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November 30, 2018

VIA HAND DELIVERY

Terry J. Romine, Executive Secretary
Maryland Public Service Commission
William Donald Schaefer Tower
6 Saint Paul Street, 16th Floor
Baltimore, Maryland 21202

Re: IN THE MATTER OF THE APPLICATION OF MORGNEC ROAD SOLAR, LLC FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 45.0 MW SOLAR PHOTOVOLTAIC GENERATING FACILITY IN KENT COUNTY, MARYLAND

Dear Ms. Romine:

Please find enclosed for filing the Application of Morgnec Road Solar, LLC for a Certificate of Public Convenience and Necessity authorizing the construction of the Morgnec Road Solar Project in Kent County, Maryland. Included for filing are an original and 17 copies of the Application and an electronic copy on compact disc in PDF format. The application consists of a CPCN application petition, an Environmental Review Document, and associated appendices. Also included is a check in the amount of $10,000 payable to the Maryland Public Service Commission as payment for the required filing fee.

Please do not hesitate to contact me if you have any questions.

Very truly yours,

Todd R. Chason/C.A.

Todd R. Chason

TRC
Enclosures

County Commissioners
Office
Date 12/03/18

6553133.1 44857/132882 11/30/2018

GORDON·FEINBLATT LLC
ATTORNEYS AT LAW

CERTIFICATE OF SERVICE

On November 30, 2018 copies of the foregoing Application for Certificate of Public Convenience and Necessity were sent to the below-listed agencies in accordance with COMAR 20.79.02.02:

4 copies to:
Ben Grumbles, Secretary
Maryland Department of the Environment
1800 Washington Blvd., 7th Floor
Baltimore, MD 21230

1 copy to:
Wendi W. Peters, Secretary
Maryland Department of Planning
301 W. Preston Street, Suite 1101
Baltimore, MD 21201-2305

6 copies to:
Mark J. Belton, Secretary
Maryland Department of Natural Resources
Tawes State Office Building, C4
580 Taylor Avenue
Annapolis, MD 21401

1 copy to:
Mike Gill, Secretary
Maryland Department of Commerce
401 E. Pratt Street
Baltimore, MD 21202

1 copy to:
Peter K. Rahn, Secretary
Maryland Department of Transportation
7201 Corporate Center Drive
P.O. Box 548
Hanover, MD 21076

1 copy to:
Paul J. Wiedefeld, Executive Director
Maryland Aviation Administration
P.O. Box 8766
Third Floor, Terminal Building
BWI Airport, MD 21240-8766

1 copy to:
Gregory C. Johnson, Administrator
State Highway Administration
Maryland Department of Transportation
707 North Calvert Street, Room C-400
Baltimore, MD 21202

1 copy to:
Mary Beth Tung, Director
Maryland Energy Administration
1800 Washington Blvd., Suite 755
Baltimore, MD 21230

1 copy to:
Paula M. Carmody, Esquire
Office of People's Counsel
William Donald Schaefer Tower
6 St. Paul Street, Suite 2102
Baltimore, MD 21202-6806

1 copy to:
Ryan Zinke, Secretary
U.S. Department of the Interior
1849 C Street NW
Mail Stop 7229
Washington, DC 20240

1 copy to:
Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

1 copy to:
Daniel K. Elwell, Administrator
Orville Wright Bldg. (FOB10A)
Federal Aviation Administration National Headquarters
800 Independence Avenue, SW
Washington, DC 20591

1 copy to:
Jim Kurth, Acting Director
U.S. Fish & Wildlife Service
Main Interior
1849 C Street NW, Room 3358
Washington, DC 20240-0001

1 copy to:
Gary R. Stockbridge, President
Delmarva Power Region for PHI
401 Eagle Run Road
Newark, DE 19714-9239

1 copy to:
Kent County Planning, Housing, and Zoning Office
400 High Street
Chestertown, MD 21620

1 copy to:
Kent County Commissioners
400 High Street
Chestertown, MD 21620

David W. Beugelmans/C.J.
David W. Beugelmans

6553133.1 44857/132882 11/30/2018

BEFORE THE PUBLIC SERVICE COMMISSION OF MARYLAND

IN THE MATTER OF THE APPLICATION OF MORGNEC ROAD SOLAR, LLC FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 45.0 MW SOLAR PHOTOVOLTAIC GENERATING FACILITY IN KENT COUNTY, MARYLAND	* * *	Case No.

* * * * * * * * * * * * *

APPLICATION OF MORGNEC ROAD SOLAR, LLC FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AND REQUEST FOR WAIVER OF TWO-YEAR NOTICE PROVISION

Morgnec Road Solar, LLC ("Applicant"), by its undersigned counsel, hereby submits this Application to the Public Service Commission ("Commission") for a Certificate of Public Convenience and Necessity ("CPCN") to construct a nominal 45.0 megawatt ("MW") alternating current ("AC") solar photovoltaic facility ("PV") in Kent County, Maryland ("Morgnec Road Solar Project" or "Project") pursuant to Md. Public Utilities Article ("PUA") § 7-207.

The Application is comprised of this petition together with the attached Environmental Review Document ("ERD") and associated appendices. Additionally, the Applicant respectfully requests a waiver of the two-year notice provision. Section I of this petition provides an overview of the Project; Section II justifies the Commission's approval of the application; Section III provides the information required by PUA § 7-207; and Section IV requests waiver of the two-year notice provision.

I. PROJECT INTRODUCTION

The Morgnec Road Solar Project will be a 45.0 MW AC solar PV project on two parcels totaling approximately 253.16-acres of property in Kent County, Maryland (Tax Map 37, Parcels 40 and 174) (the "Property") and accompanying interconnection facilities necessary to interconnect the Project to the Chestertown Substation.[1] The Project will involve a capital investment of approximately $80 million and create approximately 100-200 temporary design, management, and construction jobs working remotely or on the site at the height of construction. Construction is estimated to be complete prior to December 2021, subject to permitting restrictions. Because of the nature of solar installations, environmental and land use impacts from the Project will be minimal and the long-term benefits significant.

Maryland has established one of the most aggressive renewable portfolio standard requirements in the country, aiming for 25% of its power to be renewable by 2020, including 2.5% from in-State solar. In order to meet these goals Maryland needs not only small, residential rooftop installations, but large utility-scale facilities like the Morgnec Road Solar Project.

In summary, there are compelling economic, environmental and legal reasons for the State and the Commission to expeditiously approve this CPCN application, with no countervailing harm. Accordingly, we ask the Commission to expeditiously approve the Project.

[1] The Project's interconnection facilities are explicitly included within the scope of this Application.

II. CPCN STANDARD

When the Commission considers whether to grant a CPCN, it must take into account "the effect of the generating station, overhead transmission line, or qualified generator lead line on:

(i) the stability and reliability of the electric system;

(ii) economics;

(iii) esthetics;

(iv) historic sites;

(v) aviation safety as determined by the Maryland Aviation Administration and the administrator of the Federal Aviation Administration;

(vi) when applicable, air and water pollution; and

(vii) the availability of means for the required timely disposal of wastes produced by any generating station."

PUA § 7-207(e)(2). Additionally, the Commission must also consider "for a generating station:

(i) the consistency of the application with the comprehensive plan and zoning of each county or municipal corporation where any portion of the generating station is proposed to be located; and

(ii) the efforts to resolve any issues presented by a county or municipal corporation where any portion of the generating station is proposed to be located."

PUA § 7-207(e)(3). The attached ERD and associated appendices provide significant detail as to all applicable factors, but in summary each such factor weighs heavily in favor of granting the Applicant's requested CPCN.

Unlike other utility-scale solar projects previously proposed in Kent County, the Project is not located in an Agricultural Zoning District, on prime farmland, or in a Priority Preservation Area. Rather, the parcels are zoned as Rural Residential and Community Residential Districts and located close to the Town of Chestertown. *See* ERD at § 5.A. While it is well settled – and recently reaffirmed by the Court of Special Appeals – that the Commission's CPCN review

authority preempts local zoning requirements,[2] Kent County's existing land use requirements would preclude development of the Project in the absence of a CPCN. *See generally* Kent County Land Use Ordinance Article V, Section 4.2 (setting forth permitted principal uses and structures in Rural Residential Districts). The proposed array layout has been updated to accommodate the Applicant's understanding of potential project concerns and to support the Applicant's request for a Text Amendment to the Kent County Land Use Ordinance, which is currently in process. This Text Amendment would allow for utility scale solar projects in the Rural Residential and Community Residential District by Special Exception. Since the CPCN process encourages local participation, the Applicant intends to promote this inclusive process as part of its design approach and to continue to incorporate community input to the extent practicable. *See* ERD at § 4.E.2.

The Applicant has carefully sited the Project in an ideal location for solar generation. The surrounding properties have not been developed for residential purposes and have not remained agricultural. Instead, the area along Morgnec Road near the Project is a commercial and industrial mix. *See* ERD at § 5.A. The properties immediately across Morgnec Road from the Project are zoned as an Industrial District (the only zoning classification in Kent County that permits utility-scale solar projects) and contain modern corrugated metal industrial buildings, a junkyard, and other industrial facilities of no historical significance. *Id.* Given the Project's location close to a developed population center and adjacent to commercial and industrial facilities, the Project would not interrupt the continuity of agricultural activities in Kent County.

[2] *See Board of County Comm'rs of Washington County et al. v. Perennial Solar, LLC*, ___ Md. App. __, No. 1022, Sept. Term 2016 (Nov. 15, 2018) (finding that the Commission's CPCN authority preempts, by implication, the entire field of solar project siting, including local zoning ordinances). *See also Howard County v. Potomac Electric Power Co.*, 319 Md. 511 (1990); *Potomac Electric Power Co. v. Montgomery County*, 80 Md. App. 107 (1989). *See also* Case No. 9198, Order No. 82892, at 8 (September 9, 2009) (affirming that the Commission's CPCN authority "supersede[s] what normally would be a local land use decision"); Case No. 9411, Public Utility Law Judge's Ruling on Motions, at 1-2 (April 27, 2016); Case Nos. 9387 and 9392, Order No. 87835 (October 21, 2016).

Id. The Property is also located immediately adjacent to an area designated by Kent County as a Priority Funding Area, a desired location for growth. *Id.* The Project's location clusters growth around an established area of priority development, protecting Kent County's prime farmland and rural character.

Consistent with previously issued CPCNs, it is the Applicant's intent to ensure the Project substantially conforms to the substantive requirements of the Kent County Land Use Ordinance in existence at the time this Application was filed the Commission, with the exception of any requirement that would restrict the size and scale of, or otherwise prohibit, the Project. *See* ERD at § 4.E.2. Specifically, given the Project's close proximity to an Industrial District, the Project will be designed in substantial conformance with Kent County Land Use Ordinance Article V, Section 15.2.18, which sets forth Kent County's requirements for utility-scale projects in Industrial Districts. *Id.* The Project will also be designed in substantial conformance with Kent County site plan, stormwater management, sediment and erosion control, and forest conservation requirements and apply for local non-discretionary permits, including for a grading permit, building permit, and electrical permit. *Id.* The Project will avoid all wetlands and the Critical Area and Resource Conservation Area. *See* ERD at § 6.A.1.

At the same time, the esthetic impact to the Property and surrounding area will be minimal. The panels will be low to the ground and, where appropriate, screened from view and set back from adjacent properties. *See* ERD at § 5.A. The Applicant has engaged a professional landscape architect to develop a screening design and will seek approval of its final screening plan. *See* ERD at § 5.B.4. The Project will also be surrounded on three sides by heavily wooded areas, providing a significant natural buffer. *Id.* The Project will use underground cabling to avoid new overhead electrical cabling for purposes of connecting to the point of interconnection.

See ERD at § 1. Visually, the only impacted properties will be the commercial and industrial facilities located across from the Project on Morgnec Road. *See* ERD at § 5.A.

The Project is also coordinating with the Maryland Historical Trust ("MHT") to address any impacts to the historic built environment and/or archeological resources as determined appropriate by MHT. *See* ERD at § 6.A.2.b. If necessary, the Project will implement appropriate mitigation measures through a memorandum of understanding with MHT that will mitigate any impacts (to the extent any are determined to exist) on the Historic Built Environment and the Stories of the Chesapeake Heritage Area.

With respect to the stability and reliability of the electric distribution system, the Applicant initiated a process to be interconnected with the Delmarva Power & Light ("DPL") electric distribution grid serving Maryland by filing an Interconnection Request with PJM. *See* ERD at § 4B. Pursuant to FERC rules, PJM and DPL undertake a multi-year, three-part interconnection study process to determine any upgrades that may be necessary to allow a proposed generator to interconnect without causing negative impacts to the stability or reliability of the electric power system. The Project has received queue position AB2-133 from PJM. PJM has returned the Project's System Impact Study, the second study in the interconnection process.[3] The Project will connect to the electric distribution grid serving Maryland by interconnecting to the nearby Chestertown Substation through a new fifth position on the existing four position ring bus. *Id.* The Project will also construct a new onsite substation to facilitate the interconnection. *Id.* The installation of protective breaker equipment will allow DPL to isolate the Project during certain contingencies on the grid as necessary. PJM's FERC jurisdictional review process will

[3] *See* ERD at Appendix 1.

thus ensure the Project will not have a negative impact on the stability or reliability of DPL's system.

Due to the nature of solar power, the Project will have no impact on aviation. Unlike traditional fossil generation, there is no stack that may pose a hazard to air aviation. There is also no air or water pollution (there are no emissions or discharges) associated with the Project and there is no wastewater or cooling water for which disposal is required. 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. *See* ERD at § 6.E.

Finally, the Project will include significant economic benefits to the State by making more solar power and solar renewable energy credits available and by creating approximately 100–200 temporary design, management, and construction jobs. *See* ERD at § 5.F.

III. CPCN APPLICATION FILING REQUIREMENTS (COMAR 20.79.01.04)

A. The applicant is Morgnec Road Solar, LLC.

B. The applicant's address is: 337 Log Canoe Circle, Stevensville, Maryland 21666.

C. The following persons are authorized to receive notices and communications with respect to this Application:

Mr. James Crawford
Morgnec Road Solar, LLC
337 Log Canoe Circle
Stevensville, MD 21666
Phone 410.604.3603
James.Crawford@urbangridco.com

Mr. Todd R. Chason
Mr. David W. Beugelmans
Ms. Chastity E.C. Threadcraft
Gordon Feinblatt LLC
233 East Redwood Street
Baltimore, Maryland 21202
Phone (410) 576-4104
tchason@gfrlaw.com
dbeugelmans@gfrlaw.com
cthreadcraft@gfrlaw.com

D. Copies of this application are being made available for public inspection and copying at:

Kent County
Department of Planning, Housing, and Zoning
400 High Street
Chestertown, Maryland 21620

E. A list of each local, state, and federal government agency having authority to approve or disapprove the construction or operation of the Project is set forth in Table 1 of the ERD portion of this Application.

F. The Project will interconnect to the electric distribution grid serving Maryland through the installation of a fifth position at the nearby Chestertown Substation.

G. A general description of the generating station under COMAR 20.79.03.01 is provided in Section 5 of the ERD.

H. Implementation schedule: The Applicant expects to receive all necessary local and state approvals and engineering documents by December 2019. Construction is anticipated to begin in spring 2021 with completion and operational startup in fall/winter 2021.[4]

I. The Applicant has provided the environmental information for the generating station in Section 6 of the ERD.

IV. REQUEST FOR WAIVER AND EXPEDITED REVIEW

Although Maryland law requires the filing of CPCN applications involving both a generating station and transmission line designed to carry an excess of 69,000 volts at least two years prior to the commencement of construction, the Commission has authority to waive that notice requirement upon a showing of good cause. PUA § 7-208(c). *See also* COMAR

[4] Dates are subject to change depending on delays, including those associated with permitting, equipment availability and construction.

20.79.01.07 (granting the Commission authority to "waive or modify any provision of this subtitle"). The Commission routinely grants such requests for solar facilities. *See, e.g.*, Case No. 9370, Order No. 87012 (May 8, 2015) (granting OneEnergy Dorchester LLC's request for waiver); Case No. 9375, Order No. 87061 (June 15, 2015) (granting OneEnergy Wye Mills Solar, LLC's request for waiver); Case No. 9314, Order No. 85683 (May 31, 2013) (indicating grant of Church Hill Solar Farm, LLC's request for waiver); Case No. 9272, Order No. 84059 (May 26, 2011) (granting Maryland Solar LLC's request for a waiver).

Imposing a two-year notice requirement may make sense for certain generating facilities with long and complex transmission lines, but not for the type of project proposed here where impacts will not extend beyond the borders of the site. Here, the Project will interconnect to the Chestertown Substation, which is essentially across the street from the Project, using underground cabling, with no resulting impact on the surrounding area. Additionally, there are no emissions that will impact adjacent properties and the installation of solar PV panels will not materially impact property values for nearby residents. Requiring a two-year delay of the Project to satisfy this requirement would simply delay Maryland receiving the benefits offered by the Project without corresponding benefit. Accordingly, the Applicant submits that good cause exists to support the waiver of the two-year notice provision and that such a waiver is consistent with Commission precedent.

The Applicant further respectfully requests an expeditious review and approval of its Application. The Applicant is targeting a construction start in Spring 2021 and is now investing significant capital in permitting and project design, and needs to minimize the delay before commercial operation begins. The Applicant will continue to be as cooperative as possible with all parties to help the Commission review and approve this Application within this timeframe.

V. CONCLUSION

The Applicant respectfully requests that the Commission:

(1) waive the two-year notice provision of PUA § 7-208(c);

(2) expeditiously approve this Application for a Certificate of Public Convenience and Necessity for the construction of the proposed nominally rated 45.0 MW solar photovoltaic Morgnec Road Solar Project in Kent County, Maryland.

Respectfully submitted,

Todd R. Chason /C.J.

Todd R. Chason
David W. Beugelmans
Chastity E.C. Threadcraft
Gordon Feinblatt LLC
233 East Redwood Street
Baltimore, Maryland 21202
(410) 576-4104
Counsel for Morgnec Road Solar, LLC

VERIFICATION

Before me, the subscriber, a Notary Public, in and for Henrico, Virginia this day personally appeared E. Franklin Depew and made oath and due form of law that he is a Manager at Morgnec Road Solar, LLC and the matters and facts set forth in the foregoing Application for a Certificate of Public Convenience and Necessity for the Morgnec Road Solar Project are true and correct to the best of his/her information, knowledge, and belief.

WITNESS my hand and Notarial Seal this 20 day of November, 2018.

E. Franklin DePew, Manager
Morgnec Road Solar, LLC

Jonathan Greenhill
Notary Public Name (Print)

My Commission Expires: 8/31/2022

JONATHAN MARK GREENHILL
COMMONWEALTH OF VIRGINIA
REGISTRATION NO. 7197429
MY COMM. EXPIRES: 08/31/2022
NOTARY PUBLIC

ENVIRONMENTAL REVIEW DOCUMENT
PROJECT NO. 16008.00
NOVEMBER 29, 2018

MORGNEC ROAD
45.0 MW AC SOLAR PROJECT
KENT COUNTY, MARYLAND

PREPARED FOR:

MORGNEC ROAD SOLAR, LLC
337 Log Canoe Circle
Stevensville, MD 21666

PREPARED BY:

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

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LIST OF APPENDICES

SECTION 1 – PROJECT OVERVIEW

As currently proposed by Morgnec Road Solar, LLC (the "Applicant") and as reflected in the PJM Feasibility Study, the Project will be located within Tax Map 37, Parcel 40 (256.953 acres), and Parcel 174 (214.30 acres) owned by Fair Promise Family Limited Partnership. Based on site limitations and environmental constraints mostly associated with the Critical Area Resource Conservation Area (RCA) designation on a portion of Parcel 40 and areas of wetlands that need to be avoided, the revised Project Limit of Construction (LOC) includes approximately two hundred thirty-one (231.75) acres producing forty-five (45.0) megawatts (MW) alternating current (AC) (see ***Figure 1*** and ***Figure 2***).

The Project has contracted to lease or purchase the underlying parcels (see ***Figure 3***), from the current property owner (Fair Promise Family Limited Partnership) via an Option to Purchase Agreement. The Site primarily consists of agricultural fields surrounded by wooded areas and has been farmed for conventional agricultural crops for several decades. The Applicant is in communication with the agricultural lease tenant, which happens to be the landowner, and will provide notice consistent with Maryland Real Property Article §8-402(b)(3)(i).

The Site (Kent County Tax Map 37 Parcel 40 and Parcel 174) is located at approximately thirty-nine degrees (39.231966°) latitude (North) and seventy-six degrees (76.052009°) longitude (West) in the Chester River watershed. The entire Chester River watershed is approximately forty-three (43) miles long and encompasses three hundred sixty-eight (368) square miles; which includes two hundred ninety-five (295) square miles of land. It is interesting to note that within this area approximately eighty-five percent (85%) of the land use is being used for agricultural purposes.

The Critical Area Commission has determined and advised that Tax Map 37, Parcels 174 is not within the Critical Area; however, a portion of Tax Map 37, Parcel 40 is within the Critical Area and is in the Resource Conservation Area (RCA) designation. The Project has been designed to avoid the Critical Area and RCA. The Critical Area Commission is currently in the process of updating the Critical Area maps Statewide. The Applicant attended a meeting on Thursday August 29, 2018 in Chestertown, MD with the CAC and is fairly confident the Critical Area overlay on this parcel will be reduced; potentially allowing the LOC to be increased for additional solar panels.

In communications with the Wildlife and Heritage Services of the Department of Natural Resources, it was determined that no rare, threatened, or endangered species are onsite thus, the proposed Project will have no impacts on such protected species. Any habitat in the wooded areas surrounding the fringe of the property will not be impacted because the Applicant does not propose to cut any trees. With regards to other Agency reviews, the Applicant is working with MHT and proposes to have open sessions with the community and the Kent Conservation and Preservation Alliance in order to design the Project so as to protect and preserve the Stories of the Chesapeake Heritage Area. More specifically, the Applicant will be analyzing the Historic Built Environment

using the Determination of Eligibility forms provided by MHT to evaluate any structures over fifty (50) years old to ensure the historic integrity of existing buildings are preserved. Although there are no historic buildings onsite which would be impacted, the intent of the MHT review is to also demonstrate that the Project will not have any negative or adverse impact to sited historic properties in the area with regards to visual, auditory, or physical effects to the setting of the historic properties. If necessary, the Project will implement appropriate mitigation through a memorandum of understanding with MHT which will mitigate any impacts (to the extent any are determined to exist) on the Historic Built Environment and the Stories of the Chesapeake Heritage Area. The Applicant has started the field work for the Phase I and will complete the remaining work per MHT direction.

