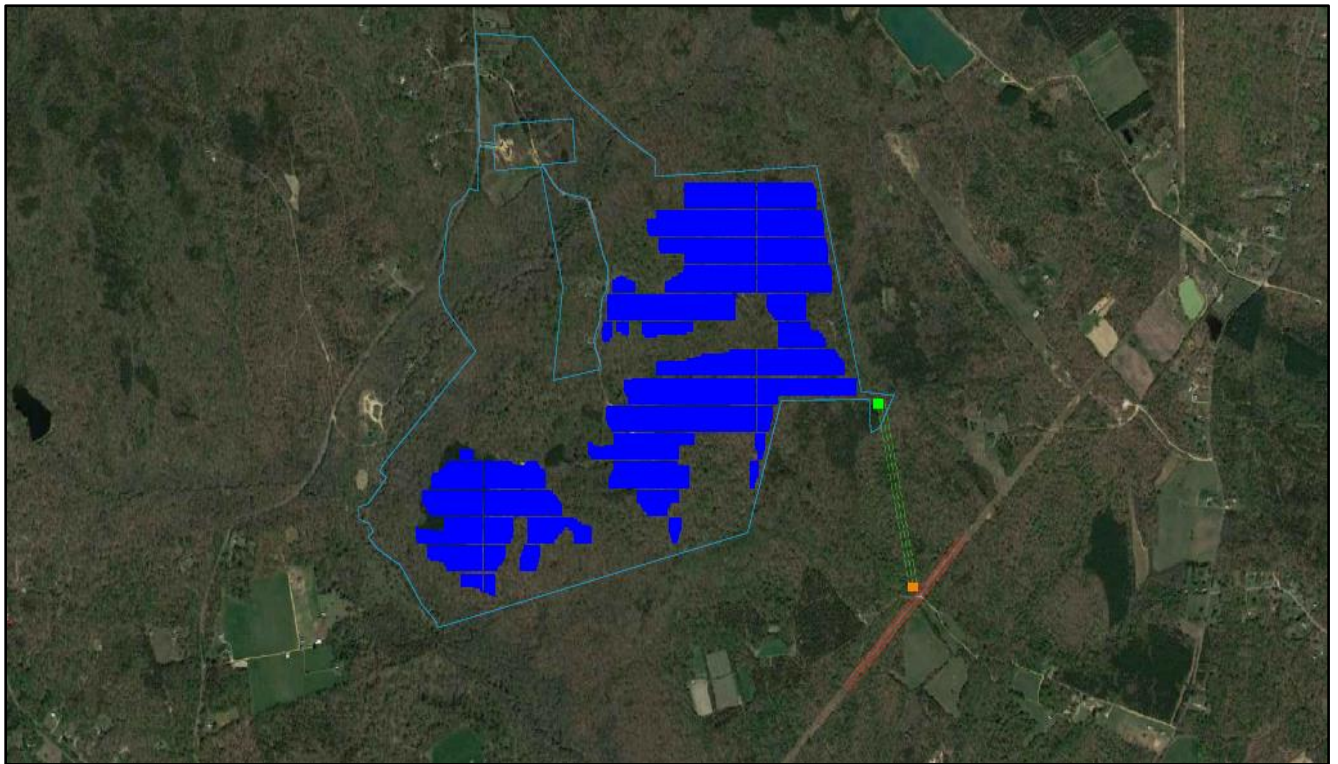


**ENVIRONMENTAL REVIEW DOCUMENT
PROJECT NO. 16009.00
SEPTEMBER 22, 2017**

**SHUGART VALLEY PLACE SOLAR PROJECT
32.5 MW SOLAR PROJECT
CHARLES COUNTY, MARYLAND**



PREPARED FOR:

MD SOLAR 1, LLC
800 Brickell Avenue, Suite 1100
Miami, FL 33131

PREPARED BY:

H&B SOLUTIONS, LLC
37534 Oliver Dr.
Selbyville, DE 19975

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SECTION 1 – PROJECT OVERVIEW

The Charles County, Maryland Solar Project (the “Project”) located in the greater La Plata area is a 32.5 MW fixed-tilt alternating current (AC) solar thin film photovoltaic (PV) project proposed by MD Solar 1, LLC (the “Applicant”). As currently proposed, the Project would consist of two hundred forty-nine (249) acres and is located on Tax Map 41, Parcel 24 in Charles County, as shown in **Figure 1** and **Figure 2** (the “Site”). More specifically the Project is located at 4850 Shugart Valley Place.

The site selection was driven by a Request for Proposal from a private off-taker which resulted in the Applicant being awarded a Power Purchase Agreement (PPA). The Project has contracted to purchase the five hundred thirty-seven (537) acres associated with this parcel from the current property owner (the James B. Busler family) as shown in **Figure 3**. The Site is primarily forested, was used in the past for agricultural purposes, and more recently for selective timbering with regrowth that is scrubby and poor. This included timbering approximately ninety-five percent (95%) to ninety-six percent (96%) of hardwoods between 1994 and 2010, cutting the pines in 1991, and sludging of hayfields in the Fall of 2000.

Although, the Project is located on agriculturally zoned property in Charles County, it should be noted that the Applicant is not purchasing prime agricultural land. In 2016 Charles County updated its Comprehensive Plan to include a new Chapter 6, entitled “Energy Conservation.” As part of its updated Comprehensive Plan, the County adopted Goal and Objective 6.6, to “Grow a green economy with an increased number of jobs in the clean energy and energy efficiency sector.” Converting part of this site to a green energy project will implement Goal 6.6 of Charles County’s 2016 Comprehensive Plan by allowing for the creation of construction jobs, increased revenue for local businesses in the County, in addition to the increased tax revenue associated with the commercial use of the property.

Pursuant to the Generation Interconnection Combined Feasibility Study Report performed by the PJM, this Project would generate 32.5 MW and connect to the Southern Maryland Electric Cooperative (SMECO) distribution system via a new 69 kV switching station to be built adjacent to the Grayton-Ripley 69 kV circuit.

The Site (Charles County Tax Map 41, Parcel 24) is located at approximately thirty-eight degrees (38°30’23.8”) latitude (North) and seventy-seven degrees (77°08’22.1”) longitude (West) in the Lower Potomac River watershed. The Lower Potomac River drains 730 square miles, including portions of Charles, Saint Mary’s, and Prince George’s Counties. The River is entirely tidal in the basin. Larger water bodies include Mattawoman Creek, Breton Bay, Nanjemoy Creek, and the Wicomico and Saint Mary’s Rivers. Specifically, the proposed project area is within the Wards Run watershed which flows into Nanjemoy Creek and ultimately discharges into the Lower Potomac River. All Maryland stream segments are categorized by sub-basin and are given a “designated use” in the Code of Maryland Regulations 26.08.02.08. Nanjemoy Creek/Lower Potomac River is protected as a Class IP Use (Use IP: Water Contact Recreation, and Protection of Aquatic Life, and Public Water Supply). The basin is located solely within the Coastal Plain physiographic province. The Project is not located in the Critical Area. There is no activity proposed on the Site which would in any way contribute to the impairment of these waterways and receiving streams.

The Site is currently zoned Agricultural Conservation (AC). In Charles County, properties zoned AC allow utility scale solar generation facilities by Special Exception, as specified in the Charles County Zoning Ordinance. The Applicant will apply for a Special Exception from Charles County, which will ensure the Project is consistent with local zoning requirements. In discussions with Charles County Department of Planning and Growth Management, the County will also participate in the CPCN process, similar to previous solar projects approved in Charles County. This will allow the Applicant to address any issues raised by Charles County.

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The surface topography is generally rolling. Approximately half of the property contains slopes ranging from fifteen percent (15%) to forty percent (40%). The remainder of the property has grades of zero percent (0%) to fifteen percent (15%). The property consists of moderately well-draining Beltsville Silt Loam soil which has ideal characteristics to support a solar array projects. These soils are typically found in the Coastal Plain Province with classifications and soil characteristics as defined in **Figure 4** below. Trees will remain on the sloped areas defined in the soils map as falling in the range of fifteen percent (15%) to forty percent (40%). Clearing will only occur in the Beltsville soils that are mostly zero percent (0%) to ten percent (10%).

Wetlands can be found sporadically throughout the property and mostly at the base of the steeper slopes which will not be used for panel installation and; therefore, will not be cleared. However, the size and location are such that they have been avoided in the solar array design and within the Project's defined Limit of Disturbance (LOD). Wetland avoidance has been achieved by holding to a thirty-five foot (35') setback from the drip line of the trees which will remain. This setback will provide considerable buffer in excess of what the Corps of Engineers (COE) or the Maryland Department of the Environment (MDE) would otherwise require and has been appropriately reflected on the site plan shown in **Figure 5**. In selecting the LOD within the parcel to locate the Project, priority was given to eliminating wetland areas, areas with steep slopes, and avoiding other environmental constraints. The LOD also characterizes the limits of clearing that will be needed for the Project, with the balance of forest stand to remain and placed into a Forest Conservation Easement (FCE) to address Forest Conservation Act (FCA) mitigation requirements.

The area selected for the Project and delineation of the LOD is also the best area to undertake clearing and grading to minimize potential impacts from sediment and erosion and to maximize opportunities to use standard perimeter controls and stormwater management practices. Site preparation work which includes cutting, clearing, and grading, will be performed internal to the property consistent with approved plans from the Charles County Soil Conservation District Office. In particular, the Applicant will utilize the existing trees which are not to be cut and which are located towards the perimeter of the property to function as a natural screen for the Project. Additionally, the entire LOD will be stabilized with a mixture of low growing grasses to ensure sediment and erosion controls are maximized in preparing for panel installation. The moderate slopes and soil characteristics are suitable to support brackets for solar panels. Limited impervious areas will be created associated with the concrete pads for the transformers and inverters. A Stormwater NPDES Permit will be obtained and an NOI will be filed prior to construction.

