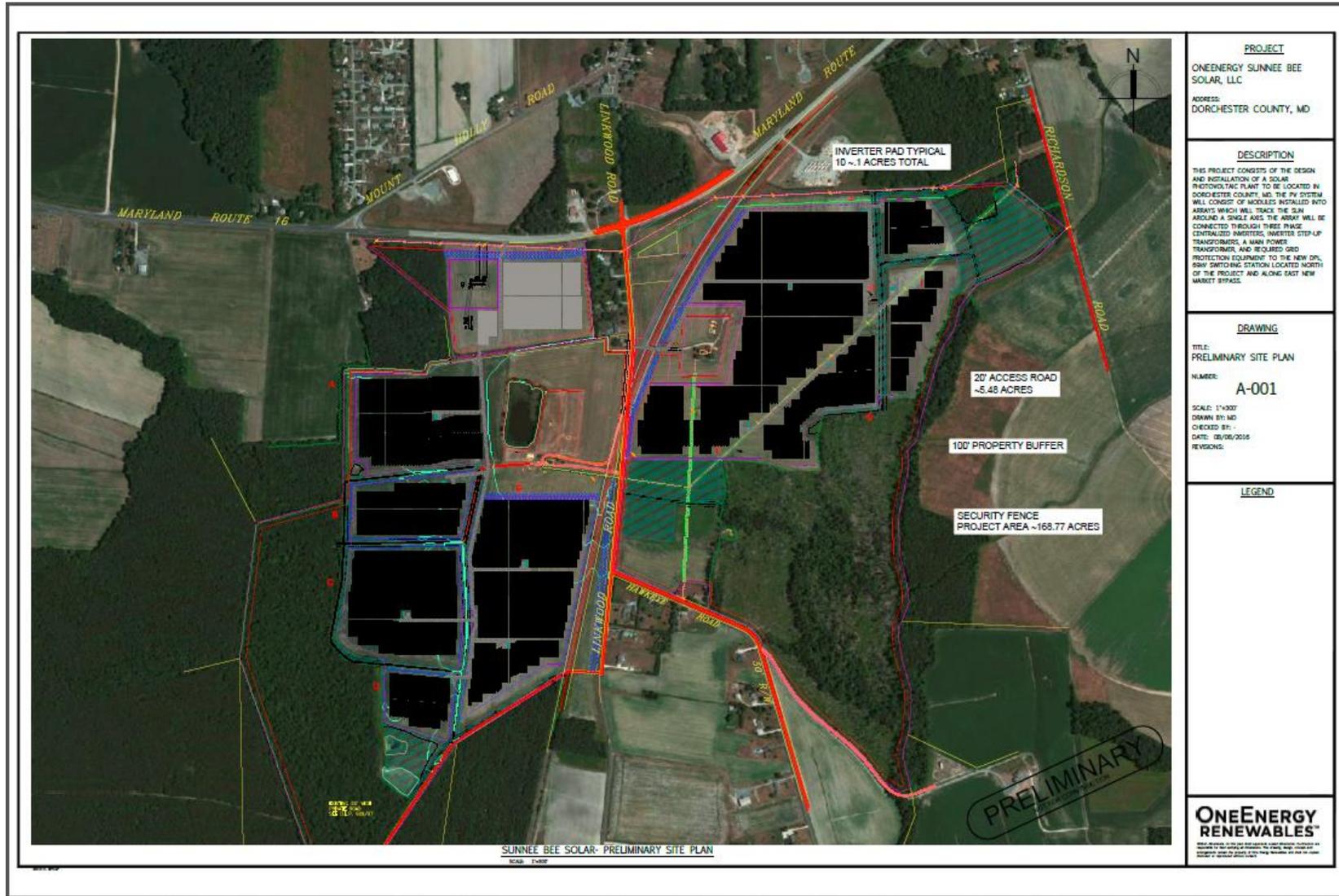
The decommissioning plan includes all current provisions for the safe removal and proper disposal or recycling of all components of the Project, documents pre-Project baseline soil conditions and specific measures to restore the soil to those condition, outlines the responsible party(ies) for decommissioning activities, decommissioning timeframes, and estimated costs for all necessary work. This plan is developed in accordance with all applicable federal, State, County and local requirements for decommissioning, dismantling, and proper removal of all Project facilities.

In addition, a financial assurance mechanism, such as a surety bond or irrevocable letter of credit, is secured to ensure that no decommissioning costs are borne by the County, State, and/or local residents. The financial assurance is designed to ensure that 100% of the estimated decommissioning cost is covered, and in many cases, the financial assurance amount is reviewed for adequacy every ten years.

Attachment 1 – Preliminary Layout Prior to Removal of Community Solar Project



Attachment 2 – Preliminary Layout After Community Solar Project Removal



Attachment 3 – Examples of Plant Species for Vegetation Buffer

PLANT IMAGE BOARD



EASTERN RED CEDAR



INKBERRY



FORSYTHIA



MAPLE LEAVED VIBURNUM



VIEW NEXT TO PANELS



WINTER VIEW



VIEW FROM ROAD

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 SOLAR, LLC PROPERTY**
 NEW MARKET, MD.
 SCALE: NTS DATE: 8.11.16

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