Based on these initial screenings, and as mentioned above, the Applicant has reduced the LOD to eliminate all portions designated as RCA on Tax Map 37, Parcel 40. As identified in detail below, by selecting equipment which has a higher energy density, the Project will still conform with PJM requirements by meeting the minimum generation capacity identified in the PJM studies. The Applicant's initial application to PJM for interconnection was for a proposed output of 75 MW, which is reflected in the PJM Generation Feasibility Study Report. The Applicant exercised its right under the FERC-jurisdictional PJM Open Access Transmission Tariff ("OATT") to reduce the Project's output to 65.29 MW for purposes of the PJM Generation System Impact Study. The Applicant exercised its additional right under the OATT to reduce the size of the Project's output after issuance of the PJM Generation System Impact Study but prior to execution of the Interconnection Services Agreement in order to ensure consistency of project output between the ISA and the CPCN issue by the Maryland Public Service Commission. The reductions to the Project's output occurred to reflect necessary reductions in the size of the Project as it has progressed through the design and due diligence process. The current PJM studies provided in ***Appendix 1*** now reflect a Project capacity of fifty-five (55.8) MW. While the design shown in ***Figure 5*** below and PVSyst modeling is based on a forty-five (45.0) MW Project using existing panel technology, the Applicant believes in addition to higher capacity panels available at the time of construction, the reduction in Critical Area designation per the Critical Map update will expand the Project LOC allowing the Applicant to achieve the fifty-five (55.8) MW capacity requirements.

As part of the preliminary design and review of applicable codes and regulations, the Applicant and their team contacted Ms. Amy Moredock (Director, Department of Planning, Zoning & Housing) with Kent County. She provided copies of utility scale solar energy criteria for our further consideration and use during the design and approval process.

The Project is located in a mix of four different zoning classifications, however the Applicant proposes to put panels in only two of those zoning jurisdictions: the Rural Residential and Community Residential Districts. Consistent with this, the Applicant has submitted a Text Amendment with Kent County on October 2, 2018, which would allow approval of utility scale solar projects within these zoning designations through a Special Exception. It is the Applicant's intent to ensure the Project substantially conforms to the substantive requirements of the Kent

County Land Use Ordinance in existence at the time of the completion of this ERD, with the exception of any requirement that would restrict the size and scale of, or otherwise prohibit, the Project. Specifically, the Project will be designed in substantial conformance with Kent County Land Use Ordinance Article V, Section 15.2.18, which sets forth Kent County's requirements for utility-scale projects in Industrial Districts. This will include: (a) the avoidance of glare or reflection onto adjacent properties and roadways such that the Project does not interfere with traffic or create a safety hazard; (b) year-round screening provided along the non-reflective axis of the arrays; (c) limiting the panels to no more than forty-five feet (45') in height; and (d) registration with the Kent County Department of Emergency Services and submission of a map noting the location of the solar collection devices and the panel disconnect(s). The Project will also be designed in substantial conformance with local site plan design, stormwater management, sediment and erosion control, forest conservation, wetland permitting, and Critical Area requirements. The Project will be designed to protect the rights of local land owners abutting the property with regards to noise, glare, stormwater runoff, erosion, vehicular and pedestrian movement, protection of historic and environmental features which are consistent with State requirements specified in the CPCN review and approval process.

Unlike other solar projects in Kent County, the Project is *not* located in an Agricultural or Industrial Zoning District, or in a Priority Preservation Area, and only part of the Project is on prime farmland. The area along Morgnec Road near the Project is a commercial and industrial mix. The properties across Morgnec Road from the Project site are zoned as an Industrial District and contain modern corrugated metal industrial buildings, a junkyard, and other industrial facilities of no historical significance. The Project is also located close to the electric load center of the Town of Chestertown and enjoys minimal and low-cost interconnection requirements due to the presence of existing electric infrastructure with sufficient capacity for the Project. Additionally, given the Project's location adjacent to a developed population center, the Project would not interrupt the continuity of agricultural activities in Kent County.

It is also noted that once the life of the Project is complete, the land will revert to its original condition. Per typical PPRP Conditions of Approval a decommissioning plan would be required. The decommissioning plan stipulates at the end of the Project's useful life, all components must be removed, and the land restored to its original conditions. This would allow for continued farming practices or other uses permitted within the Rural Residential and Community Residential District. The Project will not impact the health, safety, and welfare of the community or in any way negatively impact existing properties in the area or affect current economic conditions.

The surface topography of the Site is gently sloping with average elevations between zero percent (0%) and five percent (5%). There are few areas internal to the property which has elevations that range from five percent (5%) to ten percent (10%), with even fewer at grades as high as fifteen percent (15%) to forty percent (40%). The property consists of moderately to well-draining Atlantic Coastal Plain Soils with classifications and soil characteristics as defined in ***Figure 4***

below. These soils are ideal for the intended use to support the racking posts, grass covered internal drive aisles, and to support drainage systems and stormwater management.

From a wetlands standpoint the few farm ditches located onsite are interconnected with hydric soils/wetlands on the fringe of the property. Environmental Resources Inc. (ERI) performed a preliminary wetlands site investigation of these areas. A site visit was conducted with ERI, H&B, and a representative from the MDE. As shown in ***Figure 5*** below the panel layout has been configured to avoid these areas and maintains the appropriate setbacks. The other ditches onsite are agricultural ditches which are not Jurisdictional and may be filled as needed or incorporated into the site drainage design.

Aside from construction equipment traffic, little ground disturbance is anticipated associated with the installation of the racking and solar modules, as the posts can be installed on existing grades. Minimal earthwork will include the construction of all-weather gravel roads, concrete pads for the transformers, switch gear, and inverters. A Sediment and Erosion Control Plan will be approved by the Soil Conservation District Office in addition to a Stormwater NPDES NOI Permit which will be applied for prior to construction.

According to the current design, the Project is anticipated to be forty-five (45.0) MW AC output. However, the Applicant anticipates optimizing the design to find the best DC/AC ratio as well as the best panel for the Project, both efforts will likely increase the total capacity of the project. That being said, the Project will be bound by the PJM number of fifty-five (55.8) MW AC.

Per the most recent design, the Project would utilize approximately 140,000 LG Neon LG400N2W-A5 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 the back of one row and the front of the next is approximately thirty feet (13'). The distance between rows from post to post measured from North to South is approximately twenty-four feet (24'). The solar arrays will continuously rotate around a horizontal axis, oriented North-South, to orient the solar modules at an optimal angle to the incoming solar insolation during the day. In this configuration, the minimum leading-edge height (bottom edge of the modules) will be approximately two feet (2') from grade, and the maximum (top-edge height of the modules) will be approximately eight (8') ft from grade, although other feasible configurations are possible with higher top-edge heights. The solar arrays will be designed to withstand snow load of twenty-five (25) pounds per square foot (psf) and wind of ninety (90) miles per hour (mph) (per IBC 2012 for Kent County). Prior to connecting to the DPL system/grid the power generated by the Project will tie into a new onsite substation which will be connected to the Chestertown Substation.

Interconnection will be to the Chestertown Substation located immediately across Route 291 from the Project site. Appropriate easements will be obtained from neighboring property owners along the route of the gen-tie. The connection to the Chestertown Substation from the Project site will be made utilizing underground cabling to avoid any new overhead electrical cabling. The connection to the substation will involve offsite improvements pursuant to requirements specified in the PJM System Impact Study Report provided in ***Appendix 1***. There will be approximately eighteen (18) inverters 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 liquid filled AC transformer. Each power station will make up 1/18 of the array AC capacity.

The Project will be fully fenced with a service entrance accessible from the existing farm road along Morgnec Road. 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. In order to more fully address screening needs and requirements of the Project, the Applicant has engaged Davis, Bowen & Friedel, Inc. (DBF) to prepare a landscape buffer plan using a certified/licensed Landscape Architect. This work will be integrated with the ongoing engineering of the civil site plans and the solar array designs. As with other solar generation facilities that have been approved through the CPCN process, the Applicant will seek approval of screening designs and use vegetation indigenous to the area. The fringes of the property on three (3) sides are heavily wooded which will provide a significant natural buffer. The screening along Morgnec Road will optimize opportunities to minimize the site's visibility from pedestrian and vehicular traffic.

In addition to the 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. The Applicant is not proposing to cut any forested areas onsite and will only be removing a few isolated trees surrounding the existing farmhouse. A site plan will be subject to review as part of the CPCN process in order to achieve substantial conformance with local regulatory codes.

Figure 1 – Regional Context Map

Figure 2 – Local Context Map

Figure 3 – Project Site Location Map

Figure 4 – Project Site Soil Map

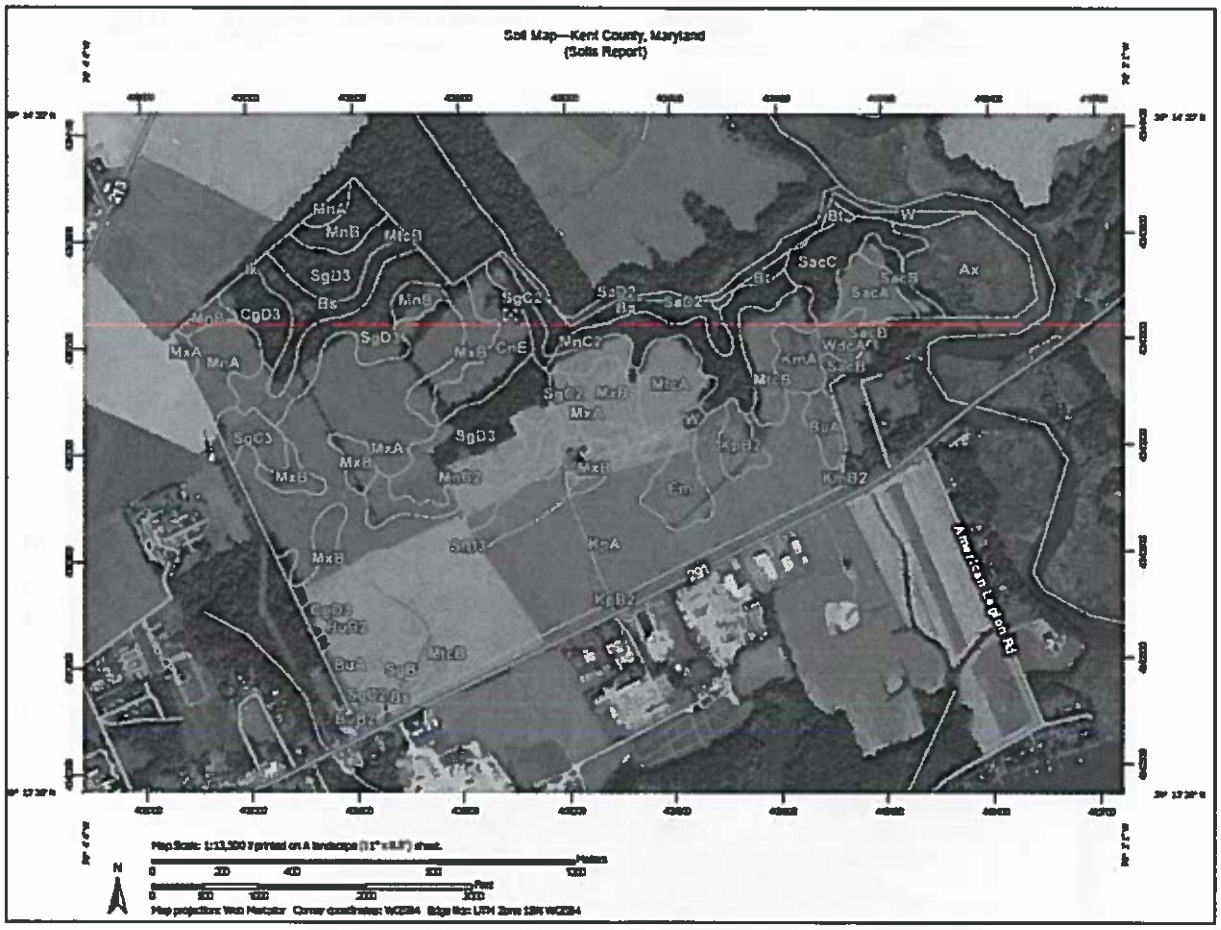


Figure 5 – Morgnec Road Design Concept and Solar Array Layout

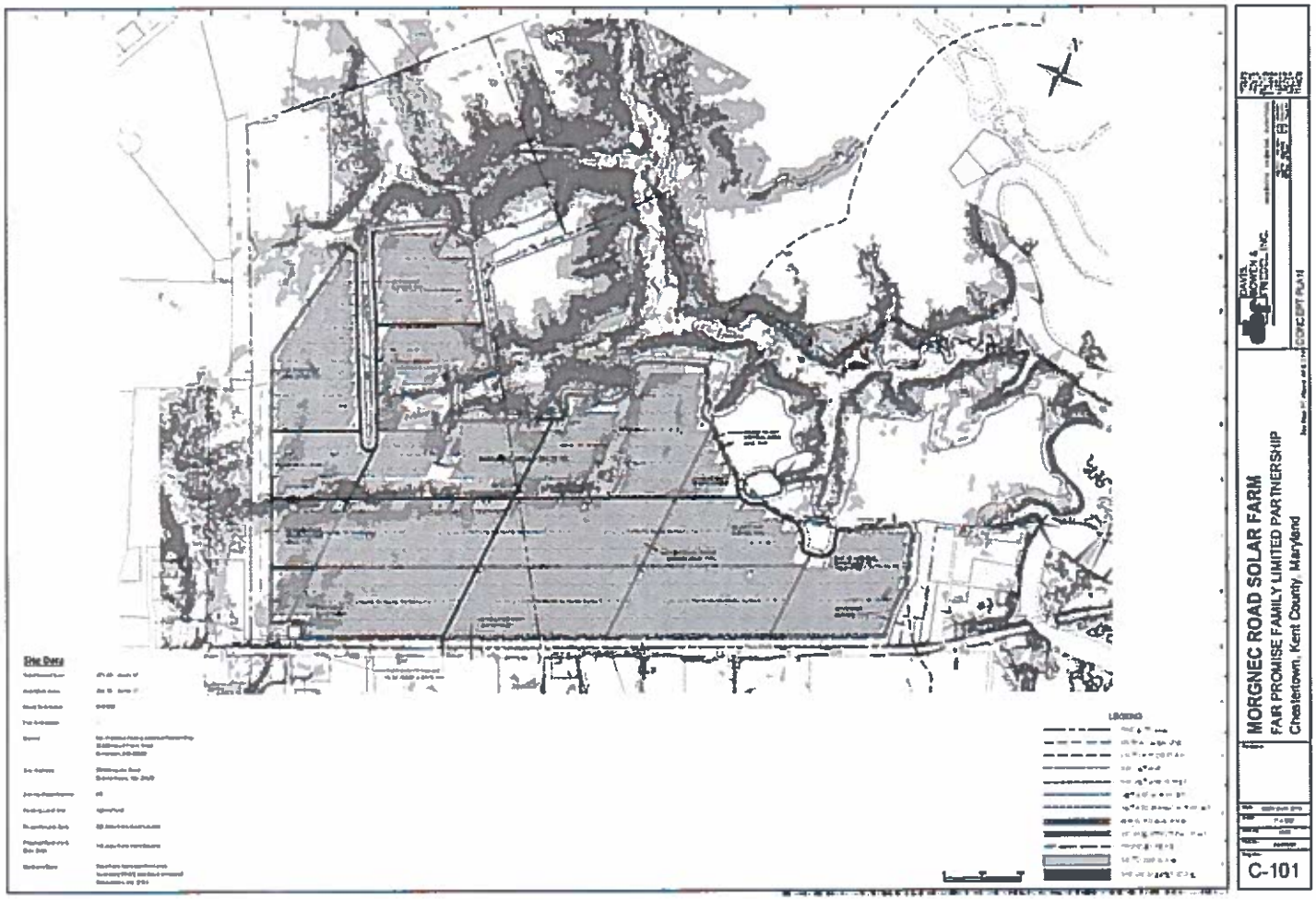
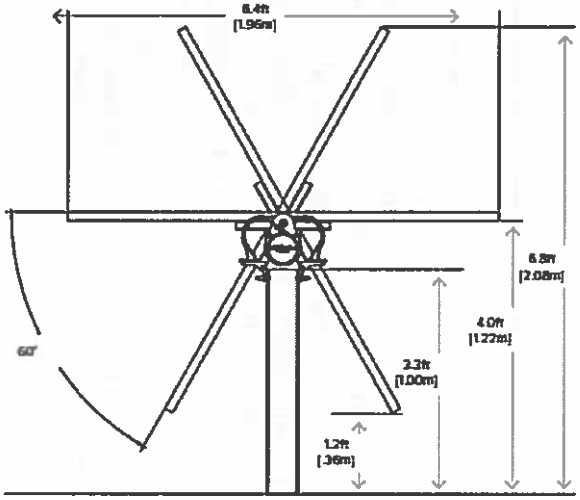


Figure 6 – Solar Array Section [Typical]

NOTES:



1. SYSTEM SPECIFICATIONS:
   TOTAL SYSTEM:
   54.91 MWP
   45.0 MW AC
   DC/AC RATION: 1.3

2. SINGLE AXIS TRACKING

3. FENCE LAYOUT - 6' HIGH CHAIN LINK FENCE

(137,268 LG NEON LG4002W-A5 MODULES, 27 MODULES PER STRING, 3,954 STRINGS)

(APPROX. 23,725 I-BEAM PILES (FINAL PILE COUNT TO BE DERMINDED BY RACKING MANUFACTUER BASED ON FINAL ARRAY SHAPE)

(18 SMA 2500-EV INVERTERS WITH NAMEPLATE 2,229KW CAPACITY EACH)

(1 INVERTER PER PAD)

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-five percent (25%) of Maryland's electricity be generated from renewable energy sources by 2020, which must include at least two and one-half 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 this forty-five (45.0) MW solar generation facility, which will increase the State's current solar electricity output. There will be significant economic benefits resulting from the Project to include a capital cost of approximately up to $80M and approximately one hundred to two hundred (100-200) design, management, and construction personnel working remotely or on the Site at the height of construction during the period from Q2 2021 to Q4 2021.

The construction schedule is estimated to be nine (9) to twelve (12) months and is scheduled to be completed prior to December 2021. 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 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.

The public benefit for the type of renewable energy we are proposing 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 Project will deliver all of its output to the PJM wholesale electricity market via the Delmarva Power and Light Company's (DPL) transmission. This Site would generate forty-five (45.0) MW to fifty-five (55.8) MW and connect to the Delmarva Power and Light Company's (DPL) Chestertown 69 kV Substation.

The Applicant is currently in discussions with multiple power purchasers for the output of the Project; however, as of the date of this submittal nothing has been executed.

SECTION 3 – APPLICANT INFORMATION

A. NAME AND ADDRESS OF APPLICANT

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

B. PERSON AUTHORIZED TO RECEIVE NOTICES AND COMMUNICATIONS

James Crawford
Morgnec Road Solar, LLC
337 Log Canoe Circle
Stevensville, MD 21666
Phone 410.604.3603
James.crawford@urbangridco.com

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

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

Kent County
Department of Planning, Housing, and Zoning
400 High Street
Chestertown, MD 21620

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

Morgnec Road Solar, LLC has performed the PJM Generation Interconnection System Impact Study, included in its entirety in ***Appendix 1.*** Pursuant to the Generation Interconnection System Impact Study Report performed by the PJM, this Site would generate up to fifty-five (55.8) MW and connect to the Delmarva Power and Light Company's (DPL) Chestertown Substation. The Project has been assigned Queue Position AB2-133.

Based on the findings from the Generation Interconnection Feasibility Study Report, a list of improvements associated with building a new fifth (5^{th}) position onto the 69 kV four (4) position ring bus at Chestertown Substation were defined. Specifically, the new position will be connected to a generator. The Project will require the addition of a 69 kV breaker, four (4) 69 kV disconnect switches, three (3) CT/VT combination units, and substation bus. The 69 kV ring bus will extend out to the west of the existing yard, and the substation will be expanded to the west by forty feet (40'). The 6727 line terminal (to future McCleans Substation, currently to Lynch Substation), will need to be rebuilt.

Other upgrades to the system necessary to accommodate the Project are defined in the PJM System Impact Study provided in ***Appendix 1.***

As mentioned above, the current PJM studies now reflect a Project capacity of fifty-five (55.8) MW. While the design shown in ***Figure 5*** below and PVSyst modeling is based on a forty-five (45.0) MW Project using existing panel technology, the Applicant believes in addition to higher capacity panels available at the of construction, the reduction in Critical Area designation per the State's efforts to update the critical area boundaries will expand the Project LOC allowing the Applicant to achieve the fifty-five (55.8) MW capacity requirements.

As shown in ***Appendix 1***, the cost associated with the interconnection relating to the various system upgrades are considerably lower than experienced on other sites. Specifically, regarding the multiple facility contingencies which would be required to upgrade the system at three (3) different locations to address thermal violations that would otherwise occur, totals $0.8M. Typically, these costs can range into the many millions of dollars and require substantive improvements to the PJM system which can be difficult for the projects to absorb and still remain cost effective. For this reason, constructing a solar project in Kent County would be most viable at this location in the grid.

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

Generation facilities subject to a CPCN may be exempt from compliance with the Forest Conservation Act ("FCA"). The Applicant will use ECS Mid-Atlantic to perform a Forest Stand Delineation and prepare an associated report for submittal to Kent County as part of its local FCA review process. Consistent with these documents and as part of the local site plan process a Forest Conservation Plan (FCP) will be prepared and submitted to the County.

Notwithstanding the above, Kent County has a fee in lieu of rate for areas inside PFA's are $0.305 per square foot or outside of PFA's at $0.366 cents per square foot. Should any type of mitigation be required to satisfy Kent County FCA requirements for the few trees to be removed, in addition to the fee option, the Applicant may also mitigate by planting trees at a one-to-one (1:1) ratio, placing appropriate acreage of wooded area within the same watershed and/or County into a Forest Conservation Easement (FCE) at a two-to-one

(2:1) ratio, or purchasing mitigation credits from a mitigation bank at a two-to-one (2:1) ratio, or paying the County's in lieu of fee. If these options cannot be achieved within the same watershed and/or County, the mitigation rate would change from two-to-one (2:1) to four-to-one (4:1).