Total generating capacity for the Project is anticipated to be 32.5 MW Alternating Current (AC) output. The Project will consist of approximately 100,000 - 104,000 First Solar FS-6420A thin film modules (solar panels) as shown in the Solar Array Layout (see **Figure 5**). The array will be installed using a pile-driven post-supported racking system utilizing galvanized steel posts with galvanized steel or aluminum structure for mounting the panels. A typical Solar Panel Racking Detail depicts the array with portrait racking with one row of modules positioned vertically on each rack (see **Figure 6**). The space between rows will be approximately eighteen feet (18'). The solar arrays will continuously rotate from east to west around a horizontal axis, oriented N-S, to orient the panels at an optimal angle to the incoming solar insolation during the day. The minimum leading-edge height (bottom edge of the modules) will be approximately one foot (1') from grade, and the maximum top edge height of the modules will be approximately seven feet (7') from grade. This will occur on a daily basis as the single-axis tracking system rotates through its cycles. In accordance with §297-112, 7.07.200, the total height of the solar energy system, including any mounts, shall not exceed twenty-five (25) feet above the ground when oriented at maximum tilt. Additionally, all electrical wiring used in the system will be trenched except where wiring is brought together for interconnection to the system components and/or the power grid. The solar arrays will be designed to withstand snow load of twenty-five (25) pounds per square foot (psf) and wind of one-hundred fifteen (115) miles per hour (mph) (per IBC 2015 for Charles County).

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Interconnection will be via an overhead line tap at a new 69 kV switching station to be built adjacent to the Grayton-Ripley 69 kV circuit which is in close proximity to the Project. Since the Project will be connected to the grid through an offsite overhead line tap, easements will be required for extension to the Point of Interconnection (POI) per the PJM Feasibility Report and Impact Study Report. The Project's solar generation facilities will be connected to the SMECO 69 kV transmission line, at the proposed POI running along the south portion of the Project site. The coordinates for the proposed POI are 38.501 latitude, -77.126 longitude. The Applicant is in negotiations to enter an Option Agreement with Smith Point LLC, the fee simple owner of a parcel of land comprising approximately fifty (50) acres, more or less and identified in a deed dated April 9, 2013 and recorded among the Land Records of Charles County, Maryland in Book 8200 Page 260 and further identified as Tax Map 42, Grid 19, Parcel 188 with Tax Account No. 02-001543. By acquiring this property the project intends to construct, operate, and maintain a utility and power generation and transmission infrastructure, necessary for the interconnection of the project to SMECO's transmission infrastructure.

There will be fourteen (14) separate power stations where the direct current from the arrays will be converted to alternating current as transmitted by the electric grid. Each power station will include an inverter pad with one (1) inverter and one step-up transformer. Each power station will make up 1/14 of the array AC capacity or approximately 2.50 MW. The nameplate capacity of the facility will be of 35 MW but due to grid interconnection requirements, the capacity of the facility at the Point of Interconnection will be 32.5 MW.

It is expected that the Project as currently configured to reflect the Site will have a nameplate capacity of 32.5 MW with PJM Queue Position AC2-101. The Applicant's initial application to PJM Generation Feasibility Study Report provided in **Appendix 1**.

In accordance with §297-112, 7.07.200, the Project will be fully fenced with a service entrance accessible from Shugart Valley Place. There is no planned need for water and sewer for the Project since there will be no planned operations and/or maintenance facilities and no full-time personnel located at this Site. Since the LOD is significantly internal to an existing forested area, it is unlikely that screening will be required along Shugart Valley Place. However, since this is a shared entrance road and there are some residential properties along the boundary of the site, appropriate landscape buffers will be planted in accordance with local site plan and CPCN conditions.

In addition to the Certificate of Public Convenience and Necessity (CPCN), the Project will require National Pollutant Discharge Elimination System (NPDES) stormwater permit coverage and other State Regulatory Approvals including conformance with stormwater management, sediment and erosion control, and consistency with Critical Areas. A site plan will be subject to County review in conjunction with the CPCN process in order to obtain substantial conformance with local regulatory codes including the County's Development Services Permit.

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Figure 1 – Regional Context Map

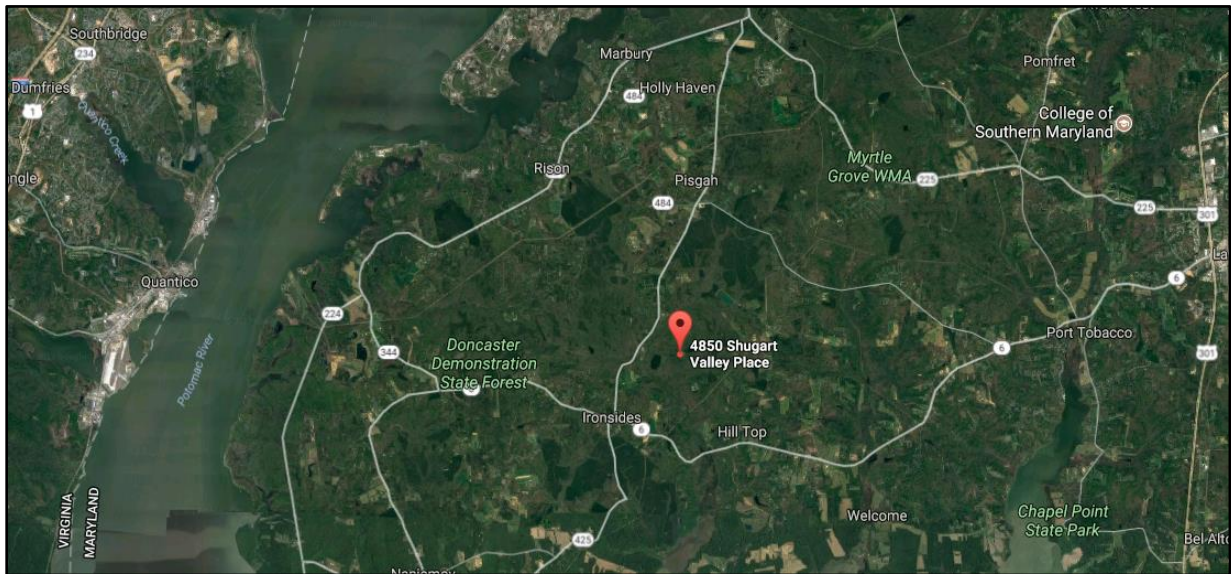
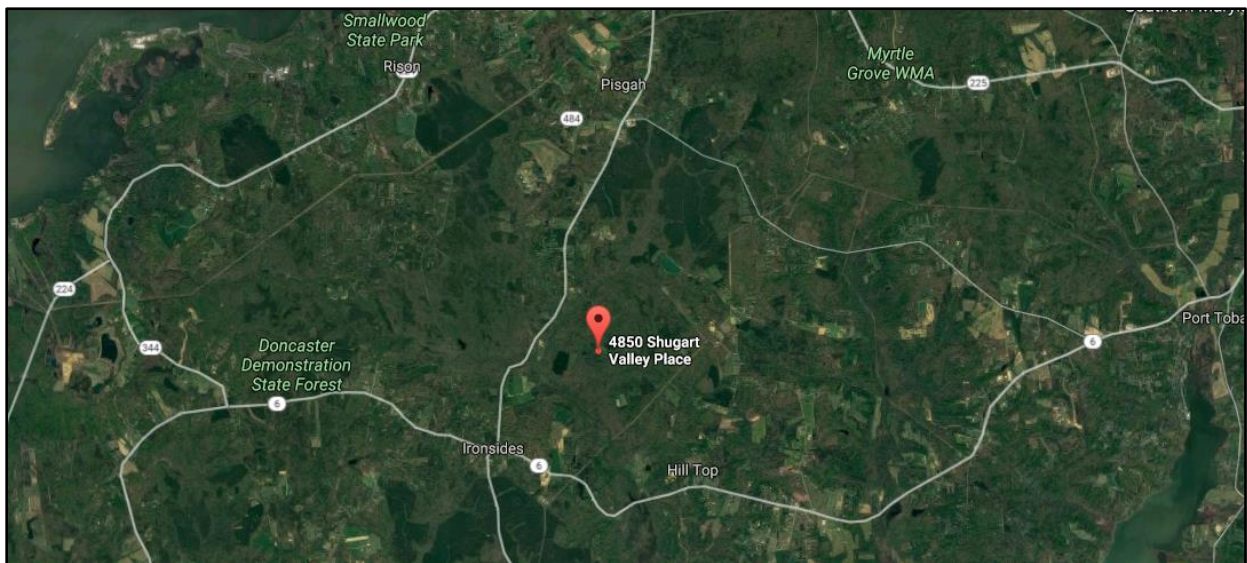


Figure 2 – Local Context Map



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Figure 5 – Shugart Valley Place Design Concept and Solar Array Layout