In summary, there is no plan to cut forested areas and the few stand-alone isolated trees that may be removed will be more than offset by acres of trees to be planted as part of the proposed vegetative buffer plan. At this time the Applicant intends to use the remaining forest stands onsite to mitigate for afforestation.

E. KENT COUNTY PLAN REVIEW AND PERMITTING

1. Grading and Building Permits

A Grading Permit and Building Permit will be applied for after the Construction Drawing approval. The documents will provide the detailed engineering and specifications required to implement the approved site plan leading to necessary grading and building permits as required by the County. At the same time the Grading and Building Permits are applied for, the Applicant will submit construction documents and for Electrical Permits needed for construction.

2. Kent County Land Use Ordinance

Consistent with Kent County Land Use Ordinance Article V, Section 15.6.11, DBF will prepare an overall engineering report which certifies that the Project was constructed in accordance with industry accepted standards and practices in addition to applicable Federal, State, and Local environmental codes. The report/certification will also verify the Project was completed in keeping with approved plans and specifications and consistently compliant with the Conditions of the CPCN approval including associated permits and approvals. This report will be prepared in two (2) phases. The first phase will certify the design as being fully compliant with applicable codes and requirements. The second phase will attest to the implementation and include certification that construction meets the plans and specifications including submittal of as-builts.

The proposed array layout has been updated to accommodate the Applicant's understanding of potential project concerns and to support the Applicant's request for a Text Amendment to the Kent County Land Use Ordinance. This Text Amendment would allow for utility scale solar projects in the Rural Residential and Community Residential District by Special Exception. Since the CPCN process encourages local participation, the Applicant intends to promote this inclusive process as part of its design approach and to continue to incorporate community input to the extent practicable.

Notwithstanding the location of the Project in a Rural Residential and Community Residential District, it is the Applicant's intent to ensure the Project substantially conforms to the substantive requirements for utility scale solar generation in Kent County Land Use in existence at the time of the completion of this ERD. Specifically, the Project will be designed in substantial conformance with Kent County Land Use Ordinance Article V, Section 15.2.18, which sets forth Kent County's requirements for utility-scale projects in Industrial Districts. This will include: (a) the avoidance of glare or reflection onto adjacent properties and roadways such that the Project does not interfere with traffic or create a safety hazard; (b) year-round screening provided along the non-reflective axis of the arrays; (c) limiting the panels to no more than forty-five feet (45') in height; and (d) registration with the Kent County Department of Emergency Services and submission of a map noting the location of the solar collection devices and the panel disconnect(s). The Project will also be designed in substantial conformance with local site plan design, stormwater management, sediment and erosion control, forest conservation, wetland permitting, and Critical Area requirements. The Project will be designed to protect the rights of local land owners abutting the property with regards to noise, glare, stormwater runoff, erosion, vehicular and pedestrian movement, protection of historic and environmental features which are consistent with State requirements specified in the CPCN review and approval process.

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, a phasing/sequencing plan will be needed as part of the site plan approval process. Thus, the sediment and erosion control plans will incorporate how each disturbed area in the phasing plan will be stabilized before the next construction area is initiated. Per State Code (COMAR 26.17.01 ESC Regulations, 2017) work can proceed to the subsequent grading area when fifty percent (50%) stabilization of the preceding grading area has been achieved. The MDE COMAR also stipulates interim stabilization is required every seven (7) days. The Project will be designed to ensure stabilization of the site occurs with appropriate vegetative cover within the proposed LOC to prevent runoff and sediment and erosion violations.

This will best be met through strategically planning the construction phase of the Project to include phasing plans. These phasing plans will maximize use of laydown areas, minimize truck traffic throughout the construction area, and phase contractors so that work on solar modules and wiring is preceded by completion of work installing posts and racking.

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 completed the Feasibility Study Report on August, 2016. System Impact Study was submitted November, 2016.
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)							√	Notwithstanding the PSC's ability to exempt projects from FCA requirements, the Project will voluntarily comply with the County's local forest conservation ordinance, which implements the State-wide FCA.

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	
Kent County	Environmental Site Design Erosion Sediment Control Construction Drawings	Applicability varies according to Local and State Requirements	√			√			√	It is expected that Kent 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 applied for 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 fifty-five (255) acres to be leased with an option to purchase from Fair Promise Family Limited Partnership located along Morgnec Road in Kent County, Maryland (see ***Figure 3***).

The proposed array layout will maintain a fifty foot (50') setback from the property line along Morgnec Road (see ***Figure 5***). Within this setback appropriate buffering/screening will be provided. A landscape plan will also be prepared as part of the Project Site Plan which will be reviewed and approved by Kent County Department of Planning, Housing, and Zoning Office along with other planting plans within the fence associated with site stabilization, drainage, and stormwater management. The perimeter fence, which is proposed to be a six foot (6') high chain-link fence, will be located thirty-five feet (35') from the drip line along the wooded perimeter of the Project as shown in ***Figure 5***. This property is located in close proximity to the Chestertown Substation. The electricity produced by the projects solar panels and inverters will be delivered 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. Potential customers for the project's output include large wholesale purchasers such as energy marketing firms and electric utilities.

The Site (Kent County Tax Map 37, Parcel 40 and Parcel 174) is located at approximately thirty-nine degrees (39.231966°) latitude (North) and seventy-six degrees (76.052009°) longitude (West) in the Chester River watershed. The entire Chester River watershed is approximately forty-three (43) miles long and encompasses three hundred sixty-eight (368) square miles; which includes two hundred ninety-five (295) square miles of land. It is interesting to note that within this area approximately eighty-five percent (85%) of the land use is agricultural.

The property borders the Town of Chestertown to the south, immediately adjacent to an area designated by Kent County as a Priority Funding Area associated with the Town of Chestertown, and thus a priority for future growth. (See ***Figure 7*** below.)

Figure 7 – Town of Chestertown/Kent County Priority Funding Area

Unlike other solar projects in Kent County, the Project is *not* proposed to be located in an Agricultural Zoning District, in a Priority Preservation Area, and only a portion of the Project is located on prime farmland. The area along Morgnec Road near the Project is a commercial and industrial mix. The properties across Morgnec Road from the Project site are zoned as an Industrial District and contain modern corrugated metal industrial buildings, a junkyard, and other industrial facilities of no historical significance (see ***Figure 8***). The Project is also located in close proximity to the electric load center of the Town of Chestertown and enjoys minimal and low-cost interconnection requirements due to the presence of existing electric infrastructure with sufficient capacity for the Project. Additionally, given the Project's location adjacent to a developed population center, the Project would not interrupt the continuity of agricultural activities in Kent County. For these reasons, a solar generation facility located on this property will be consistent with the nature and character of the neighborhood.

Figure 8 – Industrial/Commercial Uses

B. DESIGN FEATURES

Total generating capacity for the Project is anticipated to be between forty-five (45.0) MW AC and fifty-five (55.8) MW AC output. The Project's preliminary design includes approximately 140,000 LG400N2W-A5 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 panels will be arranged in either a portrait or landscape configuration. A portrait configuration (also referred to as "1V") consists of a single row of panels positioned vertically (longer side of panels installed vertically) on each rack (see ***Figure 7*** for a sample cross-section.) The space between rows will be approximately sixteen feet (16') from post to post. 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***). The solar array will be designed to withstand snow load of twenty-five (25) psf, and wind design of ninety (90) mph (per Kent County IBC 2012).

Depending on final racking vendor selection and design, the number of racks could vary. Subject to final design, the typical three 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 approximately eight feet (8') to twelve feet (12') below grade (***Figure 6***).

There will be approximately eighteen (18) separate inverter pads each with one (1) inverter per pad. Each inverter pad will make up 1/18 of the array AC capacity, or approximately 2.229 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 switchyard, which will then step up the power to 69kV for the tie line to Delmarva Power and Light's Chestertown Substation and the PJM transmission system.

A six-foot (6') high chain link perimeter fence will be installed around the Project with an existing entrance accessible from Morgnec Road. 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. If needed, water may be used to cleanse the panels, but typically panels do not need to be cleanse in the mid-Atlantic region due to adequate rainfall. Typically, this cleansing utilizes only water sprayed at relatively high speeds to remove dirt and dust from the panels. A typical washing of a plant this size would consume much less water than the irrigation requirements for an active farm.

1. Environmental Site Design (ESD)

a. ESD Components

i. Land Use and Cover

The Site primarily consists of agricultural fields and has been farmed for conventional agricultural crops by the landowner for several decades. The Applicant is in communication with the agricultural lease tenant and will provide notice consistent with Md. Real Property Article § 8-402(b)(3)(i).

ii. Soils and Steep Slopes

As noted above, one of the two (2) parcels making up the Project are not within the Critical Area. However, the Critical Area Commission also noted that the other parcel is partially within the RCA designation. The County has provided their criteria for information and use relative to utility scale projects developed in the RCA and these areas have been eliminated from the LOD to ensure consistency with CAC requirements.

A mentioned above, all CAC areas were removed from the LOD. The remaining areas outside of the Critical Area contain soils which are moderately to well-drained and suitable for various Environmentally Sensitive Design (ESD) Best Management Practices (BMPs) for stormwater management. The primary soils found on this Site as shown in ***Figure 4*** include but are not limited to, Keyport Silt Loam, Mattapex Silt Loam, Matapeake Silt Loam, Sassafras Sand Loam, Loam, Gravely Loam, and Woodstown. These soils as a grouping have slopes between zero percent (0%) and five percent (5%) with some exterior grades between five percent (5%) and ten percent (10%), and very few as high as fifteen percent (15%).

The full soils report and prime farmland report can be found in ***Appendix 2***. All of these soils are ideal for their intended use to support solar panels, inverters, switch gear, grass covered aisle ways, access roads, and associated drainage and stormwater management. As noted in the geotechnical report (***Appendix 3***), these soils are suitable to support solar panels, inverters, switch gear, grass covered aisle ways, access roads, and associated drainage and stormwater management.

Land disturbance for this Project will require very little grading or site disturbance. It is estimated that there will be two percent (2%) or less of impervious surface added. Impervious areas will be associated with some paving at the entrance of the property, all-weather gravel roads, the eighteen (18) inverter pads, piles for the solar panel and fencing, and associated improvements. See ***Table 2*** – Impervious Area Tabulation.

Table 2 – Impervious Area Tabulation

Impervious Area Description	Length (FT)	Width (FT)	Area (SF)	Quantity	Total Area (SF)	Comments
Invert/Equipment Pads (Concrete)	22	10	220	18	3,960	Inverter Pad Site
Racking Posts	-	-	0.03076	23,725	729.78	Array Piers & Motor Piers (W6x15 Max Size)
Array Field Access Ways – Grass Aisles	-	-	-	-	-	Grass Only, No Improvements
Internal Structural Roads	15	-	-	-	171,250	15' Structural Roads
Proposed Entrance Improvements	-	-	4,000	2	8,000	Conceptual / Approximate
On-Site Substation Equipment Pad/Area (Private)	100	100	10,000	1	10,000	Equipment Pads
Total Impervious Area					193,939.78	SF
					4.45	Acres

The only grading expected will be associated with the improved entrance as shown in ***Figure 5,*** the all-weather gravel roads, and the access points to the inverters. Also, there may be minor grading across the site associated with the selected support structure, inverter pads, and switchgear. At this time, the internal aisle

ways will likely be unpaved grass roads. The few all-weather gravel road locations may be modified during the local site plan process. The proposed ESD practice (level spreaders on slopes exceeding five percent (5%)), screening, and other vegetative cover are expected to offset the increases to impervious areas. Any areas with slopes over ten percent (10%) may need additional Best Management Practices (BMPs) such as infiltration basins to satisfy State and local SWM requirements. Site entrance improvements from the access road will be constructed with impervious material to stabilize this area for construction traffic and will be included in the impervious calculation for the SWM report.

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 BMP model assuming that standard posts and racking will be used. 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.

It is also important to note that as part of construction there will be little disturbance to the Site since the construction method includes installation of the panels on a pile system with minimal contact to the ground.

Because of the onsite soil characteristics and lack of steep slopes within the LOC, the Site is ideally suited for infiltration basins, bio-retention, grass swales, disconnection credits and use of level spreaders, and a variety of other ESD practices which will be evaluated during the design phase. The entire Site will be planted and maintained in low cover grass vegetation in accordance with site plans approved by the Kent County Soil Conservation District Office and included as part of the CPCN submittal process. In addition to the mixture of grass seed, and pursuant to recommendations from the PPRP, the Applicant is also proposing to incorporate wild flower seed mixes with the selected grasses in order to promote the health of honey bees and other pollinators. The purpose of this project design feature would be to improve the quality and quantity of overall acreage for pollinators. Solar energy generation facilities are ideal opportunities to increase healthy habitats for pollinators.

iii. Stream Buffers and Floodplains

The Site (Kent County Tax Map 37, Parcel 40 and Parcel 174) is located at approximately thirty-nine degrees (39.231966°) latitude (North) and seventy-six degrees (76.052009°) longitude (West) in the Chester River watershed. The entire Chester River watershed is approximately forty-three (43) miles long and encompasses three hundred sixty-eight (368) square miles; which includes two hundred ninety-five (295) square miles of land. It is interesting to note that within

this area approximately eighty-five percent (85%) of the land use is currently being used for agricultural purposes.

The Middle Chester River watershed is agriculturally diverse with considerable crop production of corn, wheat, and soybean. The Middle Chester River is among those Maryland watersheds with the least impervious surface, lowest population density, least amount of wetland loss and the highest soil erodibility. The largest urban center within the watershed is the Town of Chestertown. According to the Chesapeake Bay Program's Phase 5.2 watershed model land use, the Middle Chester watershed consists of approximately sixty-nine percent (69%) agriculture, seventeen percent (17%) forest, and fourteen percent (14%) urban land uses.

The majority of the area within the LOC has moderate to low grades which are determined to be adequate to support the single axis tracking design being proposed for the Project. Any steep slopes to the margins of the property have been eliminated. According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 24029C0281D, effective June 9, 2014, all the mapped flood plains are along the fringes of the property and does not impact the proposed Project design (see ***Appendix 4***).

One of the two (2) parcels is outside the Critical Area (see ***Appendix 5***) and contain soils which are moderately to well-drained and suitable for various ESD stormwater management practices. The one (1) parcel with a portion of Critical Area designation may be reduced once the new Critical Area maps are available.

We have consulted with MDE to confirm that wetlands on the property either in wooded areas which are not being used or at the drip line of these forested areas. These jurisdictional waters are not within the areas to be developed by the Project and the Applicant has agreed to keep the limit of disturbance thirty-five feet (35') away from these jurisdictional waters. The MDE findings were in part based on the initial report prepared by Environmental Resources, Inc. (ERI) (***Appendix 6***) which indicates the site configuration avoids any wetlands/jurisdictional waters. MDE confirmed these determinations/findings following a site visit on October 19, 2016 and their confirmations are included in ***Appendix 7*** 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 practice to be employed on the Site, as referenced above, will be the use of non-rooftop disconnection credits. This practice was selected due to application of the MDE ESD

Guidelines which do not require stormwater structures for properties with less than ten percent (10%) slopes and using designs where the disconnection length is the same as the distance between rows and is greater than the width between rows. The only structures required will be level spreaders for any sloped areas within the LOC that exceed five percent (5%).

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 of a variety of design approaches including non-rooftop disconnection and the use of micro-scale practices such as grass swales and bio-retention.

The disconnect credit will be the primary practice used to demonstrate compliance with treatment and ESD requirements. Incorporating other practices such as bio-retention and grass swales will more than satisfy the requirements for this site.

For the ESD Storm Event, the Site will mimic a forested site in good conditions under the post-development scenario. This will improve the water quality leaving the Site versus the current crop and agricultural production being conducted. 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.

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			
	Industrial	*Commercial*	*Residential*
Day	75	67	65
Night	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 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. Glare Analysis

The Applicant utilized the ForgeSolar PV Planning and Glare Analysis tool to conduct a desktop analysis of the proposed solar generation facility. Based on the results included in ***Appendix 8*** there will be no glare effects to any nearby airports. The closest airports to the sites are Kent & Queen Anne's Hospital, Hybarc Farm Airport-MD19, Nuodex Incorporated Heliport, Wright Field, and Cromwell Farm Airport.

Additionally, the Applicant has completed the Federal Aviation Administration (FAA) notice criteria tool, which indicated no application should filed (see ***Appendix 9***). The Applicant has initiated the Maryland Aviation Administration (MAA) review and provided copies of the FAA results for their information and use. Once the Applicant receives written comment from MAA this information will be provided as a supplemental filing.

Among other design considerations, the licensed landscape architect will prepare the landscape buffer plans with sufficient detail to identify the planting areas with appropriate dimensions and details. This plan will be reviewed with Kent County as part of the local review process. The Applicant will also provide this plan to PPRP and the PSC via a supplemental filing. This plan will fully address the results of the glare analysis as part of the design to ensure vehicular traffic and neighboring properties are not impacted by glare.

5. Fencing and Buffering

The panel arrays will be enclosed and protected using a six foot (6') high chain link fence with an access gate on the proposed access drive. As mentioned above, in order to more fully address screening needs and requirements of the Project, the Applicant has engaged DBF to prepare a landscape buffer plan using a certified/licensed Landscape Architect. This work will be integrated with the ongoing engineering of the civil site plans and the solar array designs. As with other solar generation facilities that have been approved through the CPCN process, the Applicant will seek approval of screening designs and use vegetation indigenous to the area. The fringes of the property are heavily wooded on three (3) sides which will provide a significant natural buffer. The screening along Morgnec Road will optimize opportunities to minimize the site's visibility from pedestrian and vehicular traffic.

6. Vegetative Stabilization

Turf style grasses mixed with white clover 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 Kent 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 white clover and other wild flowers that will promote the health of honey bees and other pollinators. As indicated by representatives from the Department of Natural Resources, Solar energy generation facilities are ideal opportunities to increase healthy habitats for pollinators.

7. Transportation

a. 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). Appropriately sized laydown areas 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.

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 and applying for local permits/approvals, construction is anticipated to be initiated at the beginning of 2021 with completion and operational startup prior to December, 2021.

As mentioned above, and consistent with Kent County Land Use Ordinance Article V, Section 15.6.11, DBF will also prepare an overall engineering report which certifies that the Project was constructed in accordance with industry accepted standards and practices in addition to applicable Federal, State, and Local environmental codes. The report/certification will also verify the Project was completed in keeping with approved plans and specifications and consistently compliant with the Conditions of the CPCN approval including associated permits

and approvals. This report will be prepared in two (2) phases. The first phase will certify the design as being fully compliant with applicable codes and requirements. The second phase will attest to the implementation and include certification that construction meets the plans and specifications including submittal of as-builts.

E. SITE SELECTION AND DESIGN

1. Project Design

See description in Section 5.B.1 above.

Table 4 identifies the design and associated energy output at the project site was modeled using PVSYST v6.76. 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 v6.76 was used to simulate the predicted energy output from the Project at approximately 93,354MWhrs in the first full year of project operation.

Table 4 – PVSyst Inputs

Location:	Chestertown, MD
Time Zone:	UT-5
Nominal DC Rating (STC):	54,907 kWp
Nominal AC Rating:	45,000 kWac
Operating Power (35° C)	40,500 kW
Array Tilt:	Single Axis Tracker, +/- 60°
Array Azimuth:	0°
Inverters:	18 Sunny Central 2500-EV US
Modules:	137,268 LG N2W-A-5, 400W modules (or equivalent)
Stringing:	27 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 a weighted mean from multiple meteorological data sources, including Meteonorm7.2, SolarGIS, 3TIER, and National Solar Resource Database (NSRDB). Data sets have been weighted accounting for the number of years of data available and inversely weighted based on the spatial resolution of each source. 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 aforementioned data sets were chosen over other common resources, like NREL's TMY3 Class I sites, because the location is based on the exact site instead of a nearby major city. The site is on a peninsula of Maryland while the closest TMY3 class I site is north at the neck of the peninsula. Wilmington, DE would be the closest one measuring over 40 miles away, followed by Baltimore which is nearly 30 miles away across the Chesapeake. Proximity to large bodies of water can have noticeable effects on weather data sets, so the location is important. There are two NREL TMY3 Class II data sets from locations on the same peninsula, however Class II data sets are considered less accurate. Since aforementioned data sets are satellite based, they are not restricted to information from a limited number of ground measurement equipment locations.

3. Modeling

PVSYST v6.76 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:	Compiled from multiple sources
Albedo:	.0.20
Thermal Loss Factor:	Uc (const) 25.0 W/m^2K, Uv (wind) 1.2 W/m^2K / m/s
Wiring Ohmic Loss (DC):	1. 5% at STC
Array Soiling Loss:	1.0%
Module Quality Loss:	0.6% (Gain)
Module Mismatch Loss:	0.5% at MPP
Light Induced Degradation:	0%
Incidence effect, ASHRAE parameterization (bo parameter)	0.04
AC loss, wires:	0.6% at STC
External transformer iron loss:	0.2% at STC
Resistive/Inductive losses	1.6% at STC
Collector Width:	2.04m
Collector Pitch:	4.57m

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 a one percent (1%) constant loss in output due to soiling with no monthly variation. 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 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 on the Eastern Shore of Maryland, this is assumed to be minimal.

4. Production Estimate Results

PVSyst Energy production results with estimated solar irradiation are included in ***Tables 6a and 6b*** below. Table 7a summarizes total plant production for Year 1. Table 7b summarizes the detailed production statistics for the first year of operations.

Table 6a – Total Plant Production Estimate Results in Year 1

Parameter	Preliminary Estimate
Annual Generation	93,354 MWh
DC Capacity Factor	19.41%
AC Capacity Factor	22.68%

Table 6b- PVSyst Modeling Monthly Energy in Year 1

45.0 MWac

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR
January	65.7	26.80	0.80	86.6	80.5	4574	4371	0.917
February	80.3	35.40	1.80	103.5	96.7	5445	5223	0.919
March	124.4	52.10	5.80	161.0	151.5	8286	7963	0.901
April	158.7	61.40	10.20	204.5	193.5	10216	9828	0.875
May	179.1	78.50	14.70	228.7	215.3	11225	10812	0.861
June	189.9	83.00	19.00	235.8	222.3	11347	10931	0.844
July	191.5	85.20	21.50	241.7	227.6	11625	11204	0.844
August	169.4	75.50	21.20	213.4	201.2	10280	9900	0.845
September	132.4	56.60	16.70	168.5	158.8	8287	7965	0.861
October	104.5	42.30	12.10	136.9	128.5	6917	6647	0.884
November	70.6	28.70	6.90	93.9	87.6	4654	4644	0.901
December	58.7	24.80	1.79	77.5	71.2	4052	3866	0.909
Year	1525.2	650.09	11.09	1952.2	1834.7	97107	93354	0.871

Legends: GlobHor Horizontal global irradiation; GlobEff Effective Global, corr. for IAM and shadings
DiffHor Horizontal diffuse irradiation; EArray Effective energy at the output of the array
T_Amb Ambient Temperature; E_Grid Energy injected into grid
GlobInc Global incident in coll. plane; PR Performance Ratio

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 $80M and approximately one hundred to two hundred (100-200) design, management, and construction personnel working remotely or on the Site at the height of construction to start in the Spring, 2021.

By connecting with the electric distribution grid 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

The Applicant initiated a process in 2016 to be interconnected with the electric distribution grid serving Maryland by filing Interconnection Requests with both PJM and DPL. The results of both the PJM and DPL interconnection feasibility studies show no potential adverse impact to the stability or reliability of the local distribution system. The Applicant does not expect anything significant from the PJM Facilities Study which the Applicant expects to receive any day. A copy of the final Facilities Study will be provided to the PPRP/PSC when it is available.

H. LOCATION AND MAJOR DESIGN FEATURES OF ELECTRIC SYSTEM UPGRADE

The Project has been assigned Queue Position AB2-133 with a single Point of Interconnection (POI) at 69 kV.

Based on the findings from the Revised Generation Interconnection Feasibility Study Report, a list of improvements associated with building a new fifth (5^{th}) position onto the 69 kV four (4) position ring bus at Chestertown Substation were defined. Specifically, the new position will be connected to a generator. The Project will require the addition of a 69 kV breaker, four (4) 69 kV disconnect switches, three (3) CT/VT combination units, and substation bus. The 69 kV ring bus will extend out to the west of the existing yard, and the substation will be expanded to the west by forty feet (40'). The 6727 line terminal (to future McCleans Substation, currently to Lynch Substation), will need to be rebuilt

I. IMPLEMENTATION SCHEDULE FOR THE PROJECT

The Project schedule identifies the following approximate implementation dates:

- Engineering and Permitting: April, 2016 through December, 2019
- Construction: Spring, 2021 through Winter, 2021
- Operation: Fall/Winter 2021

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 Kent County, Maryland along Morgnec Road and adjacent to the Town of Chestertown. The total fenced area of the Project will include approximately two hundred fifty-three (253.16) acres. The surrounding areas include industrial, commercial, farm land, and rural housing. Its close proximity to the Town of Chestertown also makes a solar project at this location compatible with the character and nature of the neighborhood.

The property is relatively flat with very little grade. No forest cutting or clearing will be required. There are no FEMA flood plains located at the Site and one hundred percent (100%) of the Project LOC will be outside the Critical Area. The portion of Parcel 40 that included RCA has been eliminated from the LOC. As with most developed property in the area, the majority of wetlands are in the wooded areas but some extend through ditches and channels into the farmed area. Site visits with ERI and MDE have determined which areas are Jurisdictional and must be avoided. These areas are denoted on ***Figure 5***.

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, and representatives from the Critical Areas Commission. Through this review process, we were able to confirm the information that was found online and reflected on various resource maps. MHT advised a Phase I Archeological Investigation and A Determination of Eligibility for National Registration of Historic Places is required which are being performed by Edward Otter, Inc. The field work has been completed, there have been no significant finds, and the Phase I report and DOE forms are be completed with an anticipated submittal date to MHT in the beginning of January, 2019.

As discussed elsewhere in this Report, the property has historically been used for agricultural purposes. The farm is primarily comprised of agricultural fields used to grow conventional crops. Because of the continuous disturbance of the Site associated with farming operations, all of the habitat is outside the LOD in the wooded areas on the fringe of the property.

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. For these reasons there are no impacts identified relative to Flora and Fauna (see below). Additionally, using construction practices with low impacting disturbance, approved ESD

practices, and other sediment and erosion controls, water quality of the surrounding area and downstream waterways will not be impacted and protected to a level exceeding that employed by the current farm operations.

a. Geology/Soils.

As noted above, two-thirds or more of the Site is outside the Critical Area and contains soils which are moderately to well-drained. The grades on the property are gently sloping which minimizes erosion and will work well with proposed designs to achieve State Environmentally Sensitive Design (ESD) Best Management Practices (BMPs) for stormwater management. The primary soils found on this Site as shown in ***Figure 4*** above include but are not limited to, Keyport Silt Loam, Mattapex Silt Loam, Matapeake Silt Loam, Sassafras Sand Loam, Loam, Gravely Loam, and Woodstown. These soils as a grouping have slopes between zero percent (0%) and five percent (5%) with some exterior grades between five percent (5%) and ten percent (10%), and very few as high as fifteen percent (15%) to forty percent (40%). As a group the soil on the property create no challenges associated with the proposed drainage system and designs for the racking and panels. These soils are suitable to support solar panels, inverters, switch gear, grass covered aisle ways, access roads, and associated drainage and stormwater management (see geotechnical report in ***Appendix 3***).

b. Land Use and Cover

The Site primarily consists of agricultural fields and has been farmed for conventional agricultural crops by the landowner for several decades. As noted above, existing wetland features will be avoided as part of the design. The primary entrances for the solar farm will be from Morgnec Road (no internal access ways/drive aisles will cross wetland areas and interconnecting electrical wires will be installed using directional drilling under any environmental areas).

c. Stream Buffers and Floodplains

The proposed project area is within the Chester River Basin, and is located along a primary tributary, Morgan Creek. 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. For this watershed, they are designated Use I- Recreation Contact and Protection of Aquatic Life.

The watershed contains roughly 37,400 acres of land in Kent and Queen Anne County. Of this, 29,600 acres are in Kent County. The majority of water from the Kent County portion of this watershed drains through rural Morgan Creek (22,200 acres) and Radcliffe Creek (4,030 acres). The agricultural land is very productive, with seventy-five percent (75%) of land being classified as prime farmland.

Based on current land use the loadings to this tributary are mostly non-point source. It will be beneficial to the watershed if a solar generation facility/green infrastructure project replaced the current plan for residential development.

d. Flora Resources

As discussed elsewhere in this Report, the property has historically been used for agricultural purposes. The farm is primarily comprised of agricultural fields used to grow conventional crops. There are also several small segregated areas of forest cover present where farming is not feasible due to hydric soils and high water tables.

The number and variety of habitats are limited at the Site as a result of historical agricultural practices. For these same reasons, there is limited biodiversity present at the Site. The Site contains flora that is common to the area. The Project is not anticipated to impact critical habitats because there will be no tree cutting onsite. The few wooded areas on the fringe of the property consist of tree lines which separate properties and which border nearby tributaries.

e. Fauna Resources

As stated in the preceding section, currently the Site consists of primarily agricultural fields that are used to grow conventional crops. These fields routinely undergo rigorous planting schedules that include a cover crop, full season crop, and/or a late season crop. The ongoing mowing, plowing, planting, application of fertilizers and pesticides, and harvesting are all performed in accordance with typical agricultural practices recommended by the local Farm Bureau and the Maryland Department of Agriculture.

Because of these rigorous and continuous agricultural activities and due to the segregated forest areas, wildlife habitat at the Site is extremely limited and associated mostly with common reptiles, birds, small mammals, amphibians, and arthropods. The most suited habitat for wildlife is in the areas of forest cover, which are not to be disturbed.

In summary, as stated above, the number and variety of wildlife habitats are limited at the Site as a result of historical agricultural practices, and; therefore, there is very limited biodiversity present. The Site contains fauna that is common to the area. The Project is not anticipated to impact significant fauna or critical habitats primarily because the Project is located in a cleared area predominantly used for crops and the forested areas that exist on the fringe of the property will not be disturbed. The letter from DNR Wildlife and Natural Heritage confirms there are no official State or Federal records for listed plant or animal species within the Project site.

f. Other Sensitive Areas
According to the Department of Natural Resources, 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
Although there are a few wetlands extending from the woods into fringe areas of the property and some portions of the property are located within the RCA designation of Critical Area, these areas have been avoided. The remaining portions of the property are unaffected by these environmental constraints and the LOC depicted in ***Figure 5*** can effectively support the solar generation facility while avoiding all environmental constraints. In addition, the solar design incorporates a thirty-five foot (35') setback from these areas.

There are no FEMA designated flood plain elevations per the Flood Insurance Rate Map (FIRM) Panel No. 24029C0281D, effective June 9, 2014. 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 switch gear.

b. Cultural Resources
The Applicant has communicated with MHT and received a response indicating the Project is located in an area of interest. As noted above, the necessary onsite Phase I Archeological Investigation and Determination of Eligibility assessment will be performed by Edward Otter, Inc. and provided to MHT for review. A copy of the Project Review Form and MHT response is enclosed (see ***Appendix 9***).

c. Historic Building Environment
As noted above, the Applicant has submitted the appropriate documents to the Maryland Historic Trust (MHT). The studies required by MHT were performed during the Fall, 2016. The Project was subsequently put on hold. Mr. Otter's report is still in progress and results of findings will be provided to MHT for final determination.

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. Wetlands Assessment

MDE's Mr. Chris Pajak of the Nontidal Wetlands Program and Mr. Thomas Nobile of Environmental Resources, Inc. conducted a joint site visit to review areas immediate and adjacent to the site which would be avoided during design and construction. ERI's report of findings is included as ***Appendix 6***. MDE's response to ERI's finding is included as ***Appendix 7***. To summarize, the findings document wetlands on the property to be mostly in the wooded areas and other fringe areas to be avoided. ERI confirmed these areas in their report of findings and MDE agreed that wetlands can be avoided and no permits will be required. A thirty-five foot (35') setback from the drip line of the forested areas will be maintained.

b. Natural Resources Inventory Plan

H&B Solutions, LLC prepared an Environmental Due Diligence and Site Feasibility Report for Morgnec Road Solar, LLC dated September 21, 2016. A summary of these findings follows:

- The Project is located within an area zoned Rural Residential and Community Residential.
- Tax Map 37, Parcel 174 is not within the Critical Area. However, part of Tax Map 37, Parcel 40 is within the Resource Conservation Area (RCA) of the State Critical Area and has been eliminated from the LOD.
- Based on the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps, there are potential Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands, and Riverine within the Project LOD, which for the most part, can be avoided during the design phase.
- The property is not subject to flooding pursuant to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 24029C0281D, effective June 9, 2014.
- According to the NRCS soils maps, the property contains moderate to well-draining soils. ECS's preliminary geotechnical report confirms these sites area suitable to accommodate the planned improvements.
- As indicated above, it is not anticipated that trees will be cut, but the Project will have to comply with afforestation requirements and mitigate using a combination of Forest Conservation Easement and in lieu of fees.
- According to Maryland Historical Trust's (MHT's) review and analyses of the property (see ***Appendix 10***), at a minimum, the following resources must be evaluated for the National Register using the MHT's Determination of Eligibility (DOE) form.
    - Any structures over 50 years of age within the Area of Potential Effect (APE).

- MHT is also requiring a Phase I archeological investigation based on the determination that several prehistoric sites have been identified just east of the project area along Morgan Creek.
- According to the Department of Natural Resources, there are no State or Federal records for listed plant or animal species.

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, MHT has identified areas of concern/interest (see ***Appendix 10***).

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 3***. 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. Based on preliminary investigations the Project has avoided identified environmental constraints and there is a reasonable expectation that the final design will meet applicable federal, state, and local regulations.

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 tanks may be used to manage dust during construction if required.

2. Affected Streams and Aquifers

As mentioned above MDE, with input from ERI, has determined there are few jurisdictional waters within the Project boundary. These areas have been avoided as part of the site plan design. The non-Jurisdictional agricultural ditches onsite will be filled to support the solar panel racking system. Wetlands adjacent to the boundary of the property will not be disturbed and the Project will be located thirty-five feet (35') from the drip line of these wooded areas. There will be no offsite impacts to streams and aquifers as the intended use would be more environmentally protective than the current farming practices and much more protective as compared to a residential community.

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 applied for and used as controls to meet the water quality standards prior to 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**

The Project is not anticipated to significantly affect any wildlife habitat. 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 at best minimal adverse effects on surrounding property or life. All components of the Project will be designed per the local and state building codes.

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, which could allow for eventual development for a residential use based on market demand.

APPENDIX 1

PJM
Generation Interconnection
System Impact Study Report

Generation Interconnection System Impact Study Report

For

PJM Generation Interconnection Request Queue Position AB2-133

"Chestertown-Church 69 kV"

May 2017

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The Interconnection Customer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

Urban Grid Holding's LLC, the Interconnection Customer (IC), has proposed a 55.8 MW (24.6 MWC) solar generating facility to be located in Kent County, Maryland. PJM studied the AB2-133 project as a 55.8 MW injection into the Delmarva Power and Light Company (DPL) system as a direct connection into the Chestertown 69 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2020. The planned in-service date, as requested by the IC, is October 1, 2018. This date is not attainable due to the need for additional studies and the Transmission Owner construction schedule.

Point of Interconnection

The Interconnection Customer requested a transmission level interconnection. As a result, the AB2-133 project will interconnect with the DPL system Chestertown 69 kV Substation (see Attachment 1).

Transmission Owner Scope of Attachment Facilities Work

Substation Interconnection Estimate

Scope: Build a new 5th position onto the 69 kV 4 position ring bus at Chestertown Substation. The new position will be connected to the AB2-133 generator. The project

will require the addition of a 69 kV breaker, 3 69 kV disconnect switches, 3 CT/VT combination units, and substation bus. The 69 kV ring bus will extend out to the west of the existing yard, and the substation will be expanded to the west by 40 feet. The 6727 line terminal (to future McCleans Substation, currently to Lynch Substation), will need to be rebuilt (see Attachment 1).

Estimate: $1,767,000
Construction Time: 24 months

Major Equipment Included in Estimate:

- Power Circuit Breaker, 69 kV, 2000A, 40kA, 3 cycle — Qty. 1
- Disconnect Switch, 69 kV, 2000A, Manual Wormgear, Arcing Horns — Qty. 4
- CT/VT Combination Units, 69 kV — Qty. 3
- Disconnect Switch Stand, High, 69 kV, Steel — Qty. 4
- Disconnect Switch Stand, Low, 69 kV, Steel — Qty. 2
- CT/VT Stand, Single Phase, Low, 69 kV, Steel — Qty. 3
- CVT Stand, Single Phase, Low, 69 kV, Steel — Qty. 3
- Relay Panel, Transmission Line, FL/BU (20") — Qty. 1
- Control Panel, 69 kV Circuit Breaker (10") — Qty. 1
- Bus Support Structure, 3 phase, 69 kV, Steel — Qty. 3
- Take-off structure, 69 kV — Qty. 1

Estimate Assumptions:

- Substation is capable of being expanded 40 feet to the west.
- Completion of the 4 breaker 69 kV ring bus at Chestertown Substation prior to start of the project.

Required Relaying and Communications

New protection relays are required for the new terminal. An SEL-487 will be required for primary protection and an SEL-387 will be required for back-up protection. One 20" relay panel for each line terminal will be required for front line and back-up protection.

An SEL-451 relay on a 20" breaker control panel will be required for the control and operation of each new 138 kV circuit breaker.

The project will require re-wiring and adjustment of existing relay schemes to accommodate the new 69 kV terminal.

The cost of the required relay and communications is included in the Substation Interconnection Estimate.

Metering

Three phase 69 kV revenue metering points will need to be established. DPL will purchase and install all metering instrument transformers as well as construct a metering

structure. The secondary wiring connections at the instrument transformers will be completed by DPL's metering technicians. The metering control cable and meter cabinets will be supplied and installed by DPL. DPL will install conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined in the construction phase. DPL will provide both the Primary and the Backup meters. DPL's meter technicians will program and install the Primary & Backup solid state multi-function meters for each new metering position. Each meter will be equipped with load profile, telemetry, and DNP outputs. The IC will be provided with one meter DNP output for each meter. DPL will own the metering equipment for the interconnection point, unless the IC asserts its right to install, own, and operate the metering system.

The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each Company metering position to facilitate remote interrogation and data collection.

It is the IC's responsibility to send the data that PJM and DPL requires directly to PJM. The IC will grant permission for PJM to send DPL the following telemetry that the IC sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.
The estimate for DPL to design, purchase, and install metering as specified in the aforementioned scope for metering is included in the Substation Interconnection Estimate.

Interconnection Customer Scope of Work
The Interconnection Customer is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

DPL Interconnection Customer Scope of Direct Connection Work Requirements

- DPL requires that an IC circuit breaker is located within 500 feet of Chestertown substation to facilitate the relay protection scheme between DPL and the IC at the Point of Interconnection (POI).

Special Operating Requirements

1. DPL will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by DPL.

2. DPL reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by DPL.

Summer Peak Analysis - 2020

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

1. (DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 97.58% to 98.5% (AC power flow) of its emergency rating (1071 MVA) for the line fault with failed breaker contingency outage of 'LINWO225/* $ DELCO $ LINWO225 $ STBK'. This project contributes approximately 11.63 MW to the thermal violation.

   CONTINGENCY 'LINWO225/* $ DELCO $ LINWO225 $ STBK'
   TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1/* LINWOOD 230.00 EDGEMR 5 230.00 $ DELCO $ LINWO225 $ STBK
   REMOVE MACHINE 1 FROM BUS 213888/* PHLISCT1 18.00 $ DELCO $ LINWO225 $ STBK
   REMOVE MACHINE 1 FROM BUS 213889/* PHLISCT2 18.00 $ DELCO $ LINWO225 $ STBK
   END/*$ DELCO $ LINWO225 $ STBK

   Please refer to Appendix 1 for a table containing the generators having contribution to this flowgate.

2. (DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 97.54% to 98.83% (AC power flow) of its emergency rating (348 MVA) for the tower line contingency outage of 'DBL_4NC'. This project contributes approximately 28.36 MW to the thermal violation.

   CONTINGENCY 'DBL_4NC'/* RED LION-CEDAR CREEK 230;RED LION-CARTANZA 230
   OPEN LINE FROM BUS 231004 TO BUS 232002 CKT 1
   OPEN LINE FROM BUS 231004 TO BUS 232003 CKT 1
   END

Please refer to Appendix 2 for a table containing the generators having contribution to this flowgate.

3. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 97.48% to 100.99% (AC power flow) of its emergency rating (348 MVA) for the tower line contingency outage of 'DBL_4NC'. This project contributes approximately 28.36 MW to the thermal violation.

   CONTINGENCY 'DBL_4NC'/* RED LION-CEDAR CREEK 230;RED LION-CARTANZA 230
   OPEN LINE FROM BUS 231004 TO BUS 232002 CKT 1
   OPEN LINE FROM BUS 231004 TO BUS 232003 CKT 1
   END

   Please refer to Appendix 3 for a table containing the generators having contribution to this flowgate.

Contribution to Previously Identified Overloads
(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements
(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

1. To mitigate the (DP&L - PECO) CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) overload will require terminal upgrades at both the Claymont and Linwood Substations. The estimate to perform this work is $800,000. The final ratings would be 1253/1519 MVA.

   Cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	Cost($0.8M)	Contingency Name	Contingency Type
AB2-036	18.43	15.97%	$127,764.29	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker
AB2-037	38.36	33.24%	$265,927.21	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker
AB2-120	17.19	14.90%	$119,168.11	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker
AB2-130	14.56	12.62%	$100,935.87	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker
AB2-133	**11.63**	**10.08%**	**$80,623.91**	**LINWO225/* $ DELCO $ LINWO225 $**	**breaker**

				STBK'	
AB2-135	11.59	10.04%	$80,346.62	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker
AB2-153	3.64	3.15%	$25,233.96	LINWO225/* $ DELCO $ LINWO225 $ STBK'	breaker

Note: There is a potential baseline to upgrade the ratings from 805 emergency to 1035 MVA, which is required to be built before this project can go into service.

2. To mitigate the (DP&L) MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) overload will require reinforcements to increase the emergency rating of the Middletown Tap to Mount Pleasant 138 kV line. Those reinforcements include rebuilding a small section of the circuit and installing new poles and the re-mounting of 138 kV disconnect switches. The estimated cost to perform this work is **$800,000** and will take **18 months** to complete following a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA). (PJM Network Upgrade Number n5300)

   Cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	Cost($0.8M)	Contingency Name	Contingency Type
AB2-032	7.84	3.32%	$26,546	DBL_4NC'	tower
AB2-036	30.169	12.77%	$102,151	DBL_4NC'	tower
AB2-037	33.53	14.19%	$113,532	DBL_4NC'	tower
AB2-063	7.56	3.20%	$25,598	DBL_4NC'	tower
AB2-120	19.70	8.34%	$66,704	DBL_4NC'	tower
AB2-130	17.30	7.32%	$58,577	DBL_4NC'	tower
AB2-133	**28.36**	**12.00%**	**$96,026**	**DBL_4NC'**	**tower**
AB2-135	27.49	11.64%	$93,080	DBL_4NC'	tower
AB2-136	10.70	4.53%	$36,230	DBL_4NC'	tower
AB2-153	7.85	3.32%	$26,580	DBL_4NC'	tower
AB2-172	10.81	4.58%	$36,602	DBL_4NC'	tower
AB2-179	34.96	14.80%	$118,374	DBL_4NC'	tower

3. To mitigate the (DP&L) TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload will require reinforcements to increase the emergency rating of the Townsend to Middletown Tap 138 kV line. Those reinforcements include rebuilding a small section of the circuit and installing new poles and the re-mounting of 138 kV disconnect switches. The estimated cost to perform this work is **$800,000** and will take **18 months** to complete following a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA). (PJM Network Upgrade Number n5301)

   Cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	Cost($0.8M)	Contingency Name	Contingency Type

AB2-032	7.84	3.32%	$26,547.02	DBL_4NC'	tower
AB2-036	30.16	12.77%	$102,124.78	DBL_4NC'	tower
AB2-037	33.53	14.19%	$113,535.93	DBL_4NC'	tower
AB2-063	7.56	3.20%	$25,598.92	DBL_4NC'	tower
AB2-120	19.70	8.34%	$66,706.17	DBL_4NC'	tower
AB2-130	17.30	7.32%	$58,579.53	DBL_4NC'	tower
AB2-133	**28.36**	**12.00%**	**$96,029.80**	**DBL_4NC'**	**tower**
AB2-135	27.49	11.64%	$93,083.89	DBL_4NC'	tower
AB2-136	10.70	4.53%	$36,231.27	DBL_4NC'	tower
AB2-153	7.85	3.32%	$26,580.89	DBL_4NC'	tower
AB2-172	10.81	4.58%	$36,603.74	DBL_4NC'	tower
AB2-179	34.96	14.80%	$118,378.06	DBL_4NC'	tower

Contribution to Previously Identified System Reinforcements
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None

Steady-State Voltage Requirements

No issue identified.