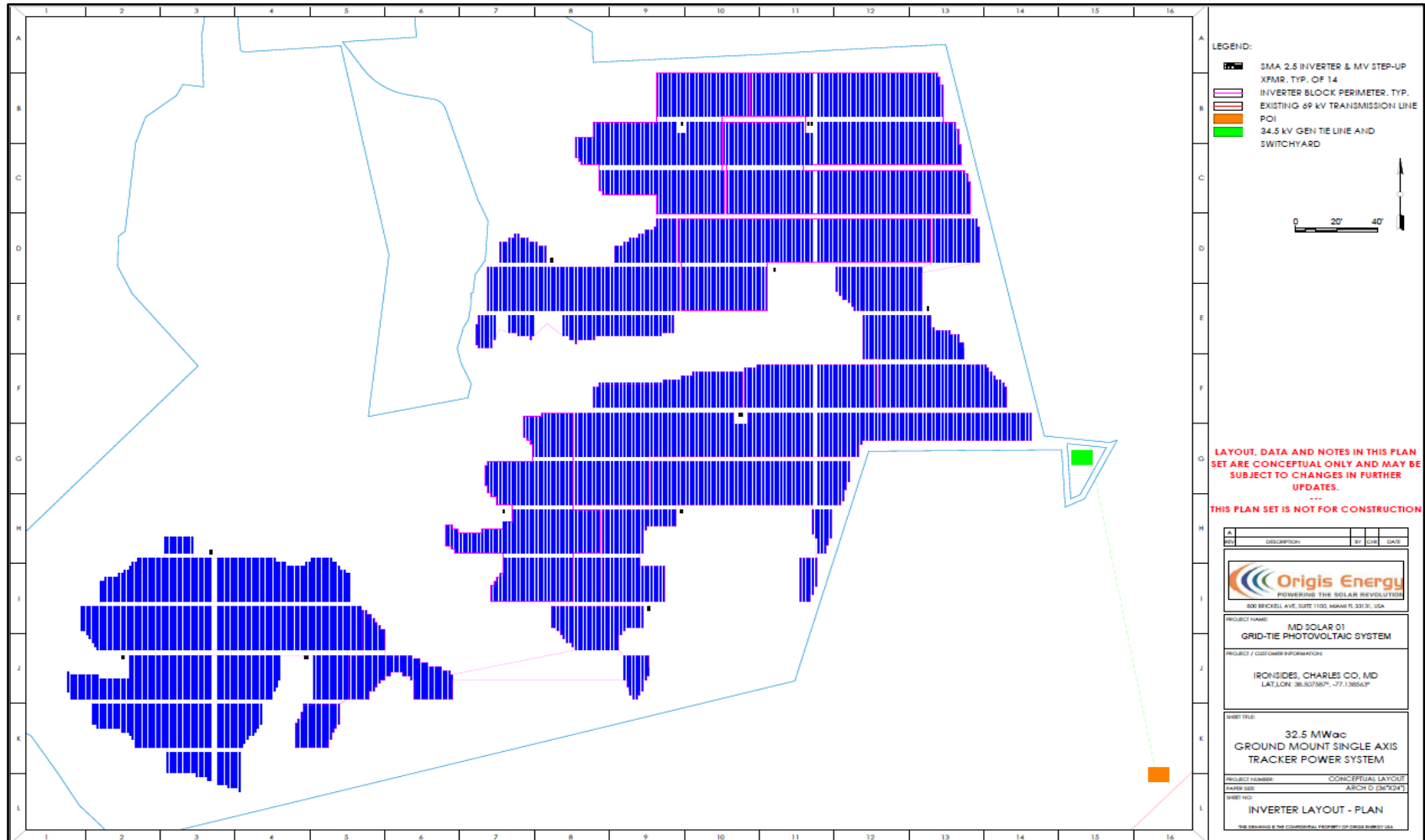


Figure 6 – Solar Array Section [Typical]

NOTES:

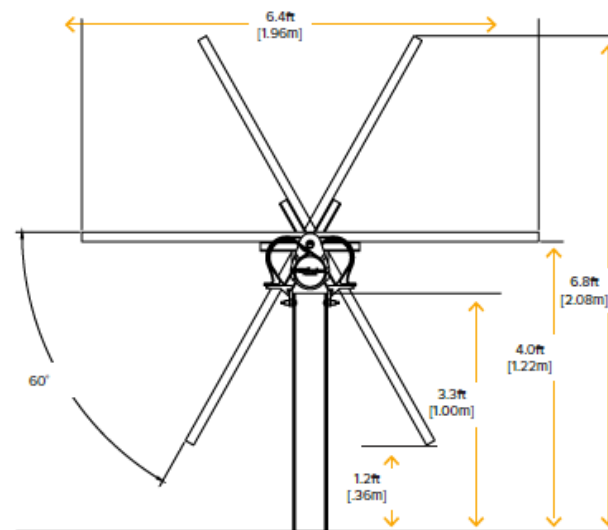
- 1. SYSTEM SPECIFICATIONS:
TOTAL SYSTEM:
40,000 – 46,000 KWP
32,500 KW AC
- 2. SINGLE AXIS TRACKING: 37.13 GCR
- 3. FENCE LAYOUT - 6' HIGH CHAIN LINK FENCE

(100,000 – 104,000 FIRST SOLAR FS-6420A THIN FILM MODULES, 6 MODULES PER STRING,
16,900 – 17,200 STRINGS)

(APPROX. 18,866 I-BEAM PILES)

(14 SUNNY CENTRAL 2500-EV (1500V) INVERTERS WITH NAMEPLATE 2500KW CAPACITY
EACH)

(1 INVERTER PER PAD)



NOTE: In accordance with §297-112, 7.07.200, the total height of the solar energy system, including any mounts, shall not exceed twenty-five (25) feet above the ground when oriented at maximum tilt.

SECTION 2 – STATEMENT OF NEED AND PURPOSE

The State of Maryland has enacted aggressive legal and policy standards in pursuit of more renewable energy generation within its borders. The State's goal and commitment is clear and widely considered to be among the most aggressive in the United States. Maryland's Renewable Portfolio Standard (RPS) mandates that twenty percent (25%) of Maryland's electricity be generated from renewable energy sources by 2020, which must include at least two percent (2.5%) solar energy. The RPS solar energy requirement increases each year from now until 2020 and the solar set-aside alone is projected to result in the need for at least 1,600 MW of solar capacity by 2020.

The Applicant proposes to develop and construct the Project as part of a PPA with a private client. There will be significant economic benefits resulting from the Project to include a capital cost of approximately \$31M to \$34M and approximately sixty to eighty (60-80) design, management, and construction personnel working remotely or on the Site at the height of construction to start in the Winter, 2018.

The construction schedule is estimated to be five (5) to six (6) months and is scheduled to be completed prior to June 30, 2019. It is also important to note that significant local resources are being employed as part of the design, entitlement, construction, and startup process. The tax revenue yield for a project of this size and type will also be significant. This Project will contribute to the local economy and Charles County's commitment to growing a "Green Economy", as well as the State's commitment to more instate renewable energy generation. It has been reported that Maryland imports upwards of forty-one percent (41%) of its required energy generation. This Project will help to reduce this reliance upon power generated out of state. Given the nature of solar power generation, it will also lead to reduced and more certain costs of electricity produced. Furthermore, this Project will contribute to the stated goals and objectives of Maryland Public Utilities Article § 7-702 and the goals and objectives set forth in Chapter 6 of Charles County's 2016 Comprehensive Plan.

The public benefit for the type of renewable energy offered by the Project has been clearly established by law. It is also clear that the State's requirements and commitments in this area are some of the most progressive in the United States. The Applicant, through this proposal, seeks to assist the State in its effort to meet these objectives and to create more renewable energy generation in Maryland. The Applicant, through this proposal, further seeks to assist Charles County's commitment to fostering "innovation and growth within its energy sector". The Project will deliver all of its output to the PJM wholesale electricity market via SMECO, through an overhead line tap 69 kV transmission line, at the proposed POI running along the south portion of the Project site. This interconnection will require several upgrades to the SMECO system as identified in **Appendix 1**.

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SECTION 3 – APPLICANT INFORMATION

A. NAME AND ADDRESS OF APPLICANT

MD Solar I, LLC
c/o Todd R. Chason
233 East Redwood Street
Baltimore, MD 21202

B. PERSON AUTHORIZED TO RECEIVE NOTICES AND COMMUNICATIONS

Mr. Jean David
MD Solar I, LLC
800 Brickell Avenue, Suite 1100
Miami, FL 33131
786-310-8365
jean.david@origisenergy.com

Mr. Todd R. Chason
Mr. David W. Beugelmans
Gordon Feinblatt LLC
233 East Redwood Street
Baltimore, MD 21202
tchason@gflaw.com
dbeugelmans@gflaw.com

C. LOCATION AT WHICH A COPY OF THE APPLICATION MAY BE INSPECTED BY THE PUBLIC

Charles County Department of Planning and Growth Management
200 Baltimore St
La Plata, MD 20646

SECTION 4 – STATE AND LOCAL PERMITS AND APPROVALS

(A Matrix of Permits and Approvals required for the Project follows as **Table 1.**)

A. MARYLAND PUBLIC SERVICE COMMISSION (PSC)

1. Certificate of Public Convenience and Necessity (CPCN)

This document accompanies the petition to the Commission requesting the grant of a CPCN for the Project.

B. INDEPENDENT SYSTEM OPERATOR

1. Interconnection

The PJM Generation Interconnection Feasibility Study has been completed and included in its entirety in **Appendix 1**. The System Impact Study Report is expected to be completed by February 28, 2018. Pursuant to the Generation Interconnection Feasibility Study Report performed by the PJM, this Site would generate thirty-two (32.5) MW and connect to SMECO via a new 69 kV switching station to be built adjacent to the Grayton-Ripley 69 kV circuit prior to being injected into the Hawkins Gate 69 kV Substation. Other miscellaneous improvements will be required which include but are not limited to the required 69 kV interconnection radial tap includes a lattice box switching station, two breakers, climate controlled control building, disconnect switches, bus work, metering, and communications. The Project has been assigned Queue Position AC2-101. Based on the findings from the Generation Interconnection Feasibility Study Report, these upgrades will cost an estimated \$1,447,782 which includes a lattice box switching station, breakers, climate controlled control building, disconnect switches, bus work, metering, and communications.

C. MARYLAND DEPARTMENT OF THE ENVIRONMENT

1. NPDES General Permit for Construction Activity

A National Pollutant Discharge Elimination System (NPDES) General Permit is required for planned construction activities with a planned total disturbance of one (1) acre or greater. Coverage under the General Permit is obtained by filing a completed Notice of Intent (NOI) form with the Maryland Department of the Environment, Water Management Administration (MDE/WMA).

The completed NOI form is considered a formal application for coverage and intent to comply with the terms of the General Permit. An NOI will be submitted to MDE during the construction drawing plan review phase.

D. MARYLAND DEPARTMENT OF NATURAL RESOURCES FOREST SERVICE

1. Forest Conservation Act

While generation facilities subject to a CPCN may be exempt from compliance with the Forest Conservation Act (“FCA”), the Project will voluntarily comply with the County’s Forest Conservation Ordinance. Accordingly, the Project will be reviewed by Charles County and an FCA worksheet prepared.

The FCA is implemented by local jurisdictions through ordinances. During the ERD/CPCN process the County completed a draft FCA Worksheet and computed a preliminary mitigation requirement. Based on these preliminary numbers and agreeing to place approximately two hundred fifty (250) acres into a FCE, no further mitigation is needed. Once the site plan/construction documents are substantially complete a final worksheet will be prepared and submitted to the County. ECS Mid-Atlantic has completed the necessary Forest Stand Delineation (FSD) (**Appendix 2**) and Forest Conservation Plan (FCP) (**Appendix 3**) which support these preliminary determinations.

As part of the FSD field work it was noted by ECS that the wooded area on this property has very little understory and no remarkable habitat. The woods in the central portion of the site are of poor quality, presumably from previous timbering operations and local conditions which have resulted in mostly scrub pines and evergreens. The wooded areas in the northeast and southwest portion of the property are primarily beech, maple and oak forests of fair quality, with some areas that appear to have been selectively timbered. The regrowth is scrubby and poor.