Short Circuit

No issues identified.

Stability and Reactive Power Requirement

No issues found. See Attachment for full report.

Light Load Analysis - 2020

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (DP&L - DP&L) The MASSEY-MASSYREA 69 kV line (from bus 232201 to bus 232810 ckt 1) loads from 52.0% to 112.75% (AC power flow) of its emergency rating (95 MVA) for the single line contingency outage of 'CKT 6773'. This project contributes approximately 63.87 MW to the thermal violation.

   CONTINGENCY 'CKT 6773'
   DISCONNECT BUS 232811/ CHURCH - CLOUGH - CHESTERTOWN 69
   END

2. (DP&L - DP&L) The MASSYREA-CHURC_69 69 kV line (from bus 232810 to bus 232203 ckt 1) loads from 54.71% to 144.19% (AC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 6773'. This project contributes approximately 63.87 MW to the thermal violation.

   CONTINGENCY 'CKT 6773'
   DISCONNECT BUS 232811/ CHURCH - CLOUGH - CHESTERTOWN 69
   END

3. (DP&L - DP&L) The Y3-033 TAP-MASSEY 69 kV line (from bus 915750 to bus 232201 ckt 1) loads from 53.1% to 115.11% (AC power flow) of its emergency rating (93 MVA) for the single line contingency outage of 'CKT 6773'. This project contributes approximately 63.87 MW to the thermal violation.

   CONTINGENCY 'CKT 6773'
   DISCONNECT BUS 232811/ CHURCH - CLOUGH - CHESTERTOWN 69
   END

4. (DP&L - DP&L) The AB2-036 TAP-OIL_CITY 138 kV line (from bus 923950 to bus 232801 ckt 1) loads from 55.91% to 70.03% (AC power flow) of its emergency rating (159 MVA) for the single line contingency outage of 'CKT 13808'. This project contributes approximately 26.7 MW to the thermal violation.

   CONTINGENCY 'CKT 13808'
   DISCONNECT BUS 232106/MOUNT PLEASANT - MIDDLETOWN - TOWNSEND 138
   DISCONNECT BUS 232804/MIDDLETOWN 138
   END

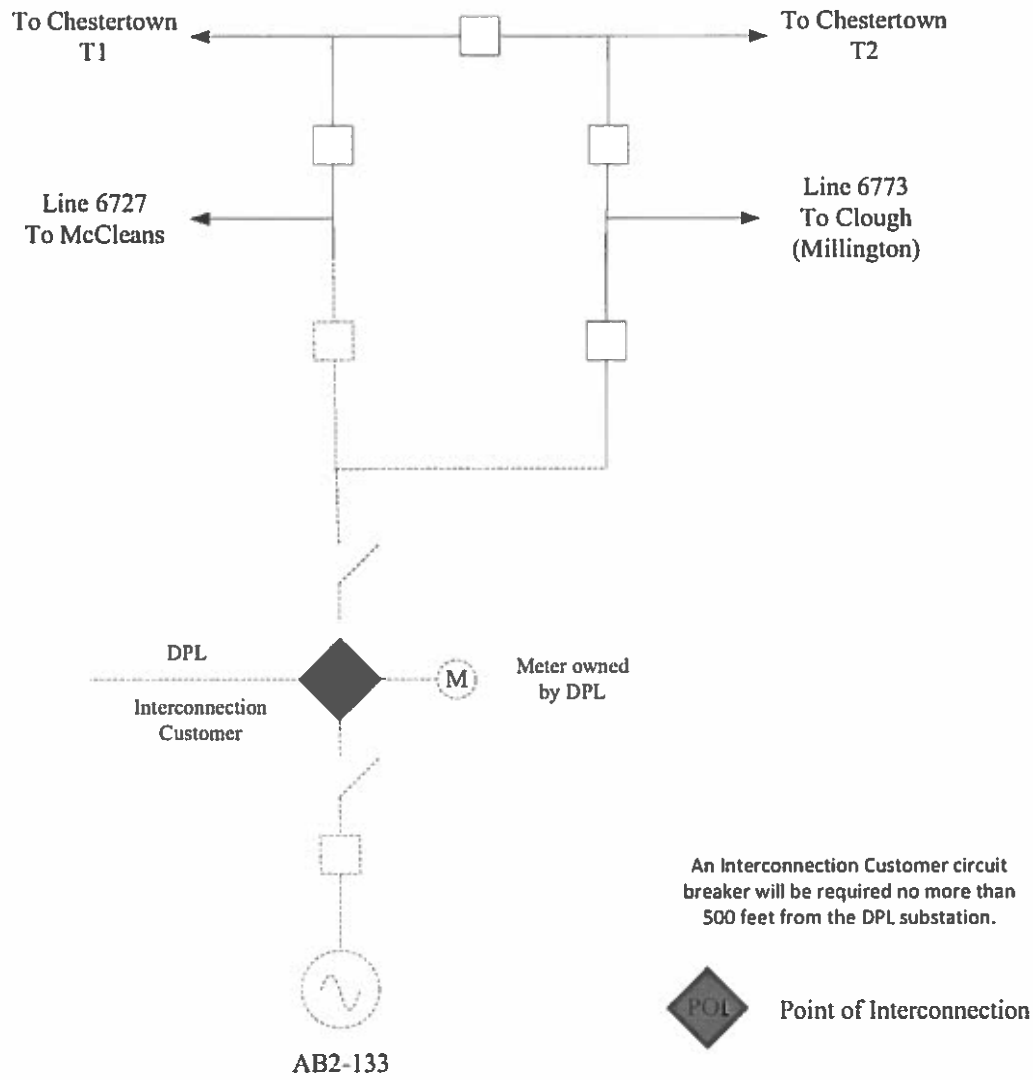
Delmarva Power and Light Costs

Cost estimates will further be refined as a part of the Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by DPL in connection with the AB2-133 project. Such costs may include, but are not limited to, any transmission system assets currently in DPL's rate base that are prematurely retired due to the AB2-133 project. PJM shall work with DPL to identify these retirement costs and any additional expenses. DPL reserves the right to reassess issues presented in this

document and, upon appropriate justification, submit additional costs related to the AB2-133 project.

Attachment 1

AB2-133
Chestertown 69 kV
Chestertown Substation



Attachment 2

AB2-133
System Impact Study

TABLE OF CONTENTS

Executive Summary

Generator Interconnection Request AB2-133 is for a 55.8 MW Maximum Facility Output (MFO) solar generation plant. AB2-133 consists of 23x2.48 MW TMEIC Samurai, PVH-L2700GR inverters with a Point of Interconnection (POI) tapped into Chestertown 69kV substation in the DPL transmission system, Kent county, MD.

This report describes a dynamic simulation analysis of AB2-133 as part of the overall system impact study.

The load flow scenario for the analysis was based on the RTEP 2020 Summer Peak case, modified to include applicable queue projects. AB2-133 has been dispatched online at maximum power output, with approximately unity power factor at the POI.

The AB2-133 queue project was tested for compliance with NERC, PJM and other applicable criteria. The range of contingencies evaluated was limited to that necessary to assess compliance and each was limited to a 20-second simulation time period.

Simulated NERC Standard TPL-001 faults include:

1. Three-phase (3ph) fault with normal clearing (Category P1)
2. Operating of a line section w/o a fault, Single-line-to-ground (slg) on Bus Section and Breaker. (Category P2)
3. Single-line-to-ground (slg) with delayed clearing as a result of breaker failure (Category P4)
4. Single-line-to-ground (slg) with delayed clearing as a result of protection failure (Category P5)
5. Single-line-to-ground (slg) with normal clearing for common structure (Category P7)

Note: For generator interconnection studies, Category P3 and P6 faults will be studied on an as needed basis. In this study, P2 contingencies are not applicable.

Other applicable criteria tested include:

1. Transmission Owner (TO) specific criteria
2. Other criteria

The system was tested for a system intact condition and the fault types listed above. Specific fault descriptions and breaker clearing times used for this study are provided in the result table.

No relevant High Speed Reclosing (HSR) contingencies were identified.

For all simulations, the queue project under study along with the rest of the PJM system were required to maintain synchronism and with all states returning to an acceptable new condition following the disturbance.

For the remaining fault contingencies tested on the 2020 Summer Peak case:

a) Post-contingency oscillations were positively damped with a damping margin of at least 4% for local modes and 3% for inter-area modes.

b) The AB2-133 generator was able to ride through all faults (except for faults where protective action trips a generator(s)).

c) Following fault clearing, all bus voltages recover to a minimum of 0.7 per unit after 2.5 seconds (except where protective action isolates that bus).

d) No transmission element trips, other than those either directly connected or designed to trip as a consequence of that fault.

No mitigations were found to be required.

1. Introduction

Generator Interconnection Request AB2-133 is for a 55.8 MW Maximum Facility Output (MFO) solar generation plant. AB2-133 consists of 23x2.48 MW TMEIC Samurai, PVH-L2700GR inverters with a Point of Interconnection (POI) tapped into Chestertown 69kV substation in the DPL transmission system, Kent county, MD.

This analysis is effectively a screening study to determine whether the addition of AB2-133 will meet the dynamic requirements of the NERC, PJM and Transmission Owner reliability standards.

In this report the AB2-133 project and how it is proposed to be connected to the grid are first described, followed by a description of how the project is modeled in this study. The fault cases are then described and analyzed, and lastly a discussion of the results is provided.

2. Description of Project

Generator Interconnection Request AB2-133 is for a 55.8 MW Maximum Facility Output (MFO) solar generation plant. AB2-133 consists of 23x2.5 MW TMEIC Samurai, PVH-L2700GR inverters with a Point of Interconnection (POI) tapped into Chestertown 69kV substation in the DPL transmission system, Kent county, MD. The AB2-133 Point of Interconnection (POI) is the Chestertown 69kV substation circuit as shown in Figure 1. Table 1 lists the parameters given in the impact study data and the corresponding parameters of the AB2-133 loadflow models.
The dynamic model for the AB2-133 plant is based on the model data supplied by the Developer.

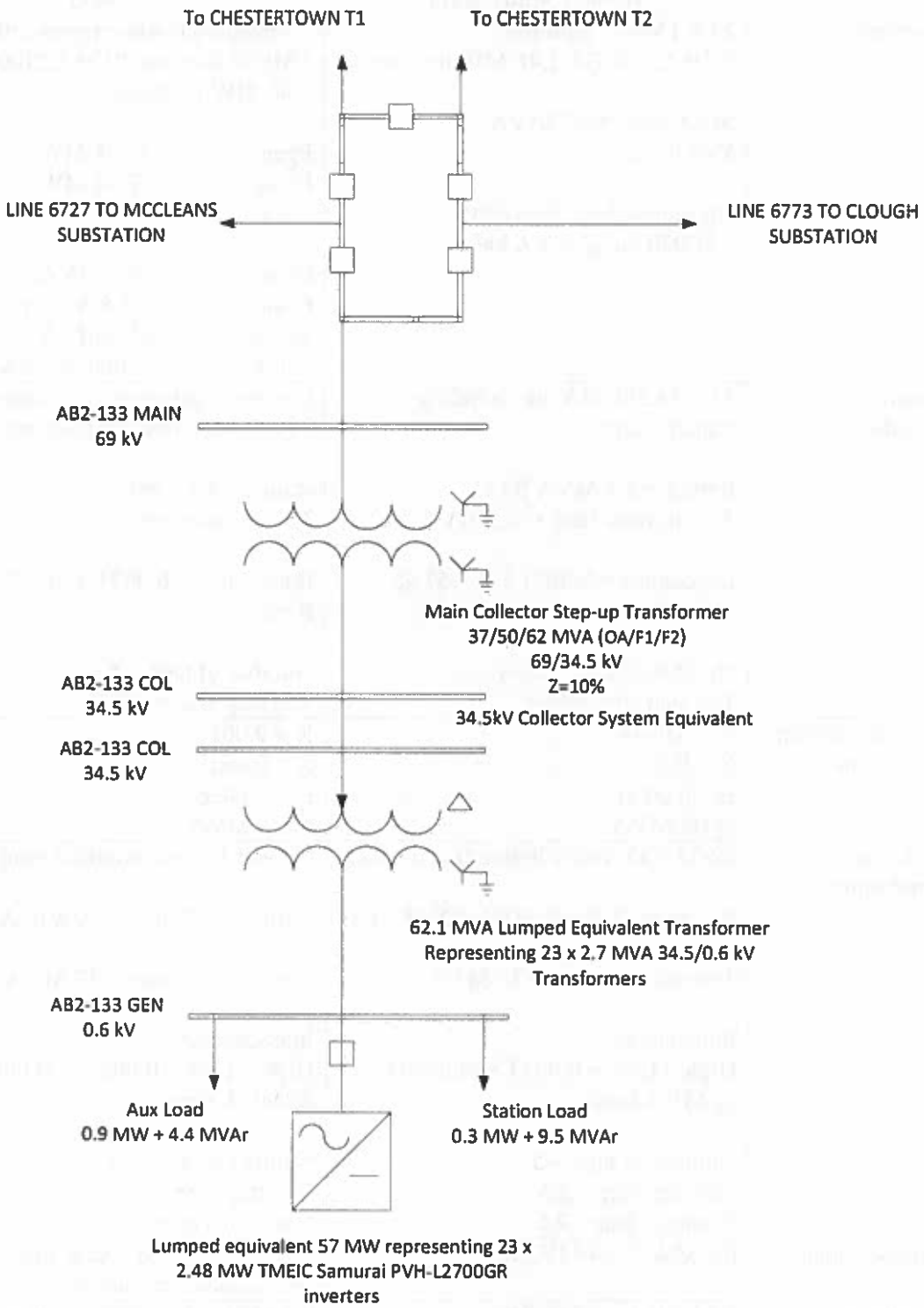


Figure 1: AB2-133 Plant Model

Table 1: AB2-133 Plant Model

	Impact Study Data	Model
Inverters	23 x TMEIC Samurai PVH-L2700GR 2.48 MW inverters MVA base = 2.7 MVA Vt = 0.6 kV Unsaturated sub-transient reactance = j1.000 pu @ MVA base	Lumped equivalent representing 23 x TMEIC Samurai PVH-L2700GR 2.48 MW inverters Pgen 57.04 MW Pmax 57.04 MW Pmin 0 MW Qmax 18.8 MVAr Qmin -18.8 MVAr Mbase 62.1 MVA Zsorce j1.000 pu @ Mbase
Inverter Transformers	23 x 34.5/0.6 kV two winding transformers Rating = 2.7 MVA (OA) Transformer base = 2.7 MVA Impedance = 0.0071 + j0.057 @ MVA Base Number of taps = N/A Tap step size = N/A	Lumped equivalent representing 23 x 34.5/0.6 kV two winding transformers Rating = 62.1 MVA Transformer base = 62.1 MVA Impedance = 0.0071 + j0.057 @ MVA Base Number of taps = 5 Tap step size = 2.5 %
Collector System Equivalent	R = 0.0018 X = 0.0010 B = 0.0036 @100MVA	R = 0.0018 X = 0.0010 B = 0.0036 @100MVA
Collector transformer	69/34.5 kV two winding transformer Rating = 37/50/62 MVA (OA/F1/F2) Transformer base = 37 MVA Impedances: High – Low = 0.0033 + j0.09994 @ MVA base Number of taps = 5 Tap step size = 2.5 Nominal Tap = 2.5	69/34.5 kV two winding transformer Rating = 37/50/62 MVA (OA/F1/F2) Transformer base = 37 MVA Impedances: High – Low = 0.0033 + j0.09994 @ MVA base Number of taps = 5 Tap step size = 2.5 Nominal Tap = 2.5
Auxiliary load	0.9 MW + 4.4 MVAR	0.9 MW + 4.4 MVAr at low voltage side of GSU transformer
Station load	0.3 MW + 9.5 MVAR	0.3 MW + 9.5 MVAR at low voltage side of GSU transformer (turned off)

Transmission line	R = 0.00073 X = 0.00291 B = 0.00006 @100MVA	R = 0.00073 X = 0.00291 B = 0.00006 @100MVA

3. Loadflow and Dynamics Case Setup

The dynamics simulation analysis was carried out using PSS/E Version 33.7.
The load flow scenario and fault cases for this study are based on PJM's Regional Transmission Planning Process[1].
The selected load flow scenario is the RTEP 2020 Summer Peak case with the following modifications:

a) Addition of all applicable queue projects prior to AB2-133.

b) Addition of AB2-133 queue project.

c) Removal of withdrawn and subsequent queue projects in the vicinity of AB2-133.

d) Dispatch of units in the PJM system to maintain slack generators within limits.

The AB2-133 initial conditions are listed in Table 2, indicating maximum power output, with AB2-133 regulating to unity power factor at the generator bus.

Table 2: AB2-133 machine initial conditions

Bus	Name	Unit	PGEN (MW)	QGEN (MVAR)	ETERM (p.u.)	POI Voltage (p.u.)
924804	AB2-133 GEN 0.6000	1	57.04	11.72	1.00	1.0298

Generation within the vicinity of AB2-133 has been dispatched online at maximum output (PMAX). The dispatch of generation in the vicinity of AB2-133 is given in Attachment 3.

[1] Manual 14B: PJM Region Transmission Planning Process, Rev 33, May 5 2016, Attachment G : PJM Stability, Short Circuit, and Special RTEP Practices and Procedures.

4. Fault Cases

Tables 3 listed the contingencies and results that were studied, with representative worst case total clearing times provided by PJM. Each contingency was studied over a 20 second simulation time interval.
Simulated NERC Standard TPL-001faults include:

1. Three-phase (3ph) fault with normal clearing (Category P1)
2. Operating of a line section w/o a fault, Single-line-to-ground (slg) on Bus Section and Breaker. (Category P2)
3. Single-line-to-ground (slg) with delayed clearing as a result of breaker failure (Category P4)
4. Single-line-to-ground (slg) with delayed clearing as a result of protection failure (Category P5)
5. Single-line-to-ground (slg) with normal clearing for common structure (Category P7)

Note: For generator interconnection studies, Category P3 and P6 faults will be studied on an as needed basis. In this study, P2 contingencies are not applicable.

Other applicable criteria tested include:

1. Transmission Owner (TO) specific criteria
2. Other criteria

The system was tested for a system intact condition and the fault types listed above. No relevant High Speed Reclosing (HSR) contingencies were studied.

5. Evaluation Criteria

This study is focused on AB2-133, along with the rest of the PJM system, maintaining synchronism and having all states return to an acceptable new condition following the disturbance. The recovery criteria applicable to this study are as per PJM's Regional Transmission Planning Process and Transmission Owner criteria:

a) The system with AB2-133 included is transiently stable and post-contingency oscillations should be positively damped with a damping margin of at least 4% for local modes and 3% for inter-area modes.

b) The AB2-133 is able to ride through faults (except for faults where protective action trips AB2-133).

c) Following fault clearing, all bus voltages recover to a minimum of 0.7 per unit after 2.5 seconds (except where protective action isolates that bus).

d) No transmission element trips, other than those either directly connected or designed to trip as a consequence of that fault.

6. Summary of Results

Plots from the dynamic simulations are provided in Attachment 4, with results summarized in Table 3.
Due to the frequency protection was disabled due to the PSSE deficiency in calculating frequencies.

For the fault contingencies tested in this study:

a) Post-contingency oscillations were positively damped with a damping margin of at least 4% for local modes and 3% for inter-area modes.

b) The AB2-133 generator was able to withstand all contingencies.

c) Following fault clearing, all bus voltages recover to a minimum of 0.7 per unit after 2.5 seconds (except where protective action isolates that bus).

d) No transmission element trips, other than those either directly connected or designed to trip as a consequence of that fault.

7. Mitigations

No Mitigations were found to be required.