E. CHARLES COUNTY PLAN REVIEW AND PERMITTING

The Site is currently zoned Agricultural Conservation (AC). In Charles County, properties zoned AC allow utility scale solar generation facilities by Special Exception, as specified in the Charles County Zoning Ordinance. The Applicant will apply for a Special Exception from Charles County, which will ensure the Project is consistent with local zoning requirements. In discussions with Charles County Department of Planning and Growth Management, the County will also participate in the CPCN process, similar to previous solar projects approved in Charles County. This will allow the Applicant to address any issues raised by Charles County.

1. Site Plan Review / Approval and Local Permitting

As with other CPCN projects, site plan requirements may include, but may not be limited to, ingress/egress, setbacks and buffers, screening, internal drive aisles and access ways, Fire Marshal conditions/requirements, electric code requirements, building code requirements/references, sediment and erosion control, stormwater management, solar panel layouts including inverter locations and switchgear, gen-tie alignment and specifications, and a number of other requirements that parallel environmental requirements of the Maryland Environmental Article as may be delegated to local jurisdictions for implementation. Charles County has acknowledged that they will participate in the CPCN process while also reviewing the site plan for consistency and substantial conformance with local requirements at the same time they are providing input and comment to the CPCN application.

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The Charles County site plan review and approval process is managed by the Department of Planning and Growth Management. The Director of Planning oversees the site plan review process which primarily is a review of plans to assure consistency with zoning regulations. In preliminary meetings with the County, a key contact person has been designated to provide for the necessary coordination associated with the internal project review.

According to Charles County Code of Regulations, prior to the issuance of a "Development Services Permit", an applicant shall have submitted to the Department copies of the approved sediment and erosion control plan, a Development Services Permit application which includes the design of grading, storm drainage, stormwater management, roads, water, and sewer plans which meet the requirements of the chapter, copies of all other plans as required by the Department, the grading fee, meet the bonding requirements of this chapter, and any other document, report, application or form as required by the Department. Section 244-10, Minimum Application Requirements, details the engineering specifications and standard submittal requirements associated with the site plan and the other associated plans referenced above. This process is managed by the Chief Engineer in the Department. The primary focus of these reviews is to ensure the construction documents satisfy all State and County code.

Following submittal, Charles County processes the application similar to other counties in Maryland. Each department and specialist in charge of their discipline reviews the submittal followed by a Technical Review Committee (TRC) review session. TRC comments are addressed and a second TRC meeting will be held to review the revised site plan. Once TRC has made their final recommendations the plans are presented to the appropriate DPGM administrator for final approval. The site plan review application and the Development Services Permit application can be submitted simultaneously; however, our experience is that it is best to wait until after the first TRC review comments are issued before submitting for the Development Services Permit.

Although this is a glimpse into the local process that relates to the CPCN, **Table 1** below outlines the State and Local permits and approvals associated with these processes.

It is important to note that in developing the site plan and addressing site stabilization requirements that will be governed by the sediment and erosion control permit, the MDE will stipulate not more than twenty (20) acres can be disturbed at any time. This means that the sediment and erosion control plans will have to specify how each twenty (20) acres will be cut and the area stabilized before the next twenty (20) acres can be cleared. Since much of the area within the LOD will need to be cleared and graded to prepare the site for construction, it is anticipated that the stabilization of the site will be governed by this grading permit and the sediment and erosion control plans. This work will be completed and the site fully stabilized prior to any work being initiated on the installation of solar panels.

2. Grading, Electrical, and Building Permits

A Grading Permit, Electrical Permit, and Building Permit will be applied for after site plan approval. The construction documents will provide the detailed engineering and specifications required to implement the approved site plan leading to necessary Grading, Electrical, and Building Permits as required by Charles County.

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F. SUMMARY OF PERMITS/APPROVALS

Table 1 – Matrix of State/Local Permits and Approvals

Agency	Permit/Approval	Regulatory Citation (s)	Required For		Status			Waiver, Variance, or Exemption		Comments
			Construction	Operation	Application Contained Herein	Application to be Filed	Permit Approval/ Obtained	Yes	No	
State of Maryland Public Service Commission (PSC)	Certificate of Public Convenience and Necessity (CPCN)	COMAR 20.79	√		√				√	To be prepared at a later date.
PJM Interconnection, LLC	Interconnection	Condition for Issuance of CPCN		√			√		√	PJM Feasibility Study Report completed July, 2017. System Impact Study due February 28, 2018.
Maryland Department of the Environment (MDE)	National Pollution Discharge Elimination System (NPDES) General Permit for Construction Activity	COMAR 26.08, Clean Water Act (CWA) Section 401, 40 CFR 122	√			√			√	Application to be submitted at the time Construction Documents have been completed.
Maryland Department of Natural Resources Forest Service	Forest Conservation Act (FCA)	Natural Resources Article 5-1602(b)(5)							√	FCA has been determined by the PSC to be required for all solar generation projects.
Charles County	Environmental Site Design Erosion Sediment Control Construction Drawing Plan	Applicability varies according to Local and State Requirements	√			√			√	It is expected that the County, will participate in the CPCN process and provide input regarding the site plan, stormwater management, and sediment and erosion control. Grading, Electrical, and Building Permits will be obtained after construction drawings are approved.

SECTION 5 – COMAR 20.79.03.01 DESCRIPTION OF GENERATING STATION

A. LOCATION

The Project, as proposed by the Applicant, will consist of approximately two hundred forty-nine (249) acres of the five hundred thirty-seven (537) acres to be purchased from the James B. Busler family located at 4850 Shugart Valley Place in La Plata, Maryland (see **Figure 3**).

In accordance with §297-212, 7.07.200 of the Charles County Code, the proposed array layout will maintain a fifty-foot (50') setback from the property line (see **Figure 5**). Within this setback and in accordance with the Charles County Code, appropriate buffering/landscape screening, fencing, and emergency drive aisle will be located. Landscape plans, drainage plans, and stormwater management plans will be prepared for review and approval Charles County. These plans will clearly define how the Project will be stabilized and controls put in place. The perimeter fence, which is proposed to be a six foot (6') high chain-link fence (no barbed wire is proposed), will be located thirty-five feet (35') from the drip line of the wooded areas on the perimeter of the Project which are not to be cut (see **Figure 5**). This property is in close vicinity to the Hawkins Gate 69 kV Substation and will be connected to the nearby 69 kV line via an overhead line tap, as reflected in **Figure 5**. The electricity produced by the projects solar panels and inverters will be delivered through SMECO into the PJM Interconnection, LLC (PJM), System, the largest centrally dispatched control area in North America consisting of all or part of the States of Maryland, Pennsylvania, New Jersey, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia, and West Virginia. A PPA with a private client has been executed for this Project.

The Site (Charles County Tax Map 41 Parcel 24) is located at approximately thirty-eight degrees (38°30'23.8") latitude (North) and seventy-seven degrees (77°08'22.1") longitude (West) in the Lower Potomac River watershed. As stated above, the Lower Potomac River drains 730 square miles, including portions of Charles, Saint Mary's, and Prince George's Counties. The River is entirely tidal in the basin. Larger water bodies include Mattawoman Creek, Breton Bay, Nanjemoy Creek, and the Wicomico and Saint Mary's Rivers. The basin is located solely within the Coastal Plain physiographic province.

The surrounding areas and neighboring properties can generally be characterized as a combination of agricultural land uses, rural development, and forested lands.

B. DESIGN FEATURES

Total generating capacity for the Project is anticipated to be 32.5 MW AC output. The Project will consist of approximately 100,000 – 104,000 First Solar FS-6420A thin film modules (solar panels) as shown in the Solar Array Layout (see **Figure 5**). The array will be installed using a single-axis tracking; pile-driven post-supported racking system (galvanized steel post with galvanized steel or aluminum structure for mounting the panels). The space between rows will be approximately eighteen feet (18'). The minimum leading-edge height (bottom edge of modules) will be approximately one foot (1') from grade, and the maximum height of the top edge of the modules will be approximately seven feet (7') from grade. A typical Solar Panel Racking Detail depicts the array with portrait racking with one (1) row of modules positioned vertically (1V) on each rack (see **Figure 6**). In accordance with §297-112, 7.07.200, the total height of the solar energy system, including any mounts, shall not exceed twenty-five (25) feet above the ground when oriented at maximum tilt. The solar arrays will be designed to withstand

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snow load of twenty-five (25) pounds per square foot (psf) and wind of one-hundred fifteen (115) miles per hour (mph) (per IBC 2015 for Charles County).

Depending on final racking vendor selection and design, the number of racks could vary. Subject to final design, the typical three (3) string rows will consist of twelve (12) pile driven posts each serving as the foundation. Each post will be driven to an estimated depth of five feet (5') to seven feet (7') below grade (**Figure 6**).

There will be approximately fourteen (14) separate inverter pads each with one (1) inverter per pad. Each inverter pad will make up 1/14 of the array AC capacity, or approximately 2.50 MW, to convert the direct current (DC) energy to AC energy. Each power station will have a transformer to step up the AC voltage from 600V to 34.5kV for connection to the site substation, which will then via a GSU will increase the power to 69kV for the tie line to the SMECO transmission line.

A six-foot (6') high chain link perimeter fence will be installed around the Project with a service entrance accessible from Shugart Valley Place. There is limited need for water and no need for sewer at the Project site since there will be no operations and/or maintenance facilities as part of this Project and no full-time personnel located at this Site. The only water use associated with the operation of this solar generation facility will be semi-annual cleansing of the panels, which may take place one (1) or two (2) times a year. Typically, this cleansing utilizes only water sprayed from tanker trucks at relatively high speeds to remove dirt and dust from the panels.

1. Environmental Site Design (ESD)

a. ESD Components

i. Land Use and Cover

The Site primarily consists of forested areas which contain minimal wetlands and riverines. The Site is clear of any improvements. As noted elsewhere in this Report, the Property is not within the Critical Area, has no impact from FEMA, and is currently zoned Agricultural Conservation.

ii. Soils and Steep Slopes

The Project Site is located within the Coastal Plain area of Maryland, which is characterized by having high sand content, are moderately to well-draining, and compact easily. These types of soils will support access roads, drive aisles, and stormwater management structures that will be required. Detailed soils classifications are discussed below and shown on **Figure 4**.