Table 3: Fault list

P0: Steady State

Fault ID	Duration
P0.00	Steady State 20 sec run

P1: Three Phase Faults with normal clearing

Fault ID	Fault description	Clearing Time Normal (Cycles)	Results
P1.00	3ph @ AB2-133 POI – Chestertown 69kV line, normal clear	9	Stable
P1.01	3ph @ Chestertown – McCleans – Lynch – Kennedyville – Massey – Church 69kV line, normal clear loss of AA1-110	9	Stable
P1.02	3ph @ Chestertown – Clough – Church 69kV line, normal clear	9	Stable
P1.03	3ph @ AB2-036 – Oil City – Steele 138kV line, normal clear	9	Stable
P1.04	3ph @ Church 69/138kV Tx #1, normal clear	9	Stable
P1.05	3ph @ Church 69/138kV Tx #2, normal clear	9	Stable
P1.06	3ph @ Church – AB2-135 POI, normal clear	9	Stable
P1.07	3ph @ Church – I.B. Corners – Price 69kV line, normal clear	9	Stable
P1.08	3ph @ Centerville – Wye Mills 69kV line, normal clear	9	Stable

P4: SLG Stuck Breaker (SB) Faults at Backup Clearing

Fault ID	Fault description	Clearing Time Normal/Delayed (Cycles)	Results
P4.01	SLG @ Chestertown 69/25kV Tx #1, SB @ Chestertown, delayed clear loss of Chestertown – McCleans – Lynch – Kennedeyville – Massey – Church 69kV line, AA1-110	9 / 22	Stable
P4.02	SLG @ Chestertown – McCleans – Lynch – Kennedeyville – Massey – Church 69kV line, normal clear loss of AA1-110, SB @ Chestertown, delayed clear loss of AB2-133	9 / 22	Stable

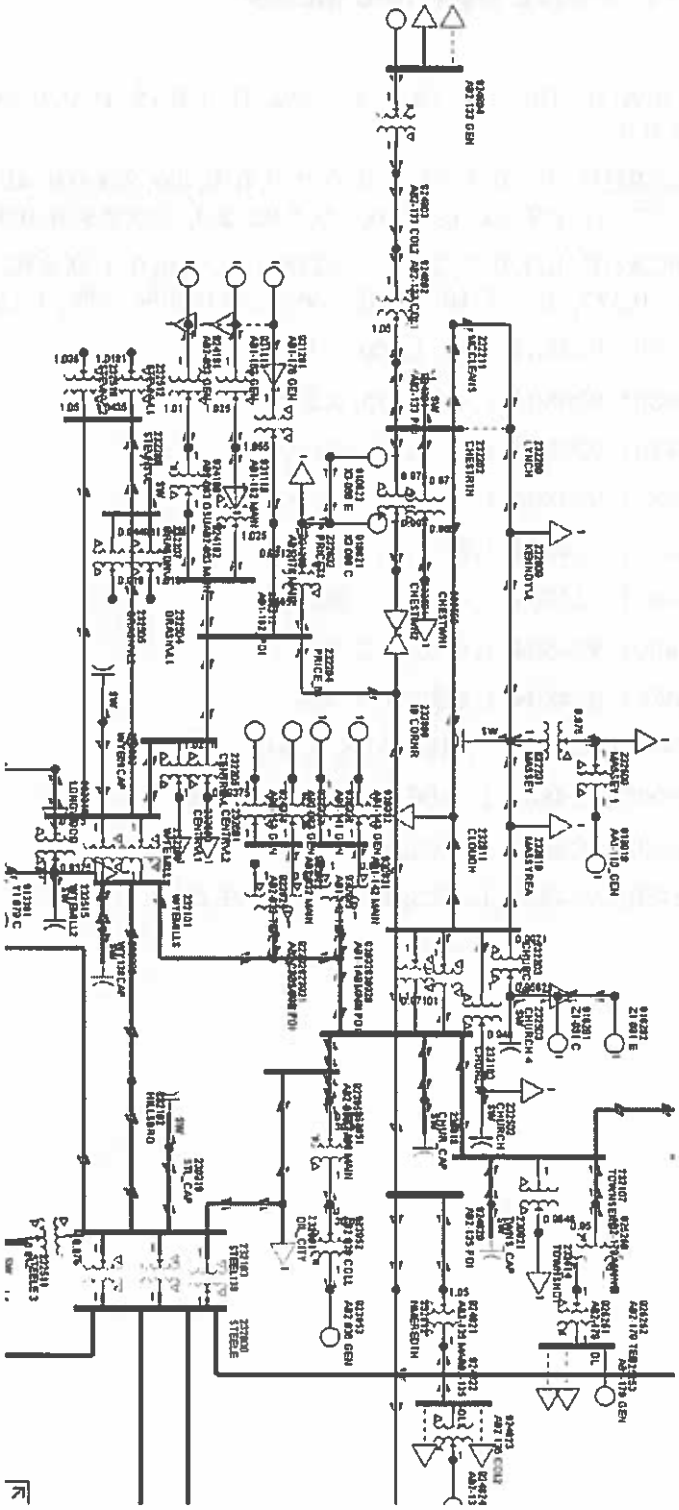
Fault ID	Fault description	Clearing Time Normal/Delayed (Cycles)	Results
P4.03	SLG @ Chestertown 69/25kV Tx #2, SB @ Chestertown, delayed clear loss of Chestertown – Clough – Church 69kV line	9 / 22	Stable
P4.04	SLG @ Chestertown – Clough – Church 69kV line, SB @ Chestertown, delayed clear loss of AB2-133	9 / 22	Stable
P4.05	SLG @ Chestertown 69/25 kV Tx #1, SB @ Chestertown, delayed clear loss of Chestertown 69/25kV Tx #2	9 / 22	Stable
P4.06	SLG @ Church – AB2-036 138kV line, SB @ Church, delayed clear loss of Church – AB1-141 138kV line.	9 / 21	Stable
P4.07	SLG at Church 69 kV on Massey – Kennedeyville – Lynch – McCleans – Chestertown circuit 6727 nomal clear loss of AA1-110. Breaker 7210 stuck. Fault cleared with loss of Church 69 kV / 138 kV transformer AT2.	9 / 22	Stable
P4.08	SLG at Church 69 kV on Massey – Kennedeyville – Lynch – McCleans – Chestertown circuit 6727, nomal clear loss of AA1-110. Breaker 7290 stuck. Fault cleared with loss of Church – AB2-135 POI circuit 6704.	9 / 22	Stable
P4.09	SLG at Church 69 kV on Clough – Chestertown circuit 6773. Breaker 7240 stuck. Fault cleared with loss of I.B. Corners – Price circuit 6710.	9 / 22	Stable
P4.10	SLG at Church 69 kV on Clough – Chestertown circuit 6773. Breaker 7260 stuck. Fault cleared with loss of Church 69 kV / 138 kV Transformer AT1.	9 / 22	Stable
P4.11	SLG at Church 69 kV on AB2-135 POI circuit 6704. Breaker 7290 stuck. Fault cleared with loss of Church 69 kV on Massey – Kennedeyville – Lynch – McCleans – Chestertown circuit 6727, loss AA1-110.	9 / 22	Stable
P4.12	SLG at Church 69 kV on AB2-135 POI circuit 6704. Breaker 7220 stuck. Fault cleared with loss of Church 69 kV / 25 kV Transformer T3 and Church 69 kV / 25 kV Transformer T4, Z1-081.	9 / 22	Stable
P4.13	SLG at Church 69 kV on I.B. Corners – Price circuit 6710. Breaker 7250 stuck. Fault cleared with loss of Church 69 kV / 25 kV Transformer T3 and Church 69 kV / 25 kV Transformer T4, Z1-081.	9 / 22	Stable
P4.14	SLG at Church 69 kV on I.B. Corners – Price circuit 6710. Breaker 7240 stuck. Fault cleared with loss of Clough – Chestertown circuit 6773.	9 / 22	Stable
P4.15	SLG at Church 69 kV on 69 kV / 138 kV transformer AT1. Breaker 60 stuck. Fault cleared with loss of Church 69 kV / 138 kV Transformer AT2.	9 / 22	Stable

Fault ID	Fault description	Clearing Time Normal/Delayed (Cycles)	Results
P4.16	SLG at Church 69 kV on 69 kV / 138 kV transformer AT1. Breaker 7260 stuck. Fault cleared with loss of Clough – Chestertown circuit 6773.	9 / 22	Stable
P4.17	SLG at Church 69 kV on 69 kV / 138 kV transformer AT2. Breaker 60 stuck. Fault cleared with loss of Church 69 kV / 138 kV Transformer AT1.	9 / 22	Stable
P4.18	SLG at Church 69 kV on 69 kV / 138 kV transformer AT2. Breaker 7210 stuck. Fault cleared with loss of Church 69 kV on Massey – Kennedeyville – Lynch – McCleans – Chestertown circuit 6727. Trips AA1-110.	9 / 22	Stable

P5: SLG Fault with Delayed (Zone 2) Clearing

Fault ID	Fault description	Clearing Time Normal/Delayed (Cycles)	Results
P5.01	SLG at 80% of 138kV line from AB2-036 to Oil City – Steele, delayed clear.	9 / 37	Stable
P5.02	SLG at 80% of 69 kV line from Chestertown to Clough – Church circuit 6773. Delayed clearing at Chestertown.	9 / 42	Stable
P5.03	SLG at 80% of 69 kV line from Church to Massey – Kennedyville – Lynch – Chestertown circuit 6727. Delayed clearing at Church, loss of AA1-110.	9 / 42	Stable
P5.04	SLG at 80% of 69 kV line from Church to Clough – Chestertown circuit 6773. Delayed clearing at Church.	9 / 42	Stable
P5.05	SLG at 80% of 69 kV line from Church on AB2-135 POI circuit 6704. Delayed clearing at Church.	9 / 42	Stable
P5.06	SLG at 80% of 69 kV line from Church on I.B. Corners – Price circuit 6710. Delayed clearing at Church.	9 / 42	Stable
P5.07	SLG at 80% of 69kV line from Chestertown – Lynch – Kennedyville – Massey – Church, Delayed clearing at Chestertown, loss of AA1-110.	9/42	Stable
P5.08	SLG at Church 69/138kV transformer AT1, Delayed clearing	/42	Stable

Attachment 1. PSS/E Model One Line Diagram



Attachment 2. AB2-133 PSS/E Dynamic Model

924804,'USRMDL', 1, 'REGCAU1', 101, 1, 1, 14, 3, 4, 1, 0.2, 10.0, 0.75,-10.0, 0.23, 2.0, 0.1, 0.0, -0.377, 0.02, 0.0, 10.0, -10.0, 0.0/

924804,'USRMDL', 1, 'REECBU1', 102, 0, 5, 25, 6, 4, 0, 0, 0, 0, 0, 0.0, 2.0, 0.0, -0.1, 0.1, 0.0, 0.377, -0.377, 0.0, 0.05, 0.377, -0.377, 1.1, 0.9, 0.0, 0.0, 0.0, 0.0, 0.02, 2.0, -2.0, 0.926, 0.0, 1.00, 0.02/

924804,'USRMDL', 1, 'REPCAU1', 107, 0, 7, 27, 7, 9, 924801, 0, 0, 0, 0, 1, 0, 0.02, 18, 5, 0, 0.15, -1, 0, 0, 0, 999, -999,-0.02, 0.02, 0.377, -0.377, 10, 1, 0.02, -99.0, 99.0, 999, -999, 0.926, 0, 20, 20, 20/

92480401, 'VTGTPAT', 924801, 924804, 1, -1, 1.200, 0, 0.0/

92480402, 'VTGTPAT', 924801, 924804, 1, -1, 1.175, 0.2, 0.0/

92480403, 'VTGTPAT', 924801, 924804, 1, -1, 1.15, 0.5, 0.0/

92480404, 'VTGTPAT', 924801, 924804, 1, -1, 1.10, 1.0, 0.0/

92480405, 'VTGTPAT', 924801, 924804, 1, 0.45, 5, 0.20, 0.0/

92480406, 'VTGTPAT', 924801, 924804, 1, 0.65, 5, 0.80, 0.0/

92480407, 'VTGTPAT', 924801, 924804, 1, 0.75, 5, 2, 0.0/

92480408, 'VTGTPAT', 924801, 924804, 1, 0.90, 5, 3, 0.0/

/92480409, 'FRQTPAT', 924801, 924804, 1, -100, 61.8, 0, 0.0/

/92480410, 'FRQTPAT', 924801, 924804, 1, -100, 60.5, 600.66, 0.0/

/92480412, 'FRQTPAT', 924801, 924804, 1, 57.8, 100, 0, 0.0/

/92480413, 'FRQTPAT', 924801, 924804, 1, 59.5, 100, 1792.049, 0.0/

Attachment 3. AB2-133 PSS/E Case Dispatch

Bus Number	Bus Name	Id	In Service	PGen (MW)	PMax (MW)	PMin (MW)	QGen (Mvar)	QMax (Mvar)	QMin (Mvar)
232227	EASTN_69 69.000	1	1	0	0	0	-30	0	-30
232616	GEN FOOD 13.200	1	1	15.2	15.2	0	0	1	0
232813	VAUGHN 69.000	1	1	3	3	0	0	0	0
232901	NORTHST 69.000	1	1	45	45	5	0	15.6	0
232902	EASTMUNI 69.000	1	1	69	69	0	25.27	34.6	0
232910	NRG_G1 13.800	2	1	44	44	0	-8.52	27	-20
232911	NRG_G2 13.800	1	1	44	44	0	-8.52	27	-20
232922	MR3 13.000	3	1	102	102	35	0	35	0
232923	MR1 12.500	1	1	17	17	6	0	12	0
232924	MR2 12.500	2	1	17	17	6	0	12	0
910821	X3-066 C 12.500	1	1	2.28	2.28	0	0	0	0
910822	X3-066 E 12.500	1	1	3.72	3.72	0	0	0	0
913361	Y1-079 C 24.900	1	1	3.8	3.8	0	0	0	0
913362	Y1-079 E 24.900	1	1	6.2	6.2	0	0	0	0
916281	Z1-081 C 24.900	1	1	2.28	2.28	0	0	0	0
916282	Z1-081 E 24.900	1	1	3.72	3.72	0	0	0	0
918910	AA1-110_GEN 0.8000	1	1	6	6	0	-0.28	2.75	-2.75
923923	AB2-032 GEN 0.6000	1	1	20	20	0	-4.28	6.58	-6.58
923953	AB2-036 GEN 0.3850	1	1	102.4	102.4	0	-33.7	33.66	-33.7
924191	AB2-063 GEN 0.4180	1	1	20	20	0	-6.57	6.573	-6.57
924804	AB2-133 GEN 0.6000	1	1	57.04	57.04	0	11.72	18.8	-18.8
924824	AB2-135 GEN 0.6000	1	1	65.4	65.4	0	3.598	21.5	-21.5
924881	AB2-142 C 24.900	1	1	5.1	5.1	0	0	0	0
924882	AB2-142 E 24.900	1	1	8.3	8.3	0	0	0	0
924973	AB2-153 GEN 0.6000	1	1	20	20	0	-4.28	6.58	-6.58
925111	AB2-168 C 34.500	1	1	3.8	3.8	0	0	0	0
925253	AB2-179 GEN 0.3850	1	1	50	50	0	-16.5	16.5	-16.5
925271	AB2-185 C OP24.900	1	1	14	14	0	0	0	0
925272	AB2-185 E OP24.900	1	1	6	6	0	0	0	0
930922	AB1-141 GEN 0.5500	1	1	20	20	0	-4.28	6.58	-6.58
930932	AB1-142 GEN 0.5500	1	1	20	20	0	-4.28	6.58	-6.58
931111	AB1-162 GEN 0.4180	1	1	16.7	16.7	0	-5.48	5.479	-5.48
931261	AB1-176 GEN 0.4800	1	1	9	9	0	0	0	0

Attachment 4. Plots from Dynamic Simulations (See separated .PDF file)

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.
It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Appendix 1

(DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 97.58% to 98.5% (AC power flow) of its emergency rating (1071 MVA) for the line fault with failed breaker contingency outage of 'LINWO225/* $ DELCO $ LINWO225 $ STBK'. This project contributes approximately 11.63 MW to the thermal violation.

CONTINGENCY 'LINWO225/* $ DELCO $ LINWO225 $ STBK'
TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1 /* LINWOOD 230.00 EDGEMR 5 230.00 $ DELCO $ LINWO225 $ STBK
REMOVE MACHINE 1 FROM BUS 213888 /* PHLISCT1 18.00 $ DELCO $ LINWO225 $ STBK
REMOVE MACHINE 1 FROM BUS 213889 /* PHLISCT2 18.00 $ DELCO $ LINWO225 $ STBK
END/* $ DELCO $ LINWO225 $ STBK

Bus Number	*Bus Name*	*Full Contribution*
231917	*EM10*	*1.08*
231916	*EM3*	*6.48*
231901	*EM4*	*13.01*
231900	*EM5*	*46.75*
231908	*HR1*	*9.35*
231909	*HR2*	*9.42*
231910	*HR3*	*9.35*
231505	*HR4*	*19.22*
232923	*MR1*	*2.75*
232924	*MR2*	*2.75*
213641	*PELTZ*	*-0.32*
297077	*V2-028 E*	*0.65*
904212	*V4-022E*	*0.53*
901004	*W1-003 E*	*0.78*
901014	*W1-004 E*	*0.78*
901024	*W1-005 E*	*0.78*
901034	*W1-006 E*	*0.78*

907052	X1-032 E	0.69
907211	X1-074	44.04
907324	X1-096 E	16.03
910572	X3-008 E	2.18
910592	X3-015 E	2.11
910822	X3-066 E	0.67
910902	X3-081 E	-0.07
913362	Y1-079 E	1.12
913412	Y1-080 E	0.37
915542	Y3-058 E	1.61
920582	Z1-076 C	0.91
920583	Z1-076 E	1.49
920592	Z1-077 C	0.65
920593	Z1-077 E	1.07
916282	Z1-081 E	0.68
917082	Z2-012 E	2.13
920763	Z2-076 E	0.34
920773	Z2-077 E	0.34
920813	Z2-097 E	0.27
921123	AA1-059 E	0.29
921142	AA1-061 C	2.35
921143	AA1-061 E	1.16
921443	AA1-110 E	0.36
921592	AA1-140 C	1.29
921593	AA1-140 E	2.11
921602	AA1-141 C	0.98
921603	AA1-141 E	1.6
921872	AA2-069	85.66
922213	AA2-129 E	3.44
922222	AA2-130	0.34
922752	AB1-056 C OP	10.93
922753	AB1-056 E OP	31.14
922762	AB1-057 C	11.1
922763	AB1-057 E	31.65
923282	AB1-137 C	2.38
923283	AB1-137 E	1.02
923322	AB1-141 C OP	2.46
923323	AB1-141 E OP	1.15
923332	AB1-142 C OP	2.46
923333	AB1-142 E OP	1.15
923452	AB1-162 C OP	1.15
923453	AB1-162 E OP	1.88
923602	AB1-176 C	0.62
923603	AB1-176 E	1.02
923902	AB2-030 E	0.69

923921	AB2-032 C	2.48
923922	AB2-032 E	1.17
923931	AB2-033 C	1.23
923932	AB2-033 E	0.49
923951	AB2-036 C	7.
923952	AB2-036 E	11.44
923961	AB2-037 C	14.57
923962	AB2-037 E	23.79
924191	AB2-063 C	1.38
924192	AB2-063 E	2.25
924361	AB2-084 C	0.65
924362	AB2-084 E	1.07
924681	AB2-120 C OP	6.53
924682	AB2-120 E OP	10.66
924781	AB2-130 C OP	5.53
924782	AB2-130 E OP	9.03
924801	AB2-133 C OP	5.83
924802	AB2-133 E OP	5.81
924821	AB2-135 C	5.41
924822	AB2-135 E	6.17
924832	AB2-136 E	4.6
924881	AB2-142 C	0.92
924882	AB2-142 E	1.49
924971	AB2-153 C	1.38
924972	AB2-153 E	2.26
925091	AB2-166 C	0.34
925092	AB2-166 E	0.6
925101	AB2-167 C	0.91
925102	AB2-167 E	1.5
925111	AB2-168 C	0.74
925112	AB2-168 E	1.01
925151	AB2-172 C OP	3.33
925152	AB2-172 E OP	5.44
925231	AB2-177 C	0.43
925232	AB2-177 E	0.7
925251	AB2-179 C OP	7.1
925252	AB2-179 E OP	2.34
925261	AB2-180 C	2.42
925262	AB2-180 E	1.04
925271	AB2-185 C OP	2.53
925272	AB2-185 E OP	1.08

Appendix 2

(DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 97.54% to 98.83% (AC power flow) of its emergency rating (348 MVA) for the tower line contingency outage of 'DBL_4NC'. This project contributes approximately 28.36 MW to the thermal violation.

CONTINGENCY 'DBL_4NC' /* RED LION-CEDAR CREEK 230;RED LION-CARTANZA 230
OPEN LINE FROM BUS 231004 TO BUS 232002 CKT 1
OPEN LINE FROM BUS 231004 TO BUS 232003 CKT 1
END

Bus Number	*Bus Name*	*Full Contribution*
232900	*DEMECSMY*	*2.25*
232851	*DUP-SFR1*	*0.43*
232902	*EASTMUNI*	*3.57*
232923	*MR1*	*3.36*
232924	*MR2*	*3.36*
232910	*NRG_G1*	*2.55*
232911	*NRG_G2*	*2.55*
297077	*V2-028 E*	*0.75*
904212	*V4-022E*	*0.61*
232813	*VAUGHN*	*0.16*
901004	*W1-003 E*	*0.89*
901014	*W1-004 E*	*0.89*
901024	*W1-005 E*	*0.89*
901034	*W1-006 E*	*0.89*
901411	*W1-062*	*2.39*
907052	*X1-032 E*	*0.79*
907324	*X1-096 E*	*18.27*
910571	*X3-008 C*	*0.34*
910572	*X3-008 E*	*2.68*
910591	*X3-015 C*	*0.32*
910592	*X3-015 E*	*2.51*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.41*
913361	*Y1-079 C*	*0.25*
913362	*Y1-079 E*	*1.96*
913411	*Y1-080 C*	*0.05*
913412	*Y1-080 E*	*0.43*
915751	*Y3-033*	*1.19*
915752	*Y3-033*	*7.92*
915542	*Y3-058 E*	*1.86*
920582	*Z1-076 C*	*1.05*
920583	*Z1-076 E*	*1.71*
920592	*Z1-077 C*	*0.75*
920593	*Z1-077 E*	*1.22*

916281	Z1-081 C	0.21
916282	Z1-081 E	1.65
917082	Z2-012 E	2.44
920763	Z2-076 E	0.4
920773	Z2-077 E	0.4
920812	Z2-097 C	0.32
920813	Z2-097 E	0.65
921123	AA1-059 E	0.33
921142	AA1-061 C	2.87
921143	AA1-061 E	1.42
921442	AA1-110 C	0.36
921443	AA1-110 E	0.89
921592	AA1-140 C	1.51
921593	AA1-140 E	2.47
921602	AA1-141 C	1.13
921603	AA1-141 E	1.84
921872	AA2-069	104.83
922213	AA2-129 E	3.94
922222	AA2-130	0.39
922752	AB1-056 C OP	12.8
922753	AB1-056 E OP	36.44
922762	AB1-057 C	12.99
922763	AB1-057 E	37.04
923282	AB1-137 C	2.79
923283	AB1-137 E	1.2
923322	AB1-141 C OP	5.3
923323	AB1-141 E OP	2.47
923332	AB1-142 C OP	5.3
923333	AB1-142 E OP	2.47
923452	AB1-162 C OP	2.4
923453	AB1-162 E OP	3.92
923602	AB1-176 C	1.29
923603	AB1-176 E	2.12
923902	AB2-030 E	0.79
923921	AB2-032 C	5.34
923922	AB2-032 E	2.51
923931	AB2-033 C	1.41
923932	AB2-033 E	0.56
923951	AB2-036 C	11.45
923952	AB2-036 E	18.72
923961	AB2-037 C	12.73
923962	AB2-037 E	20.8
924191	AB2-063 C	2.87
924192	AB2-063 E	4.69
924361	AB2-084 C	0.75

924362	AB2-084 E	1.22
924681	AB2-120 C OP	7.49
924682	AB2-120 E OP	12.22
924781	AB2-130 C OP	6.58
924782	AB2-130 E OP	10.73
924801	AB2-133 C OP	14.2
924802	AB2-133 E OP	14.16
924821	AB2-135 C	12.84
924822	AB2-135 E	14.65
924831	AB2-136 C	1.07
924832	AB2-136 E	5.51
924881	AB2-142 C	1.14
924882	AB2-142 E	1.85
924971	AB2-153 C	2.98
924972	AB2-153 E	4.87
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925101	AB2-167 C	1.05
925102	AB2-167 E	1.72
925151	AB2-172 C OP	4.11
925152	AB2-172 E OP	6.7
925231	AB2-177 C	0.49
925232	AB2-177 E	0.81
925251	AB2-179 C OP	26.29
925252	AB2-179 E OP	8.67
925261	AB2-180 C	2.8
925262	AB2-180 E	1.2
925271	AB2-185 C OP	4.42
925272	AB2-185 E OP	1.89

Appendix 3

(DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 97.48% to 100.99% (AC power flow) of its emergency rating (348 MVA) for the tower line contingency outage of 'DBL_4NC'. This project contributes approximately 28.36 MW to the thermal violation.

CONTINGENCY 'DBL_4NC' /* RED LION-CEDAR CREEK 230;RED LION-CARTANZA 230
OPEN LINE FROM BUS 231004 TO BUS 232002 CKT 1
OPEN LINE FROM BUS 231004 TO BUS 232003 CKT 1
END

Bus Number	Bus Name	Full Contribution
232900	DEMECSMY	2.25
232851	DUP-SFR1	0.43

232902	EASTMUNI	3.57
232923	MR1	3.36
232924	MR2	3.36
232910	NRG_G1	2.55
232911	NRG_G2	2.55
297077	V2-028 E	0.75
904212	V4-022E	0.61
232813	VAUGHN	0.16
901004	W1-003 E	0.89
901014	W1-004 E	0.89
901024	W1-005 E	0.89
901034	W1-006 E	0.89
901411	W1-062	2.39
907052	X1-032 E	0.79
907324	X1-096 E	18.27
910571	X3-008 C	0.34
910572	X3-008 E	2.68
910591	X3-015 C	0.32
910592	X3-015 E	2.51
910821	X3-066 C	0.18
910822	X3-066 E	1.41
913361	Y1-079 C	0.25
913362	Y1-079 E	1.96
913411	Y1-080 C	0.05
913412	Y1-080 E	0.43
915751	Y3-033	1.19
915752	Y3-033	7.92
915542	Y3-058 E	1.86
920582	Z1-076 C	1.05
920583	Z1-076 E	1.71
920592	Z1-077 C	0.75
920593	Z1-077 E	1.22
916281	Z1-081 C	0.21
916282	Z1-081 E	1.65
917082	Z2-012 E	2.44
920763	Z2-076 E	0.4
920773	Z2-077 E	0.4
920812	Z2-097 C	0.32
920813	Z2-097 E	0.65
921123	AA1-059 E	0.33
921142	AA1-061 C	2.87
921143	AA1-061 E	1.42
921442	AA1-110 C	0.36
921443	AA1-110 E	0.89
921592	AA1-140 C	1.51

921593	AA1-140 E	2.47
921602	AA1-141 C	1.13
921603	AA1-141 E	1.84
921872	AA2-069	104.83
922213	AA2-129 E	3.94
922222	AA2-130	0.39
922752	AB1-056 C OP	12.8
922753	AB1-056 E OP	36.44
922762	AB1-057 C	12.99
922763	AB1-057 E	37.04
923282	AB1-137 C	2.79
923283	AB1-137 E	1.2
923322	AB1-141 C OP	5.3
923323	AB1-141 E OP	2.47
923332	AB1-142 C OP	5.3
923333	AB1-142 E OP	2.47
923452	AB1-162 C OP	2.4
923453	AB1-162 E OP	3.92
923602	AB1-176 C	1.29
923603	AB1-176 E	2.12
923902	AB2-030 E	0.79
923921	AB2-032 C	5.34
923922	AB2-032 E	2.51
923931	AB2-033 C	1.41
923932	AB2-033 E	0.56
923951	AB2-036 C	11.45
923952	AB2-036 E	18.72
923961	AB2-037 C	12.73
923962	AB2-037 E	20.8
924191	AB2-063 C	2.87
924192	AB2-063 E	4.69
924361	AB2-084 C	0.75
924362	AB2-084 E	1.22
924681	AB2-120 C OP	7.49
924682	AB2-120 E OP	12.22
924781	AB2-130 C OP	6.58
924782	AB2-130 E OP	10.73
924801	AB2-133 C OP	14.2
924802	AB2-133 E OP	14.16
924821	AB2-135 C	12.84
924822	AB2-135 E	14.65
924831	AB2-136 C	1.07
924832	AB2-136 E	5.51
924881	AB2-142 C	1.14
924882	AB2-142 E	1.85

924971	*AB2-153 C*	*2.98*
924972	*AB2-153 E*	*4.87*
925091	*AB2-166 C*	*0.4*
925092	*AB2-166 E*	*0.7*
925101	*AB2-167 C*	*1.05*
925102	*AB2-167 E*	*1.72*
925151	*AB2-172 C OP*	*4.11*
925152	*AB2-172 E OP*	*6.7*
925231	*AB2-177 C*	*0.49*
925232	*AB2-177 E*	*0.81*
925251	*AB2-179 C OP*	*26.29*
925252	*AB2-179 E OP*	*8.67*
925261	*AB2-180 C*	*2.8*
925262	*AB2-180 E*	*1.2*
925271	*AB2-185 C OP*	*4.42*
925272	*AB2-185 E OP*	*1.89*

APPENDIX 2

NRCS Soils Report & Prime Farmland Report

Soil Map—Kent County, Maryland
(Soils Report)

Map Scale: 1:13,500 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kent County, Maryland
Survey Area Data: Version 17, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

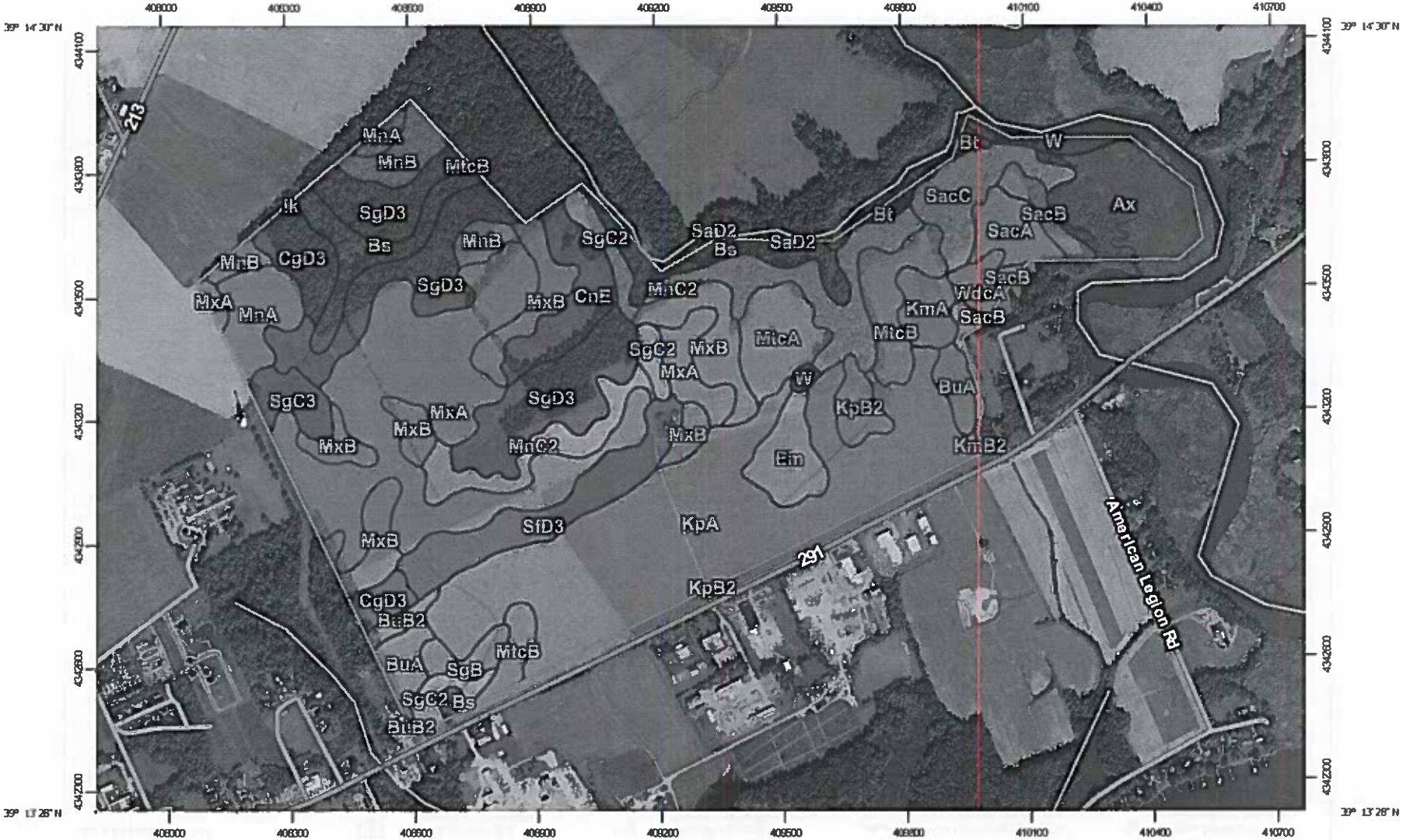
Date(s) aerial images were photographed: Jun 16, 2014—Oct 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ax	Axis mucky silt loam	20.1	4.4%
Bs	Bibb silt loam	19.8	4.3%
Bt	Bibb variant silt loam	2.4	0.5%
BuA	Butlertown-Mattapex silt loams, 0 to 2 percent slopes	8.0	1.7%
BuB2	Butlertown-Mattapex silt loams, 2 to 5 percent slopes, moderately eroded	2.0	0.4%
CgD3	Colts Neck gravelly loam, 10 to 15 percent slopes, severely eroded	10.6	2.3%
CnE	Colts Neck and Sassafras soils, 15 to 40 percent slopes	11.9	2.6%
Em	Elkton silt loam, 0 to 2 percent slopes	9.7	2.1%
Ik	Iuka silt loam, rarely flooded	0.1	0.0%
KmA	Keyport fine sandy loam, 0 to 2 percent slopes	5.7	1.2%
KmB2	Keyport fine sandy loam, 2 to 5 percent slopes	0.2	0.0%
KpA	Keyport silt loam, 0 to 2 percent slopes	85.9	18.6%
KpB2	Keyport silt loam, 2 to 5 percent slopes	4.4	1.0%
MnA	Matapeake silt loam, 0 to 2 percent slopes	10.9	2.4%
MnB	Matapeake silt loam, 2 to 5 percent slopes	10.8	2.3%
MnC2	Matapeake silt loam, 5 to 10 percent slopes, moderately eroded	25.9	5.6%
MtcA	Mattapex silt loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	10.6	2.3%
MtcB	Mattapex silt loam, 2 to 5 percent slopes, Mid-Atlantic Coastal Plain	13.7	3.0%
MxA	Mattapex-Matapeake-Butlertown silt loams, 0 to 2 percent slopes	66.3	14.3%
MxB	Mattapex-Matapeake-Butlertown silt loams, 2 to 5 percent slopes	30.8	6.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SacA	Sassafras sandy loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	6.8	1.5%
SacB	Sassafras sandy loam, 2 to 5 percent slopes, Mid-Atlantic Coastal Plain	4.5	1.0%
SacC	Sassafras sandy loam, 5 to 10 percent slopes, Mid-Atlantic Coastal Plain	11.4	2.5%
SaD2	Sassafras sandy loam, 10 to 15 percent slopes, moderately eroded	0.2	0.1%
SfD3	Sassafras loam, 10 to 15 percent slopes, severely eroded	17.5	3.8%
SgB	Sassafras gravelly loam, 0 to 5 percent slopes	3.8	0.8%
SgC2	Sassafras gravelly loam, 5 to 10 percent slopes, moderately eroded	9.5	2.0%
SgC3	Sassafras gravelly loam, 5 to 10 percent slopes, severely eroded	5.7	1.2%
SgD3	Sassafras gravelly loam, 10 to 15 percent slopes, severely eroded	45.9	9.9%
W	Water	3.7	0.8%
WdcA	Woodstown sandy loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	3.2	0.7%
Totals for Area of Interest		461.9	100.0%



Map Scale: 1:13,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Points

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Water Features

MAP INFORMATION

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kent County, Maryland
Survey Area Data: Version 17, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 16, 2014—Oct 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ax	Axis mucky silt loam	Not prime farmland	20.1	4.4%
Bs	Bibb silt loam	Not prime farmland	19.8	4.3%
Bt	Bibb variant silt loam	Not prime farmland	2.4	0.5%
BuA	Butlertown-Mattapex silt loams, 0 to 2 percent slopes	All areas are prime farmland	8.0	1.7%
BuB2	Butlertown-Mattapex silt loams, 2 to 5 percent slopes, moderately eroded	All areas are prime farmland	2.0	0.4%
CgD3	Colts Neck gravelly loam, 10 to 15 percent slopes, severely eroded	Not prime farmland	10.6	2.3%
CnE	Colts Neck and Sassafras soils, 15 to 40 percent slopes	Not prime farmland	11.9	2.6%
Em	Elkton silt loam, 0 to 2 percent slopes	Farmland of statewide importance	9.7	2.1%
Ik	Iuka silt loam, rarely flooded	All areas are prime farmland	0.1	0.0%
KmA	Keyport fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland	5.7	1.2%
KmB2	Keyport fine sandy loam, 2 to 5 percent slopes	All areas are prime farmland	0.2	0.0%
KpA	Keyport silt loam, 0 to 2 percent slopes	All areas are prime farmland	85.9	18.6%
KpB2	Keyport silt loam, 2 to 5 percent slopes	All areas are prime farmland	4.4	1.0%
MnA	Matapeake silt loam, 0 to 2 percent slopes	All areas are prime farmland	10.9	2.4%
MnB	Matapeake silt loam, 2 to 5 percent slopes	All areas are prime farmland	10.8	2.3%
MnC2	Matapeake silt loam, 5 to 10 percent slopes, moderately eroded	Farmland of statewide importance	25.9	5.6%
MtcA	Mattapex silt loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	All areas are prime farmland	10.6	2.3%
MtcB	Mattapex silt loam, 2 to 5 percent slopes, Mid-Atlantic Coastal Plain	All areas are prime farmland	13.7	3.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MxA	Mattapex-Matapeake-Butlertown silt loams, 0 to 2 percent slopes	All areas are prime farmland	66.3	14.3%
MxB	Mattapex-Matapeake-Butlertown silt loams, 2 to 5 percent slopes	All areas are prime farmland	30.8	6.7%
SacA	Sassafras sandy loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	All areas are prime farmland	6.8	1.5%
SacB	Sassafras sandy loam, 2 to 5 percent slopes, Mid-Atlantic Coastal Plain	All areas are prime farmland	4.5	1.0%
SacC	Sassafras sandy loam, 5 to 10 percent slopes, Mid-Atlantic Coastal Plain	Farmland of statewide importance	11.4	2.5%
SaD2	Sassafras sandy loam, 10 to 15 percent slopes, moderately eroded	Not prime farmland	0.2	0.1%
SfD3	Sassafras loam, 10 to 15 percent slopes, severely eroded	Not prime farmland	17.5	3.8%
SgB	Sassafras gravelly loam, 0 to 5 percent slopes	All areas are prime farmland	3.8	0.8%
SgC2	Sassafras gravelly loam, 5 to 10 percent slopes, moderately eroded	Farmland of statewide importance	9.5	2.0%
SgC3	Sassafras gravelly loam, 5 to 10 percent slopes, severely eroded	Not prime farmland	5.7	1.2%
SgD3	Sassafras gravelly loam, 10 to 15 percent slopes, severely eroded	Not prime farmland	45.9	9.9%
W	Water	Not prime farmland	3.7	0.8%
WdcA	Woodstown sandy loam, 0 to 2 percent slopes, Mid-Atlantic Coastal Plain	All areas are prime farmland	3.2	0.7%
Totals for Area of Interest			**461.9**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

APPENDIX 3

ECS Mid-Atlantic Preliminary Geotechnical Assessment Report

PRELIMINARY REPORT OF
SUBSURFACE EXPLORATION, LABORATORY TESTING, AND GEOTECHNICAL ENGINEERING ANALYSES

Morgnec Road Solar Farm
Chestertown, Kent County, Maryland

ECS Project No. 02-8291

Prepared For:

URBAN GRID HOLDINGS, LLC
C/O H&B SOLUTIONS, LLC
37534 OLIVER DRIVE
SELBYVILLE, DELAWARE 19975

December 12, 2016

ECS MID-ATLANTIC, LLC
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities

December 12, 2016

Mr. Dane Bauer
Urban Grid Holdings, LLC
c/o H&B Solutions, LLC
37534 Oliver Drive
Selbyville, Delaware 19975

ECS Project No. 02-8291

Reference: Preliminary Report of Subsurface Exploration and Geotechnical Engineering Services for **Morgnec Road Solar Farm,** Chestertown, Kent County, Maryland.

Dear Mr. Bauer:

As requested, ECS Mid-Atlantic, LLC (ECS) has completed the geotechnical engineering services for the above-referenced project. This work was performed in accordance with ECS Proposal No. 02-17093-PR, dated November 11, 2016.

It has been our pleasure to be of service to Urban Grid Holdings, LLC c/o H&B Solutions, LLC and the Design Team for this project. We would appreciate the opportunity to continue our role as Geotechnical Engineer of Record during final design and subsequent construction. If you have any questions with regard to the information contained in the enclosed report, or if we can be of further assistance to you during the planning or construction phases of the project, please contact us.

Most sincerely,

ECS Mid-Atlantic, LLC

Dawn M. Appelbaum, P.E.
Senior Project Engineer

Hasan M. Aboumahar, P.E.
Principal Engineer

Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No 29553. Expiration Date: 12/31/2017

PRELIMINARY REPORT OF SUBSURFACE EXPLORATION, LABORATORY TESTING, AND GEOTECHNICAL ENGINEERING ANALYSES

Morgnec Road Solar Farm
Chestertown, Kent County, Maryland

ECS Project No. 02-8291

Prepared For:

URBAN GRID HOLDINGS, LLC
C/O H&B SOLUTIONS, LLC
37534 OLIVER DRIVE
SELBYVILLE, DELAWARE 19975

Submitted by:

ECS Mid-Atlantic, LLC
1340 Charwood Road, Suite A
Hanover, Maryland 21076

December 12, 2016

MORGNEC ROAD SOLAR FARM

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MORGNEC ROAD SOLAR FARM

INTRODUCTION

Project Location

The project site is located along the northern side of Morgnec Road in the Chestertown area of Kent County, Maryland. A Site Location Diagram is provided in the Appendix.

Project Information and Site Conditions

Based on the provided information and our discussions with you, we understand that the project consists of the construction of a solar panel array at the above-referenced site. We understand that the solar panels will be located across the project site and the panels will be supported on posts and beams system. In addition to the solar panel array, we understand that project will have fencing, perimeter roadways, access road, internal grass drive aisles, inverter pads, and potential substation. Also, stormwater management (SWM) facilities are anticipated for the site development.

The site is currently used as an agricultural field. The site generally slopes downwards in the general north south direction from approximate EL 65 in the northern portion of the site to approximate EL 25 in the southern portion of the site. We anticipate that the solar panel construction and associated roadways and pads will generally follow the existing grades and minor grading, if any, would be required to establish final grades. In preparing the subsurface exploration program for this preliminary study, ECS located the soil borings on grids of approximately 600 ft to 1,000 ft by 600 ft to 1,000 ft across the project site.

Scope of Services

Our scope of services included drilling twenty-six (26) soil borings, designated as B-1 through B-26, to a depth of 20 feet each, for a total drilling footage of 520 feet. The approximate boring locations are presented on the Boring Location Plan in the Appendix.

All borings were drilled in general accordance with ASTM D 1586 standards. The scope of work also included visually classifying soil boring samples, performing laboratory testing on selected soil samples from the borings, performing various engineering analyses, and providing this written report of findings, evaluations and recommendations.

The report contains the following information:

a. Information regarding site conditions, geology, and special site features;
b. Descriptions of the field exploration and laboratory testing procedures used;

c. Boring logs in accordance with the standard practice of geotechnical engineers, showing subsurface strata and descriptions, groundwater conditions, and results of field tests;
d. Results of laboratory tests will be submitted in an addendum to this report;
e. A Site Vicinity Map, a Boring Location Plan, and pertinent Reference Sheets;
f. Preliminary recommendations for allowable bearing pressure for conventional isolated footing foundations and estimates of predicted foundation settlement for equipment pads/structures, if required;
g. Preliminary recommendations for driven beam foundations; and
h. Preliminary recommendations for slab-on-grade construction for equipment pads/structures, roadways, SWM facilities, earthwork operations, and construction considerations, as required.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

The soil borings were drilled with an ATV-mounted drill rig, using continuous-flight, hollow-stem augers to advance the boreholes. Drilling fluid was not used during advancement of the boreholes. The boring locations were located in the field by ECS personnel using GPS methods.

Representative soil samples were obtained by means of the split-barrel sampling procedure in general accordance with ASTM D 1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler through the second and third 6-inch drive increments is termed the Standard Penetration Test (SPT) value (blow count, or N-value) and is indicated for each sample on the Boring Logs. In the borings, split-barrel sampling was performed at 2.5 ft intervals to depths of 10 ft and at 5.0 ft intervals thereafter.

N-values can be used to provide a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, N-values also provide an indication of consistency for cohesive soils. The indications of relative density and consistency are qualitative, since many factors can significantly affect N-values and prevent direct correlations, including differences among drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

A field log of the subsurface conditions encountered in the borings was maintained by the Drill Crew during the drilling operations. Each recovered soil sample was removed from the sampler and visually classified by the Drill Crew. Representative portions of soil samples were sealed in glass jars and returned to the ECS laboratory for further visual examination and possible laboratory testing.