The County's Grading and Sediment Control Ordinance defines steep slopes as slopes over fifteen percent (15%) grade. Grading is permitted provided an applicant obtains an approved erosion and sediment control plan. Steep slopes near streams are given additional protection through the Resource Protection Zone (RPZ); the minimum buffer from streams is increased to account for fifteen percent (15%) steep slopes contiguous or adjacent to the buffer. Areas of steep slopes over twenty-five percent (25%) and over 10,000 square feet are encouraged to be preserved as undeveloped open space under design standards contained in the subdivision regulations. For this Project these steeper slopes will be avoided.

As noted above, there are slopes between fifteen percent (15%) and forty percent (40%), which will be avoided during design. However, the majority of the soil types on the property where solar panels will be installed contain slopes of between zero percent (0%) to fifteen percent (15%) which are ideal

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for solar panel I-beams. Because of the proposed clearing and grubbing, grading will be needed associated with site preparation. In order to protect areas from erosion during clearing and grubbing, “state-of-the-art” sediment and erosion controls, stormwater management, and effective stabilization will be required. Under Maryland Law only twenty (20) acres at a time can be cleared and graded. Until each twenty (20) acre area is stabilized with a grass cover that is approved by the County Soil Conservation District Office, the next twenty (20) acres cannot be cleared.

According to the National Resources Conservation Service (NRCS) soils maps, approximately fifty percent (50%) of property contains a moderately well-draining Beltsville Silt Loam (BaB) soil which has ideal characteristics to support a solar array project with slopes averaging five percent (5%) or less. Another significant portion of the property consists of Grosstown soils (Grosstown-Marr-Hoghole (GmF), and Grosstown-Woodstown-Beltsville (GwD)) which are also well-draining. However, the GmF series which is mapped with approximately one hundred ten (110.7) acres consists of fifteen percent (15%) to forty percent (40%) slopes will not be cleared or mass graded.

The full soils report can be found in **Appendix 4**. These soils are suitable to support solar panels, inverters, switch gear, grass covered aisle ways, access roads, and associated drainage and stormwater management provided that areas of steep slopes are avoided.

As mentioned earlier, the impervious area created by the Project will exceed one (1) acre, so an NPDES General Permit (NOI) will need to be submitted to MDE. Impervious areas will be associated with improvements to the existing entrance of the property, inverter pads and switchgear, posts for the solar panel brackets and perimeter fencing, and other associated improvements. All of the internal service drives will be unpaved grass drive roads. The proposed ESD practices, screening, and other vegetative cover are expected to adequately address these increases to impervious areas. Any improvement to the site entrance off of the access road will be constructed with pervious material in order to stabilize this area for construction traffic to the Site.

Land disturbance for this Project will mostly be associated with the cutting and clearing of trees as well as associated mass grading. In selecting the LOD, soils with moderate slopes were preferred while steeper slopes have been avoided. There will be fifteen percent (15.80%) or less of impervious surface added. Impervious areas will be associated with some paving at the entrance of the property, the fourteen (14) inverter pads, piles for the solar panel and fencing, and associated improvements. See **Table 2** – Impervious Area Tabulation below.

Table 2 – Impervious Area Tabulation

Impervious Area Description	Length (FT)	Width (FT)	Area (SF)	Quantity	Total Area (SF)	Comments
Invert/Equipment Pads (Concrete)	28	14	392	14	5,488	Inverter Pad Site
Racking Posts	12-14	5.77	0.1816	18,866	3,426	Array Piers & Motor Piers
Array Field Access Ways – Grass Aisles	25,700	26	668,195	1	668,195	Grass Only, No Improvements
Proposed Entrance Improvements	200	10	2,000	1	2,000	Conceptual / Approximate
On-Site Substation Equipment Pad/Area (Private)	100	100	10,000	1	10,000	Equipment Pads
Total Impervious Area					689,109	SF
					15.82	Acres

Typically little or no grading is recommended for these projects since the goal is to significantly minimize disturbance. In this case some grading will be unavoidable in dealing with clearing, grubbing, and preparing the site for construction. The Applicant will use “state-of-the-art” methods to ensure that cleared areas are immediately stabilized. Super silt fence will be used on the perimeter of the area to be cleared to ensure downstream water quality is not impacted. Filter logs and sod will be used to stabilize drainage ditches in these areas.

All of the internal aisle ways will be unpaved grass roads. The proposed Environmentally Sensitive Design (ESD) practices, screening, and other vegetative cover are expected to effectively control sediment and erosion. Any improvement to the site entrance from the access road will be constructed with pervious material in order to stabilize this area for construction traffic to the site.

Using MDE guidelines for solar generation facilities, it is most likely that the civil engineer will prepare the stormwater management report and associated plans using a non-rooftop disconnection Best Management Practices (BMP) model. The entire Site will be planted and maintained in low cover grass vegetation in accordance with site plans and designs to be approved by the Soil Conservation District Office as part of the CPCN process.

iii. Stream Buffers and Floodplains

The Site (Charles County Tax Map 41, Parcel 24) is located at approximately thirty-eight degrees (38°30'23.8”) latitude (North) and seventy-seven degrees (77°08'22.1”) longitude (West) in the Lower Potomac River watershed. As stated above, the Lower Potomac River drains 730 square miles, including portions of Charles, Saint Mary’s, and Prince George’s Counties. The River is entirely tidal in the basin. Larger water bodies include Mattawoman Creek, Breton Bay, Nanjemoy Creek, and the Wicomico and Saint Mary’s Rivers. The basin is located solely within the Coastal Plain physiographic province.

The majority of the Site to be used for panel installation has moderate to low grades which are determined to be adequate to support the single-axis tracking design being proposed for the Project.

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According to FEMA FIRM Map Number 24017C0145D Panel 145 of 575, effective May 4, 2015, there are no mapped flood plains in the area of the proposed Project (see **Appendix 5**). However, as noted above, the mapped flood plains are proximate to the proposed location of the entrance road. Some improvements at this location may be warranted to ensure the entrance is not subject to periodic flooding.

Specifically, the proposed Project is within the Wards Run watershed which flows into Nanjemoy Creek and ultimately discharges into the Lower Potomac River. Wards Run watershed, a tributary of the Nanjemoy Creek is in the headwaters and significantly upstream of areas of environmental concern. Nanjemoy Creek flows directly into the Lower Potomac River. Although impairments identified in Maryland's 305(b) Report include nutrients and sedimentation, solar generation facilities typically stabilize the properties on which they are located. As stated elsewhere in this Report, solar generation facilities are considered environmentally friendly and would be more protective of water quality in this watershed than a residential subdivision, industrial development, or farming practices; all of which would be permitted by-right or Special Exception within the AC zoning.

All Maryland stream segments are categorized by sub-basin and are given a "designated use" in the Code of Maryland Regulations 26.08.02.08. Nanjemoy Creek/Lower Potomac River is protected as a Class IP Use.

The Site is outside the Critical Area (see **Appendix 6**) and contains soils which are moderate to well-drained and suitable for various ESD stormwater management practices. In as much as the Site is not located in a Critical Area, is not impacted by designated flood plains, and is outside of any boundary where wetlands have been delineated, there will be no measured impact to streams and/or flood plains; provided appropriate measures, such as super silt fence, are used as controls during cutting and clearing activities.

Jurisdictional waters identified onsite are not within the areas where solar panels will be located and the Applicant has agreed to keep the limit of disturbance thirty-five feet (35') away from these jurisdictional waters. MDE concurrence with the wetland locations were based on the report prepared by ECS Mid-Atlantic (see **Appendix 7**) which indicates the site configuration avoids any wetlands/jurisdictional waters. MDE confirmed these determinations/findings following a site visit on October 28, 2017 and their confirmations are included in **Appendix 8** respectively.

b. Impacts to Stormwater During Construction

COMAR 26.17.02.01-1B(1) requires that stormwater quality and quantity controls be implemented. Guidelines for Water Quality and Quantity through ESD techniques and Best Management Practices (BMPs) are included in the 2000 Maryland Stormwater Design Manual, Volumes I and II (2000) with Supplement No. 1. The specific ESD techniques to be employed on the Site as referenced above in more detail will consist primarily of non-rooftop disconnection BMPs.

c. Impacts to Stormwater During Operations

COMAR 26.17.02.01-1B(1) requires that stormwater quality and quantity controls be implemented. Guidelines for Water Quality and Quantity through ESD techniques and BMPs are included in the 2000 Maryland Stormwater Design Manual, Volumes I and II (2000) with Supplement No. 1. The specific ESD

techniques to be employed on the Site as referenced above in more detail will consist primarily of non-rooftop disconnection BMPs.

In summary, the disconnection credit will be the primary practice used to demonstrate compliance with treatment and ESD requirements.

For the ESD Storm Event, the Site will mimic a forested site in good conditions under the post-development scenario. The installation of the solar array will incorporate the use of piles with platforms erected above the ground surface thereby minimizing any need to treat or capture stormwater that is resulting from the construction operations. As a result of the proposed design and elevated panel system, vegetation will grow under the panels and essentially the entire field will remain in pervious vegetative cover. Consistent with the approved SCD Sediment and Erosion Control for the project, grasses will be selected which grow to a minimum height and can be easily maintained.

It should be noted due to previous selective timbering and localized soil/drainage conditions, there is very little understory or cover in the existing wooded areas. When the site is stabilized and a grass cover is established, water quality following rain events should be improved over current conditions; especially considering the property will be managed and maintained. Grasses, pollinators, and buffer plantings will provide an enhanced filtering process which will contribute to further water quality benefits.

2. Noise and Vibration

a. Impacts of Noise During Construction

Maryland noise pollution standards as referenced in COMAR 26.02.03 provide certain exceptions for noise sources and noise generating activities. During construction of this facility, all noise shall be maintained below the average daily ninety decibel (90 dB) rating at the property lines. **Table 3** lists the maximum allowable noise levels specified in the State regulations.

Table 3: Maximum Allowable Noise

Zoning Designation			
	<i>Industrial</i>	<i>Commercial</i>	<i>Residential</i>
<i>Day</i>	75	67	65
<i>Night</i>	75	62	55

Source: COMAR 26.02.03

Note: Day refers to the hours between 7 AM and 10 PM.

Night refers to the hours between 10 PM and 7 AM.

b. Impacts of Noise During Operation

The Project, once constructed, will have no moving parts but for the slowly rotating tracker mechanism. The only noise generated from the electrical equipment at the facility will be from the transformers and inverters at each pad. As utility scale solar generating power facilities become more common, more studies have been done demonstrating the low impact of noise during operation. Typical transformers used for a solar facility have a 50dB rating at one hundred feet (100'). The Project anticipates a low-level noise of interior to the perimeter fence. Noise reduction occurs at 6dB for every one hundred feet (100') of added distance. The closest residential dwelling is approximately one quarter (1/4) mile away from the

closest inverter pad and the dB levels at this location will be well below the sixty-five/fifty-five (65/55) dB levels identified above.

3. Lighting

Although there are no lighting requirements for the Project, the Applicant may consider minimal lighting for security considerations, or as required through the CPCN review process.

4. Fencing and Buffering

In accordance with §297-112, 7.07.200, the panel arrays will be enclosed and protected using a six foot (6') high chain link fence (no barbed wire is proposed) with an access gate on the proposed access drive. A buffer/landscape plan, which is compliant with Bufferyard D as set forth in the Charles County Code, will be provided as appropriate and depicted on the site plan submitted as part of this Application. As referenced above, the buffer/landscape plan will be included along with other site stabilization and landscaping required for the Project. This plan will be reviewed/approved by the Charles County Soil Conservation District Office in addition to reviews by Charles County DPGM.

5. Vegetative Stabilization

Turf style grasses that are conducive to growing in partial shade, so that vegetation can be maintained beneath and around the arrays, will be indigenous to the area and those typically recommended for use by Charles County SCD. This will also include a type and seed mix that provides low growth and low maintenance.

As noted above, the Applicant is also proposing to plant wild flowers that will promote the health of honey bees and other pollinators. Solar energy generation facilities are ideal opportunities to increase healthy habitats for pollinators.

6. Transportation

a. Transportation During Construction

Major material and equipment will be delivered by tractor-trailers and offloaded by construction vehicles (tulls, 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. Excavation and other equipment will be utilized during construction of the Project, which may include dump trucks, trenching equipment, concrete trucks, front loaders, backhoes, post installation equipment, excavators, and other equipment. Staging and parking areas will be designated on the site plan.

b. 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. Quarterly to yearly maintenance of the solar array components will be necessary, along with site visits for any operational issues that may arise during normal operation.

C. OPERATIONAL FEATURES

The operational features will be controlled through a Project Operations & Maintenance Agreement to track performance and monitor the health and safety of the solar field. Typical duties and features of this plan are:

- Local and remote control over key features of the Solar Fields Electrical System to assure compliance with the Interconnect Agreement and safety of the plant.
- Scheduling, control, and reporting of all onsite maintenance activities.
- Operations Center with remote monitoring of performance data and physical systems 365 days a year.
- Immediate dispatch of fire, police, or contractors in the event of emergency or force outage.

D. SCHEDULE FOR ENGINEERING, CONSTRUCTION, AND OPERATION

Engineering documents are being prepared and programmed for submittal as part of the CPCN joint review process with County representatives. The engineering and construction documents will include pertinent information regarding the solar panels, inverter pads, construction methods, electrical requirements, ingress and egress, stormwater management, sediment and erosion control, electrical connection to the grid/substation, fencing within the setback, landscaping and screening, and grading. Following CPCN approval, construction is anticipated to be initiated in the Winter, 2018 with completion and operational startup prior to June 30, 2019.

E. SITE SELECTION AND DESIGN

1. Project Design

See description in Section 5.B.1 above.

The design and associated energy output at the project site was modeled using PVSYST v6.64 in **Table 4** shown below. PVSYST is a photovoltaic solar project modeling software that is widely used in the solar power industry and is considered the state of the art standard for output simulation. The energy output simulated by PVSYST is based on the meteorological data at the project site, models of the system equipment such as the inverter and the solar panels, and project design specifications such as the number of panels in series (string sizing), system DC size, array type – fixed tilt or tracking, rack orientation, including azimuth and tilt, DC and AC wiring length, transformer losses, etc. PVSYST v6.64 was used to simulate the predicted energy output from the Project at approximately 70,000 to 73,000 MWhrs in the first full year of project operation.

Table 4 – PVSyst Inputs

Location:	Shugart Solar, MD
Time Zone:	UT-5
Nominal DC Rating (STC):	40,000 – 46,000 kWp
Nominal AC Rating:	32,500 kW
Operating Power (50° C)	40,323 kW
Array Tilt:	Single-axis tracking
Array Azimuth:	0°
Inverters:	Sunny Central 2500-EV 2500kVA -14 units
Modules:	First Solar FS-6420A, 420W modules (or equivalent)
Stringing:	6 modules in series

2. Solar Resource Data

A key input in simulating the power output from the project is the local solar resource data or insolation. Solar resource data is typically obtained from third party resources that provide long-term average meteorological data.

The weather file used for in the production analysis was from the Solar Prospector database. This is a tool created by US National Renewable Energy Laboratory (NREL) to provide information for Solar projects within the continental United States. The data is satellite based and includes the following variables: Global Horizontal Irradiance (GHI), Direct Normal Irradiance (DNI), Diffuse Irradiance, Ambient Temperature, and Wind Speed.

The Solar Prospector data was chosen over other common resources, like NREL’s TMY3 Class I sites, because the location is approximately seven (7.8) miles from the project site. The site is close to La Plata in Charles County, Maryland while the closest TMY3 class I site is approximately seven (7.8) miles to the west in Quantico, VA. Since Solar Prospector is satellite based, it is not restricted to information from a limited number of ground measurement equipment locations.

3. Modeling

PVSYST v6.64 uses a manufacturer-provided, independently certified model for the panel, inverter, and other components to simulate the output of the plant given racking orientation, row spacing, and other design variables. This output simulation degrades over the lifetime of the plant due to degradation in panel performance. Our main design variables and related settings are described in **Table 5**.

Table 5 - PVSyst Modeling Assumptions

Meteo Data:	CPR GHI Average TMY3 data at LatLon 38.50° N/-77.30° W
Albedo:	.20
Thermal Loss Factor:	Uc (const) 30 W/m ² K, Uv (wind) 0.0 W/m ² K / m/s
Wiring Ohmic Loss (DC):	1.6% at STC
Array Soiling Loss:	2.62% (Average)
Module Quality Loss:	-2.3 %
Module Mismatch Loss:	0.8% at MPP
Light Induced Degradation:	1%
Incidence effect, ASHRAE parameterization (bo parameter)	See Table 6 below.
AC loss, wires:	1.1% at STC
External transformer iron loss:	0.2% at STC
Resistive/Inductive losses	0.8% at STC
Collector Width:	1.23m
Collector Pitch:	5.4m

Table 6 – Incidence Effect Profile

0°	30°	55°	60°	65°	70°	75°	80°	90°
1.00	1.00	0.990	0.980	0.960	0.920	0.850	0.720	0.00

a. Soiling and Albedo Losses

Dust, snow, and other particles that settle on the array can attenuate the radiation that arrives at the panel and are referred to as soiling. Rainfall of greater than one half (0.5) inch per month is generally accepted as adequate to remove dust from the array and to prevent significant losses due to soiling. Given temperature ranges and anticipated rain on the site, we do not expect the continued soiling of the panels to be very heavy and have modeled an average of slightly more than two and a half percent (2.6%) loss in output due to soiling. In the event that the plant does not receive rainfall over an extended period, the panels may be washed to ensure that soiling is not exacerbated.

The albedo is the fraction of sunlight that is reflected from the ground and other surfaces surrounding the PV array. Albedo contributes slightly to the diffuse irradiance incident but for most fixed-tilt array designs, the energy model output will not be very sensitive to the model albedo parameter. The energy model for the Project uses twenty percent (20%) as the albedo model parameter, which is a typical value suitable for most situations.

b. Shading

If any structure blocks the sunlight falling on the panels in the array, output from the shaded panel can be significantly attenuated due to the electrical characteristics and design of the panels. Blockage may arise from objects such as hills or undulating terrain in the distance, transmission structures, trees, and

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buildings. The array can also create mutual shading between the rows of panels, particularly when the sun is low in the sky, i.e., in the morning or evening.

Given site constraints, array design can minimize the impact of mutual shading. However, location-specific factors will result in near and horizon shading from other objects. PVSYST includes built-in, sophisticated modeling of mutual shading between rows given the size of the panels and spacing between rows. For locations in which near and horizon shading are unavoidable, the impact of this shading should be accounted for, but in the case of this Project located in Charles County, west of Maryland, this is assumed to be minimal.

4. Sample Production Estimate Results

PVSyst Energy production results with estimated solar irradiation have been sampled and are included in **Tables 7a** and **7b** below. **Table 7a** summarizes total plant production for Year 1. **Table 7b** summarizes the detailed production statistics for the proposed system in the first year of operations.

Table 7a – Total Plant Production Estimate Results in Year 1

Parameter	Preliminary Estimate
Sample Annual Generation	72,411 MWh
DC Capacity Factor	19.12%
AC Capacity Factor	23.61%

Table 7b- PVSyst Modeling Monthly Energy in Year 1

Shugart Solar - 43.243DC 32.5AC SMA FSLR S6420W NEXTracker 5.4m pitch PF0.95 Ava
 Balances and main results

	GlobHor kWh/m ²	DiffHor kWh/m ²	T Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	EApGrid kVAh	PR
January	67.7	26.50	3.27	95.5	81.7	3584831	3616986	0.832
February	85.2	34.19	1.55	120.8	104.5	4587487	4648679	0.845
March	124.5	51.94	7.61	169.7	151.3	6376069	6475309	0.838
April	155.7	64.50	14.08	201.2	183.1	7273966	7397526	0.808
May	182.1	75.79	18.50	228.9	211.7	8241118	8388482	0.805
June	186.4	75.76	22.46	237.0	223.0	8681095	8843762	0.820
July	190.7	75.82	23.31	241.0	228.7	8943589	9110965	0.830
August	170.7	68.43	25.72	218.3	206.2	8107875	8255890	0.831
September	133.2	53.93	21.88	179.4	165.8	6757684	6873177	0.842
October	103.5	42.16	13.67	143.9	128.5	5451057	5532312	0.845
November	73.4	28.47	6.65	106.5	92.4	4013663	4060083	0.838
December	58.8	25.40	6.28	81.7	69.9	3009412	3026515	0.814
Year	1531.9	622.88	13.82	2023.8	1846.8	75027845	76229686	0.827

Legends: GlobHor Horizontal global irradiation
 DiffHor Horizontal diffuse irradiation
 T Amb Ambient Temperature
 GlobInc Global incident in coll. plane
 GlobEff Effective Global, corr. for IAM and shadings
 EArray Effective energy at the output of the array
 EApGrid Apparent energy to the grid
 PR Performance Ratio

5. MAA/FAA Glare Analysis Study

The Project is in relative close proximity to two airports (MD83 and Finagin Airfield) which are approximately 4.17 miles and 1.5 miles from the site, respectively. The results of the glare analysis (see **Appendix 9**) indicates there would be no impact to flight patterns associated with the two (2) airports identified above. The Applicant has also utilized the FAA Notice Criteria Tool and provided notification in accordance with that process. As of the date of this filing the Applicant has not heard back. However, a supplemental filing will be made with their responses once received.

Relative to any impacts to nearby residents, Solar Photovoltaic (PV) panels, such as those proposed for this Project, are designed to absorb the sun's rays, rather than reflect it, in order to convert the solar energy into electricity. The PV technology differs from concentrated solar technology, which uses mirrors to concentrate the sun's rays, common in desert settings. Solar PV panels are becoming the most common solar technology, are constructed of dark materials, and are covered with an anti-reflective coating. As a result, glare is not an issue. In fact, PV panels are increasingly being installed near numerous airports with the support of the DOE and FAA.

Notwithstanding the technical characteristics of the panel, the landscape buffer and the natural forested areas that surround the property, will likely absorb any residual glare that could potentially impact neighboring properties.

F. IMPACTS ON THE ECONOMICS OF THE STATE

Based on 2012 reports, Maryland continues to import approximately forty-one percent (41%) of its generation power. This Project will not only provide some measurable offset to these generation import numbers.

There will be significant economic benefits resulting from the Project to include a capital cost of approximately \$31M to \$34M and approximately sixty to eighty (60-80) design, management, and construction personnel working remotely or on the Site at the height of construction to start in the Winter, 2018.

By connecting with the electric distribution system serving Maryland, the Project will contribute towards compliance with the Renewable Portfolio Standard, which mandates that all suppliers that sell electricity at retail in Maryland accumulate solar renewable energy credits in an incrementally increasing percentage.

The Project should not detract from the value or diminish the characteristics of adjacent properties.

G. IMPACT ON THE STABILITY AND RELIABILITY OF THE ELECTRIC SYSTEM

In March, 2017 the Applicant initiated a process to be interconnected with the electric distribution grid serving Maryland by filing Interconnection Requests with PJM. The results of the interconnection feasibility study show no potential adverse impact to the stability or reliability of the local distribution system.

H. LOCATION AND MAJOR DESIGN FEATURES OF ELECTRIC SYSTEM UPGRADE

The physical interconnection to SMECO transmission line will include an overhead line tap at a new 69 kV switching station to be built adjacent to the Grayton-Ripley 69 kV circuit which is in close proximity to the Project prior to being injected into the Hawkins Gate 69 kV Substation. Since the Project will be connected to the grid through an offsite overhead line tap, easements will be required for extension to the Point of Interconnection (POI) per the PJM Feasibility Report and Impact Study Report. The Project's solar generation facilities will be connected to the SMECO 69 kV transmission line, at the proposed POI running along the south portion of the Project site. The coordinates for the proposed POI are 38.501 latitude, -77.126 longitude. The Project has been assigned Queue Position AC2-101. Based on the findings from the Generation Interconnection Feasibility Study Report, these upgrades will cost an estimated \$1,447,782 which includes a lattice box switching station, breakers, climate controlled control building, disconnect switches, bus work, metering, and communications.

I. IMPLEMENTATION SCHEDULE FOR THE PROJECT

The Project schedule identifies the following approximate implementation dates:

- Engineering and Permitting: June, 2017 through December, 2018
- Construction: Winter, 2018 through June 30, 2019
- Operation: July, 2019

SECTION 6 – COMAR 20.79.03.02 ENVIRONMENTAL INFORMATION

A. GENERAL INFORMATION

1. General Description of the Site and Adjacent Areas

The Site is located in La Plata – Charles County. As mentioned elsewhere in this report, the proposed Project consists of approximately two hundred forty-nine (249) acres of the total five hundred thirty-seven (537) acres to be purchased from the James B. Busler family. The Site is currently undeveloped, was farmed many years ago, and consists of low quality wooded areas that have been selectively timbered.

The portion of the property to be used for the solar project is gently rolling with grades from zero percent (0%) to fifteen percent (15%). Some grades in excess of fifteen percent (15%) will be used only to the extent needed to be PJM capacity requirements. Cutting and clearing will be needed and the remainder of the wooded area will be placed into an FCE in order to meet project FCA mitigation requirements. There are no FEMA flood plains located within the solar array site, no wetlands will be impacted, the Project is outside the Critical Area, and there are no other environmental issues associated with the Site or project development.

Site information contained in this report has been discussed and reviewed with various regulatory agencies including the Maryland Department of the Environment, Maryland Department of Natural Resources, Maryland Historic Trust, Charles County Department of Planning and Growth Management, Charles County Soil Conservation District Office, and representatives from the Critical Areas Commission. Through this review process, it was determined that there are no FEMA or wetlands impacts. MHT has reviewed the Area of Potential Effect and will not require further studies. In addition, the Project is not in a Critical Area, and there are no rare, threatened or endangered species.

Previous disturbances to the site included farming and timbering with the current physical characteristics remaining as forested areas. Due to the relatively low quality of the scrub pine, lack of understory, and visual erosion, the Project is likely to benefit the site by adding significant stabilization following cutting and clearing. Also, adding pollinators, landscape buffer, and a property maintenance plan will more than likely improve water quality leaving the site following rain events. During the field work associated with the Forest Stand Delineation, ECS noted the number and variety of habitats were of fair quality. The Site contains flora and fauna that are common to the area.

The Project received a letter from the Wildlife and Heritage Services which indicates there is no State or Federal Record for listed plant or animal species documented on this site.

In summary, the property is not located within a Chesapeake Bay Critical Area, or within any stream buffer, special planning area, protected watersheds, reservoirs, or other impoundment drainage areas. The Project is also not anticipated to compromise any esthetic or cultural resources.

a. Geology/Soils.

As noted above, the Site is outside the Critical Area and contains soils which are moderate to well drained. The principal soil components on this Site as shown in **Figure 4** above consist of Beltsville soils (BaB, BaC, BcA, and BgB) and Grosstown-Woodstown Beltsville (GwD) which accounts for approximately fifty-

five percent (55%) of the total property but almost ninety percent (90%) of the proposed LOD. The remainder of soils within the LOD are silt loams which contain higher slopes.

The presence of these silt loam soils are suitable for achieving drainage requirements, meeting State Environmentally Sensitive Design (ESD) Best Management Practices (BMPs) for stormwater management, and for the needed compaction relating to other improvements associated with roads, inverter pads, switchgear, etc. The full geotechnical report can be found in **Appendix 10**.

b. Land Use and Cover

As noted above, the Site primarily consists of forested areas which contain minimal wetlands and riverines, is not within the Critical Area, has no impact from FEMA, and is currently zoned Agricultural Conservation. The Site is clear of any improvements. The primary entrance for the solar generation facility will be from Shugart Valley Place.

There are no other unique land uses or covers which would create any type of conflict or impairment for the proposed Project.

c. Stream Buffers and Floodplains

The Project is not located in the Chesapeake Bay Critical Area. There are no FEMA mapped flood plains located within the LOD. As noted above, the mapped flood plains are proximate to the proposed location of the entrance road. Some improvements at this location may be warranted to ensure the entrance is not subject to periodic flooding.

d. Flora Resources

Forest lands represent the dominant land use in Charles County with approximately 164,600 acres or fifty-six percent (56%) of the land area. According to the County's Comprehensive Plan, the County's forest conservation ordinance applies to all lands outside the Critical Area and requires development proposals to include forest stand delineations and forest conservation plans. The forest conservation plan can require afforestation or reforestation. Afforestation is planting trees where forest cover has been absent, such as farm fields. Reforestation is replacing existing trees. For this Project mitigation will be achieved through the creation of a substantial FCE.

e. Fauna Resources

Charles County's extensive open water shoreline marshes and mature forests provide excellent habitat for numerous plant, fish, bird, amphibian, reptile, insect, and mammal species. Anadromous fish, species that live in marine environments and migrate to freshwater to spawn, utilize the Patuxent, Potomac and Wicomico Rivers. Striped bass spawning occurs in the Potomac River between Indian Head and Riverside. Remaining portions of the river are important nursery areas for spot, croaker, gray trout, white perch, and yellow perch. Colonial water bird nesting sites, and waterfowl staging and concentration areas exist along tidal shorelines, tributary streams, and non-tidal wetlands throughout the County. The only colonial water bird to nest in Charles County in recent history is the Great Blue Heron. Great Blue Heron rookeries can be found on Mattawoman Creek, Nanjemoy Creek, Zekiah Swamp Run, and Swanson Creek, and numerous active Bald Eagle nests have been identified along the County's extensive shoreline.

**SHUGART VALLEY PLACE SOLAR PROJECT
CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY
ENVIRONMENTAL REVIEW DOCUMENT**

Since there are 164,600 acres of forested land within the County, much of which is along the Potomac River, this creates a natural habitat for all types of birds. Many of the birds of prey and migratory song birds found in Charles County are classified as Forest Interior Dwelling Species (FIDS). Large forests are required to support these populations. The County Subdivision Regulations protect habitat areas, including but not limited to Forest Interior Dwelling Bird habitat and Rare, Threatened, and Endangered Species.

However, the proposed Project is far upstream of these protected habitats and located in the headwaters of the Nanjemoy watershed where most of the land use is mixed agriculture and rural development.

f. Other Sensitive Areas

As noted in **Appendix 11**, the Department of Natural Resources found there were no other sensitive areas documented at the Site.

2. Summary of Environmental and Socioeconomic Effects

It is the Applicant's contention that the Project's construction and operation will have no significant adverse environmental or socioeconomic impacts.

a. Environment Resources

The Project is extremely environmentally friendly. It is not located in the Critical Areas and will not impact wetlands. The Project has been reviewed by the MDE and determination has been made that wetlands will not be impacted because panels can avoid these areas and the solar design incorporates a thirty-five foot (35') setback from remaining wooded areas will be maintained. According to the Department of Natural Resources there are no rare, threatened, or endangered species onsite. According to the FEMA FIRM Map Number 24017C0145D Panel 145 of 575, effective May 4, 2015, there are no mapped flood plains in the area of the proposed Project. All of the mapped flood plains are to the north and west of the LOD and do not impact the proposed Project design. The Project's construction activities which would lead to additional impervious area will be minimal since the structures are built on pilings and there are very few paved areas to be created with the exception of the pads for inverters and switchgear.

b. Cultural Resources

The Applicant has communicated with MHT and received a response indicating the Project is not located in an area of interest (see **Appendix 12**).

c. Historic Building Environment

As noted above, the Applicant has submitted the appropriate documents to the Maryland Historic Trust (MHT). The have indicated the Project is not located in an area of interest (see **Appendix 12**).

d. Archeological

See items b and c above.

e. Consultation with Consulting and Interested Parties

As noted above, the Applicant is complying with MHT requirements.

3. Environmental Studies

a. Routine Wetlands Delineation Study

MDE's Mr. Jeff Thompson of the Nontidal Wetlands Program, along with representatives from PPRP, ECS, and H&B conducted a joint site visit to review areas immediate and adjacent to the site which would be avoided during design and construction. ECS's report of findings is included as **Appendix 7**. MDE's response to ECS's findings as well as observations during the site visit on October 28, 2017 are included as **Appendix 8**. To summarize, the findings document wetlands on the property to be mostly in the wooded areas and in areas which can be easily avoided.

b. Natural Resources Inventory

H&B Solutions, LLC prepared an Environmental Due Diligence and Site Feasibility Report for MD Solar I, LLC, dated May 15, 2017. A summary of these findings follows:

- The Project is zoned AC.
- The project is not within the Critical Area.
- Based on the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps, there are isolated Freshwater Forested/Shrub Wetlands and Riverines. A twenty-five foot (25') setback will be required from both. However, because of the large size of the property and the minimal environmental constraints associated with these few wetland/riverine features, the design should be able to easily avoid these areas and apply appropriate setbacks without negatively impacting the proposed solar array layout.
- A site visit will need to be conducted to obtain MDE concurrence that wetlands/riverines can be safely avoided without impacting the Project or requiring any type of wetlands permit from the MDE or the US Army Corps of Engineers (COE). These field visits should be attended by H&B with an MDE representative and ECS Mid-Atlantic (ECS), who will be providing the written wetland avoidance and minimization field report for H&B to submit to MDE.
- According to FEMA FIRM Map Number 24017C0145D Panel 145 of 575, effective May 4, 2015, there are no mapped flood plains in the area of the proposed Project. The closest flood plain borders on the north and west property line boundary near the location of the proposed entrance to the Project. This Zone is classified as a Special Flood Hazard Area subject to inundation by the one percent (1%) annual chance flood.
- According to the National Resources Conservation Service (NRCS) soils maps, approximately fifty percent (50%) of property contains a moderately well-draining Beltsville Silt Loam soil which has ideal characteristics to support a solar array project with slopes averaging five percent (5%) or less. Another significant portion of the property consists of Grosstown soils which are also well-draining; however, the Grosstown-Marr-Hoghole series which is mapped with approximately one hundred ten (110.7) acres consists of fifteen percent (15%) to forty percent (40%) slopes. Everything in this category which exceeds fifteen percent (15%) should be avoided.
- As indicated above, it is anticipated that trees will be cut. As a result, the Project will have to comply with FCA requirements and mitigate by creating an FCE.
- A desktop review of the Maryland Historical Trust (MHT) inventory revealed no historic buildings or archeological concerns along Shugart Valley Place.
- As indicated above, DNR's Natural Heritage program has reviewed the project site and determined that no State or Federal records for listed plant or animal species (see **Appendix 11**). DNR did note that consideration should be given to the FID habitat that can be found in

this type of forested area. Specifically, it was indicated that interested land owners can contact DNR in regard to voluntary guidelines available to help conserve this important habitat.

c. Environmental Review Request

As indicated above, DNR's Natural Heritage program has reviewed the project site and determined that no State or Federal records for listed plant or animal species (see **Appendix 11**).

d. Cultural Resources Due Diligence Resources Investigation

As mentioned elsewhere in this report, an environmental screening of architectural and archeological site investigation was conducted by MHT. No further action required.

e. Geotechnical Investigations

The Applicant has engaged ECS Mid-Atlantic to perform necessary geotechnical and seismic analysis to demonstrate the site is suitable to support the proposed solar generation facility. The Preliminary Geotechnical Assessment is included in **Appendix 10**. The seismic analysis will be performed once the one hundred percent (100%) construction documents are complete.

4. Ability to Conform to Applicable Environmental Standards

The Project's design and construction will require review by state and local authorities through the CPCN process. The Project will also comply with various federal and state environmental regulatory requirements as applicable.

B. AIR QUALITY

1. Compliance with Federal or State Air Quality Standards

As a solar generation facility, the Project will emit no pollutants, and the below listed standards, provisions, and requirements will not be applicable.

a. Air Quality During Construction

The primary air-quality issue during construction will be dust from non-point sources such as earthwork and construction traffic on unpaved roads. This type of dust is described as fugitive dust. Fugitive dust is expected to be less than a normal construction project since this Project will not require excessive earthwork activities. Other potential sources of pollutants during construction are mobile internal combustion engines from earthwork equipment and an increase in vehicle traffic by workers. Emissions from these sources should have little impact.

b. Air Quality During Operation

The Project, like all solar generation facilities, will generate no air pollution emissions during its operation.

2. Impact on Deterioration Areas and Nonattainment Areas

The Project will have no impact on any attainment or nonattainment areas of the State.

3. Requirements Under COMAR 26.11

Generally, the provisions of COMAR 26.11 will not be applicable to the Project as the facility will not emit pollutants.

C. WATER QUALITY AND APPROPRIATION

1. Availability of Surface Water and Groundwater

As a standalone unmanned facility, there will be limited water and no sewer requirements for the Project. The Project will not require surface or groundwater for construction or operation. Normal rain events will keep manual cleanings of the solar panels to a minimum. Occasional water for quarterly/semi-annual cleanings may be required. Water tanker trucks may be used to manage dust during construction if required.

2. Affected Streams and Aquifers

As mentioned above, the MDE has determined there are no jurisdictional waters within the Project boundary. The majority of the wetlands on the property are in the woods and will not be disturbed. The Project will be located thirty-five feet (35') from the drip line of these wooded areas. The Site is located in the Nanjemoy watershed which discharges to the Potomac River. No impacts to streams or aquifers are anticipated as a result of the Project.

3. Impact on Other Water Users

No impact to other water users is anticipated as a result of the Project.

a. Impacts to Other Water Users During Construction

It is assumed that there will not be a need to use water during construction. If water is needed to control dust, a tanker truck will be provided.

b. Impacts to Other Water Users During Operation

Stormwater facility approvals, sediment and erosion control permits, grading permits, and NOI coverage under the NPDES Program will all be obtained as controls on the water quality leaving the Site. As an unmanned facility, there will be no ongoing water consumption requirement. Any other interim water consumption required will be fairly intermitted and provided as identified above.

4. Mitigation and Minimization Techniques Evaluated

No impacts to water quality or appropriation are anticipated. As a result, mitigation and minimization techniques are not warranted.

5. Requirements Under COMAR 26.17.06.07 and 26.17.07

It is assumed that there is no reason for permits to be issued under COMAR 26.17.06.07 and 26.17.07 since no water use or appropriation is required for the Project.

D. DESCRIPTION OF EFFECT ON STATE OR PRIVATE WETLANDS

1. Public Health and Welfare

The Project's operation will not produce, emit, or discharge any significant noise, air pollutants, or water pollutants, which may have an effect on public health or welfare. Additionally, the Project will not generate, transport, store, treat, and/or dispose of hazardous waste as a result of the Project's operation.

2. Marine Fisheries

The Project will not impact marine fisheries.

3. Shell Fisheries

The Project will not impact shell fisheries.

4. Wildlife

There are no known federal or state listed rare, threatened, or endangered species at the Project Site. The Project is not anticipated to impact critical habitats.

5. Protection of Life and Property from Flood, Hurricane, or other Natural Disaster

This Project is unique in the aspect that during a natural disaster there would only be destruction to the panel array itself. Total destruction of the panel array and the transformers would not release harmful gases or liquids and would have no adverse effects on surrounding property or life. All components of the Project will be designed per the local and state building codes. Also, there are no floodplains located onsite and the design will make considerations for the existing drainage patterns.

6. Mitigation and Minimization or Replacement Land Acquisition

Mitigation and minimization or replacement land acquisition is not applicable to the Project.

7. License for use of State Tidal or Nontidal Wetlands

The information and forms required by the MDE regulations relating to a license for use of State tidal wetlands or nontidal wetlands under COMAR 26.23 and 26.24 are not required for this Project.

E. WASTE HANDLING

1. Waste Handling During Construction

During construction, the contractor will collect any waste material and remove it from the Site to an approved waste handling facility. Large amounts of waste during construction are not anticipated. Waste material will

mainly consist of packaging materials from the framing and electrical equipment that will be delivered to the Site.

2. Waste Handling During Operation

During operation, there will be little or no waste material generated at the Site. Any waste that is generated from maintenance and/or repair operations will be removed from the Site and disposed of at an approved waste handling facility. There will be no sanitary sewer waste generated at the Site.

3. Waste Handling During Decommissioning

Waste associated with decommissioning and deconstruction of the Project will be handled appropriately pursuant to a Decommissioning Plan provided to the Commission and Power Plant Research Program. Once the life of the Project is complete, the land will revert back to its original condition.