Laboratory Testing Program

The laboratory testing program included visual classification of the boring samples by an experienced Geotechnical Engineer. The classifications were based on texture and plasticity in accordance with the Unified Soil Classification System (USCS). A brief explanation of the USCS is included in the Appendix of this report. The USCS group symbol for each soil type is indicated in parentheses following the soil descriptions on the Boring Logs.

During the visual classification procedures, the Geotechnical Engineer grouped the various soil types into the major strata noted on the Boring Logs. The stratification lines designating the interfaces between various soil strata on the Boring Logs are approximate. In situ, these transitions will likely be gradual and could occur at slightly different levels from those shown on the Boring Logs.

The limited laboratory testing program included moisture contents and resistivity and pH testing on selected samples from the soil borings. The results of the laboratory testing will be included in an addendum to this report.

The soil samples will be retained in the ECS laboratory for a period of 60 days. After that holding period, the samples will be discarded, unless ECS receives other instructions regarding their disposition.

EXPLORATION RESULTS

Geologic Conditions

The project site is located within the Atlantic Coastal Plain Physiographic Province, which is characterized by marine and river sediments deposited during successive periods of fluctuating sea level and moving shorelines. Generally, the sediments thicken from west to east, towards the Atlantic Ocean. The uppermost sediments are often comprised of interbedded sands, gravels, clays, and silts.

Based on our review of the *Geologic Map of Maryland*, dated 1968, the natural soils at the project site generally consist of Upland Deposits (Qu), which are described as the following: Gravel, sand, silt and clay; mostly cross-bedded, poorly sorted, medium- to coarse-grained white to red sand and gravel, boulders near base, minor pink and yellow silts and clays.

Subsurface Conditions

In general, the conditions encountered at the ground surface during our field exploration consisted of up to 14 inches of topsoil, overlying natural soils.

The natural soils were generally brown, reddish brown and gray in color. The natural soils consisted generally of SAND (SP-SM), Clayey SAND (SC), SILT (ML), Clayey SILT (ML), Sandy CLAY (CL), CLAY (CL/CH) and Silty CLAY (CL/ML) soil types. The N-values recorded in the natural cohesive soils ranged from 5 blows per foot (bpf) to 26 bpf, indicating medium stiff to very stiff relative consistencies. The N-values recorded in the natural granular soils ranged from 8 bpf to 35 bpf, indicating loose to dense relative densities. More detailed descriptions of the encountered subsurface conditions are provided on the boring log in the Appendix.

Water Level Observations

Groundwater level observations were made in the borehole, generally during the drilling operations and at completion of drilling operations, both before and after removal of the drilling augers. Groundwater was encountered in Borings B-1, B-6, B-12, B-13, B-14, B-17, B-19, B-23, B-24, B-25 and B-26 at depths ranging from 8.8 ft to 19.0 ft below existing grade. For preliminary design purposes, we have assumed an average groundwater depth of 15.0 ft below existing grades. Cave-in depths for the borings also were observed after removal of the drilling augers from the boreholes and ranged from 7.1 feet to 16.6 feet below existing grades.

Observations regarding the presence and absence of groundwater levels reflect the conditions at the time of this exploration only. Fluctuations in the locations of groundwater tables or perched water levels could occur as a result of seasonal variations in evaporation, precipitation, surface water run-off, and other factors. Therefore, water levels at future times could vary from those observed at the time of the borings.

PRELIMINARY ANALYSES AND RECOMMENDATIONS

Solar Array Foundation Considerations

Based on the provided information we anticipate that the solar panel construction and associated roadways and pads will generally follow the existing grades and minor grading, if any, would be required to establish final grades. Based on the project characteristics, the encountered subsurface conditions and the geotechnical engineering analysis, it is ECS' opinion that the solar panel array can be supported on a driven beam foundation system. Inverter pads, switch gear/substation pads and any other light weight structures can be supported on shallow foundations and slabs-on-grade. Shallow foundation recommendations are provided below.

Driven Beam Considerations for Solar Panels

Based on the subsurface conditions encountered during our preliminary exploration, the proposed solar panels can be supported on a deep foundation system consisting of driven beams embedded at a sufficient depth to resist lateral loads, uplift and overturning. Specific design information was not provided to us for detailed foundation recommendations. Therefore, we have provided general design recommendations for the driven beam foundation system. We have provided a table of soil properties anticipated for each stratum encountered for use in the final foundation design.

The following table summarizes the engineering characteristics of the soils encountered at the site:

Approx. Depth (ft)	Soil Type	Effective Total Unit Weight (pcf)	Internal Angle of Friction (ϕ)	Cohesion (psf)	E_{50} Value	Modulus of Subgrade Reaction, k (pci)	Unit Skin Friction (psf)	Unit Allowable End Bearing (psf)*
0-5.0'	Granular	115.0	30	---	---	25	40	----
0-5.0'	Cohesive	115.0	----	1,100	0.007	----	200	----
5.0'-10.0'	Granular	120.0	32	---	---	90	125	5,000
5.0'-10.0'	Cohesive	120.0	----	1,100	0.007	----	225	3,000
10.0'-15.0'	Granular	120.0	32	---	---	90	200	10,000
10.0'-15.0'	Cohesive	120.0	----	1,000	0.007	----	225	3,000
15.0'-20.0'	Granular	57.6	33	----	----	60	300	15,000
15.0'-20.0'	Cohesive	57.6	----	1,000	0.007	----	225	3,000

Shallow Foundation Considerations

Based on the provided project information, equipment pads (substation, inverter, etc.) are planned for the project. Recommendations for slab-on-grade and pads in provided below. However, should such structures be required to be supported on foundations or if light weight structures are needed for the project the following preliminary recommendations are provided for shallow foundations design for the project.

Footings placed on firm natural soils, or new engineered fill placed on firm soils or approved existing fill can be designed for net allowable bearing pressure on the order of 2,000 pounds per square foot (psf). The net allowable soil bearing pressure refers to the pressure that can be

transmitted to the foundation bearing soils in excess of the final overburden pressure at the base of a footing.

Prior to the placement of reinforcement and concrete for footings, the bases of the footing excavations should be observed, tested, and approved by a qualified representative of the Geotechnical Engineer to verify that soil conditions at each footing location are suitable for the design bearing pressure. If unsuitable soils are encountered at planned subgrade levels for any footing, the unsuitable soils should be undercut to suitable bearing materials. The footing can be directly supported on the competent soils at greater depths or, alternatively, the design footing bearing level can be restored through placement of lean concrete or select engineered fill materials.

If the design bearing level is restored using select engineered fill, then the excavation to remove the unsuitable soils should extend at least 0.5 ft laterally beyond the bottom edge of the footing for each 1 ft of vertical undercut below the footing bearing level. The select engineered fill materials should be placed and compacted as discussed in greater detail later in this report.

Settlement of the equipment pad foundations will be a function of the compressibility of the underlying subgrade soils, the actual applied loads, and other factors. The anticipated total settlements of individual footings, designed and constructed as outlined in this report, will be less than 1 inch. Maximum differential settlements within the proposed solar panel array and equipment pads are expected to be ½ inch over a horizontal distance of 30 feet.

In order to reduce the possibility of foundation bearing failure and excessive settlement due to local shear or "punching" action, we recommend that continuous footings have a minimum width of 1.5 feet and that isolated footings have a minimum lateral dimension of 2.5 feet. In addition, footings should be placed at a sufficient depth to provide adequate protection against frost heave. We recommend that all footings be placed at a minimum depth of 30 inches below finished grade.

Ground Supported Floor Slabs/Pads

Equipment pads and slab-0n-grade, if required, may be ground-supported on subgrades prepared in accordance with the recommendations in the sections titled Subgrade Preparation and Fill Placement. It is important that pad/slab subgrade be firm and stable before the placement of the granular subbase materials, and the concrete. Based on the test boring results and the anticipated planned finished grades, the anticipated slab subgrade should generally consist of firm natural soils, or new engineered fill.

The existing subgrade should be thoroughly proofrolled with suitable equipment and/or probed by a qualified representative of the Geotechnical Engineer in an effort to detect unstable or otherwise unacceptable soil conditions. Soils in any excessively unstable areas should be undercut and replaced with new engineered fill. Recommendations for construction of engineered fill are presented in the Fill Placement section of this report.

It is recommended that equipment pads and ground-supported slabs be underlain by a minimum of 4 inches of CR-6 or GA S/B dense-graded aggregate or approved equivalents. Acceptable granular subbase materials should have no aggregate size greater than 1.5 inches, 95 to 100 percent passing the 1 inch sieve, and less than 12 percent by total weight passing the Number 200 sieve. The granular subbase materials will provide a capillary break between the subgrade and the concrete slab, a higher modulus of subgrade reaction, and more uniform support conditions.

All granular materials should be compacted; however, if the granular subbase materials have more than 5 percent fines, those materials should be compacted to a minimum of 98 percent of the maximum dry density as determined by the Standard Proctor compaction test method (ASTM D 698). For structural design purposes, a modulus of subgrade reaction (k) of 100 pounds per cubic inch (pci) may be utilized for the structural design of slabs, provided a 4-inch subbase is utilized and the subgrade has been prepared in accordance with the recommendations presented herein.

The encountered soils at the anticipated pads subgrade are considered susceptible to frost. Should frost heave be an issue for the planned equipment pads, we recommend either lowering the pad bottoms to 30 inches below finished grade or over-excavating and replacing the upper 30 inches with a non-susceptible frost material such as CR-6/RC-6 material.

In the event there is a significant time lag between the site grading work and the fine grading of concrete slab areas prior to the placement of the subbase stone or concrete, the Geotechnical Engineer should verify the condition of the prepared subgrade. Prior to final pad/slab construction, the subgrade may require scarification and re-compaction to provide firm and stable conditions.

Other Site Development Considerations

Based on the provided project information, we understand that grass roadways may be required for the site development. Based on the boring results, the near-surface soils should be adequate to remain in-place to support grass roadways; however, up to 14 inches of topsoil was observed at the ground surface in some areas of the site. Reduction of topsoil thickness may be required for the construction of grass roadways. However, construction entrances to the site will be subjected to heavy loads, which will require additional support. For such entrances, 12 inches to 18 inches of No. 2 stone may be required to provide a stable construction entrance, provided that the topsoil has been removed.

In addition to grass roadways, we understand that SWM facilities may be part of the site development. Groundwater was encountered during drilling operations in Borings B-1, B-6, B-12, B-13, B-14, B-17, B-19, B-23, B-24, B-25 and B-26 at depths ranging from 8.8 ft to 19.0 ft below existing grade; which should not impact the design and construction of SWM facilities. Based on the borings, some of the natural soils consisted of granular soils, which may be considered suitable to support infiltration practices, if required. It is our opinion that the site conditions should be adequate to support SWM facilities. Additionally, standard sediment and erosion control measures would be suitable for the project.

Earthwork Operations

The following paragraphs detail our recommendations regarding subgrade preparation and compaction requirements, if required.

Subgrade Preparation

Subgrade preparation for structures requiring footings and slabs-on-grade should generally include the stripping of any unsuitable surface materials from the planned structure areas. It is recommended that the stripping of unsuitable surficial materials should extend to a minimum of 10 feet beyond the structure area limits, where feasible.

Subsequent to stripping operations, the exposed subgrade soils in the planned solar panel array areas should be examined by a qualified representative of the Geotechnical Engineer. The exposed soils should be thoroughly proofrolled by a vehicle having an axle weight of at least 20 tons, such as a fully-loaded tandem-axle dump truck. This procedure is intended to assist in identifying any localized loose or yielding materials. In the event that any yielding materials are encountered during the proofrolling operations, those subgrade soils should either be thoroughly densified in-place, or undercut to firm ground and replaced with controlled, compacted fill to final subgrade elevations.

Fill Placement

Prior to placement of compacted fill, representative bulk samples (about 50 pounds) should be taken of the proposed fill soils and laboratory tests should be conducted to determine Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. These test results will be necessary for proper control of construction for new engineered fill.

Upon achieving competent subgrade conditions, the Contractor can place and compact engineered fill to reach final subgrade levels. In general, any materials to be used as structural fill should consist of soil types classified as ML or more granular, in accordance with ASTM D 2487, and should have a Liquid Limit less than 40 and a Plasticity Index less than 15.

Finer-grained, more plastic, and organic soil types, if encountered at the site, may be used as fill materials in non-structural areas. Any such materials encountered during grading operations should be either stockpiled for later use in landscape fills, or should be placed in approved disposal areas either on-site or off-site.

Prior to the utilization of any on-site or off-site borrow materials, the Geotechnical Engineer should be provided with representative samples in order to determine the suitability of the materials for use as a controlled compacted fill and to develop moisture-density relationships. In order to expedite the earthwork operations, it is recommended that any off-site borrow materials generally should be comprised of SM or more granular soil types.

All structural fill should be placed in loose lifts, which do not exceed 8 inches in thickness, and should be compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor Compaction Test (ASTM D 698). Fill placed in non-structural areas should be compacted to at least 90 percent of the Standard Proctor maximum dry density in order to avoid significant subsidence. Generally, the moisture content of the fill material should be maintained within ±2 percentage points of the optimum moisture content for the fill material, as determined by ASTM D 698.

All filling operations should be observed on a full-time basis by a qualified representative of the Geotechnical Engineer to determine that minimum compaction requirements are being achieved. A minimum of one compaction test per lift should be made per 2,500 square feet of fill lift area, but not fewer than two tests per lift should be made for any lift. The elevations and locations of the field density tests should be clearly identified at the time of fill placement and compaction.

Compaction equipment suitable for the soil types being used as fill should be selected to compact the fill. Theoretically, any equipment type can be used, so long as the required density is achieved. Ideally, a steel drum roller generally will be the most efficient for compaction of granular soil types and for sealing the surface soils, while a sheepsfoot roller or pneumatic-tire roller generally will be most efficient for compaction of cohesive soil types.

At the end of each work day, all fill areas should be graded to facilitate surface drainage of any surface runoff associated with precipitation, and should be sealed by use of a smooth-drum roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the Contractor should scarify existing subgrade soils so that a weak plane will not be formed between the new fill and the existing subgrade soils. We recommend that subgrade soils should be scarified to depths of about 4 inches prior to placement of new fill.

Fill materials should not be placed on frozen soils, frost-heaved soils, and/or excessively wet soils. All frozen, frost-heaved, or excessively wet soils should be removed prior to continuation of fill operations. Borrow fill materials should not contain frozen materials at the time of placement. All frozen, frost-heaved, or excavated wet soils should be removed prior to placement of controlled, compacted fill. Moisture contents for excessively wet soils will need to be lowered to the range limits previously discussed.

If any problems are encountered during the earthwork operations, or if site conditions deviate from those indicated by the borings, the Geotechnical Engineer should be notified immediately.

Construction Considerations

The on-site soils contain silt and clay fines that will be sensitive to moisture increases and to construction disturbance. Construction activities in the presence of excessive moisture can lead to softening of the subgrade soils and loss of bearing capacity. Therefore, it will be prudent to schedule earthwork operations during the warmer and drier seasons that generally occur from late spring to early fall. Measures should also be taken to limit site disturbance, especially

from rubber-tired heavy construction equipment, and to provide for drainage of surface water from areas being developed.

A firm working surface for the placement of engineered fill should be established prior to construction of new fills. The moisture content of the fill soils at the time of placement should be carefully controlled to ensure that the required compaction effort can be achieved without excessive pumping or movement of the fill mass.

In the event that the earthwork operations are accomplished during the cooler and wetter periods of the year, delays and additional costs should be anticipated. At these times, reduction of soil moisture may need to be accomplished by a combination of mechanical manipulation and the use of chemical additives, such as lime or cement, in order to lower moisture contents to levels appropriate for compaction.

As noted in the **Water Level Observations** section of this report, groundwater was encountered in Borings B-1, B-6, B-12, B-13, B-14, B-17, B-19, B-23, B-24, B-25 and B-26 at depths ranging from 8.8 ft to 19.0 ft below existing grade. Any other groundwater encountered during construction should be the result of perched water and should be readily managed by interceptor trenches and localized systems of sumps and pumps.

Foundation excavations must be protected to prevent the disturbance of the subgrade materials and to minimize any potential loss of support capacity. Foundation concrete generally should be placed for foundations during the same day that the foundation excavations are made and approved. Should excavating and placing the foundation concrete the same day not be practical, we recommend that a concrete mud mat, 2 to 3 inches thick, be placed to protect the subgrade soils from moisture changes and disturbance. If protection of the soils is not provided, then undercutting of softened or loosened soils may be necessary prior to the placement of reinforcing steel and foundation concrete.

Prior to the placement of any foundation concrete or mud mat, the subgrade soils must be carefully examined and tested by a qualified representative of the Geotechnical Engineer to confirm the availability of the design soil bearing capacity. To minimize disturbance to the subgrade soils during excavation, we recommend that a bucket without scarifying teeth, in addition to hand excavation methods, be used during the final phases of the excavation for the foundations.

Any cuts or excavations associated with solar panel array and utility excavations may require forming or bracing, slope flattening, or other physical measures to control sloughing and/or to prevent slope failures. An examination of the applicable OSHA codes and requirements should be made by the appropriate Contractor to ensure that adequate protection of the excavations and trench walls is provided. The surface soils contain some silt and fine sands and are considered erodible. The Contractor should provide and maintain good site drainage during earthwork operations to help to maintain the integrity of the surface soils.

All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current local requirements. Surface water should be directed away from the construction area, and the site should be sloped at gradients of 1 to 2 percent to reduce the potential for ponding water and the subsequent saturation of the surface soils.

CLOSING

This preliminary report has been prepared to provide the Owner and the Design Team with subsurface information and evaluations and recommendations to guide geotechnical-related design and construction for development of the proposed Morgnec Road Solar Array in Chestertown, Maryland. Additional Geotechnical Consulting may be needed as planning and design for the project progress.

The evaluations and recommendations presented in this report are, of necessity, based on the information made available to us at the time of the actual writing of the report and the site conditions, surface and subsurface, that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the aerial extent of the site and to depth, are representative of general subsurface conditions across the site. If subsurface conditions are encountered that differ significantly from those reported herein, the Geotechnical Engineer should be notified immediately so that the analyses and recommendations presented in this report can be reviewed for validity.

If there are significant changes to the proposed construction from those previously discussed, ECS may need to review the changes to determine whether the evaluations and recommendations of this report will remain valid. ECS should be provided with appropriate plans and other information as project design progresses, so that we can review the information and provide additional geotechnical guidance, as needed. ECS recommends further subsurface investigation at the site prior to final design so that the presence of existing fill materials at the site can be more fully investigated. The Geotechnical Engineer should be retained to prepare, or at least to review, any earthwork specifications to assure that the recommendations of this report have been properly interpreted and included in the construction documents.

APPENDIX

- Site Location Diagram
- Reference Notes for Boring Logs
- Boring Logs
- Generalized Subsurface Profiles
- Boring Location Plan

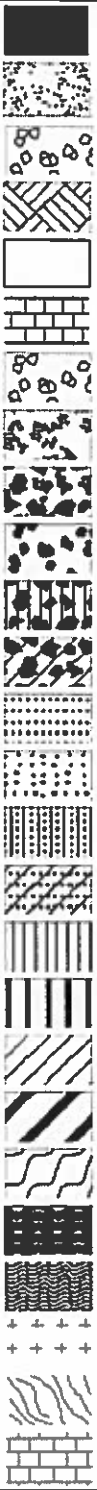
Site Location Diagram
MORGNEC ROAD SOLAR FARM

H&B SOLUTIONS
CHESTERTOWN MD

ENGINEER	ZLA
SCALE	1 " = 1,500 '
PROJECT NO.	02:8291
SHEET	1 OF 1
DATE	11/16/2016

REFERENCE NOTES FOR BORING LOGS

MATERIALS[1,2]



- ASPHALT
- CONCRETE
- GRAVEL
- TOPSOIL
- VOID
- BRICK
- ABC STONE
- FILL[3] Man-placed or disturbed soils
- GW — WELL-GRADED GRAVEL: gravel-sand mixtures, little or no fines
- GP — POORLY-GRADED GRAVEL: gravel-sand mixtures, little or no fines
- GM — SILTY GRAVEL: gravel-sand-silt mixtures
- GC — CLAYEY GRAVEL: gravel-sand-clay mixtures
- SW — WELL-GRADED SAND: gravelly sand, little or no fines
- SP — POORLY-GRADED SAND: gravelly sand, little or no fines
- SM — SILTY SAND: sand-silt mixtures
- SC — CLAYEY SAND: sand-clay mixtures
- ML — SILT: non-plastic to medium plasticity
- MH — ELASTIC SILT: high plasticity
- CL — LEAN CLAY: low to medium plasticity
- CH — FAT CLAY: high plasticity
- OL — ORGANIC SILT or CLAY: non-plastic to low plasticity
- OH — ORGANIC SILT or CLAY: high plasticity
- PT — PEAT: highly organic soils
- IGNEOUS ROCK
- METAMORPHIC ROCK
- SEDIMENTARY ROCK

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

Designation		Particle Sizes
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

WATER LEVELS[4]

▽	WL	Water Level (WS)(WD)
		(WS) While Sampling
		(WD) While Drilling
▽	SHW	Seasonal High WL
▽	ACR	After Casing Removal
▽	WL	Water Level as stated
	DCI	Dry Cave-In
	WCI	Wet Cave-In

Relative Proportions	Coarse Grained	Fine Grained
Trace	<5%	<5%
Dual Symbol *(ex: SW-SM)*	10%	
With	15% - 20%	15%-25%
Adjective *(ex: "Silty")*	25% - <50%	30% - <50%

COHESIVE SILTS & CLAYS

Unconfined Comp. Strength, Q_p[5] (tsf)	SPT[6] (bpf)	Consistency (cohesive
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Medium Stiff
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[6]	Density
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
51 - 99	Very Dense
100+	Partially Weathered Rock to Intact Rock

[1] Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.

[2] To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types.

[3] Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-*FILL*)].

[4] The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally taken.

[5] Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[6] Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% -- --- -- REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT
0								
	S-1	SS	18	18			4 4 4	8
	S-2	SS	18	18			4 6 7	13
5								
	S-3	SS	18	18			4 5 5	10
	S-4	SS	18	18			4 5 5	10
10								
	S-5	SS	18	18			3 5 6	11
15								
	S-6	SS	18	18			6 6 7	13
20								
25								
30								

(SC) CLAYEY SAND, Dark Brown, Moist, Loose to Medium Dense

END OF BORING @ 20'

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 12.5 WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 8.1'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

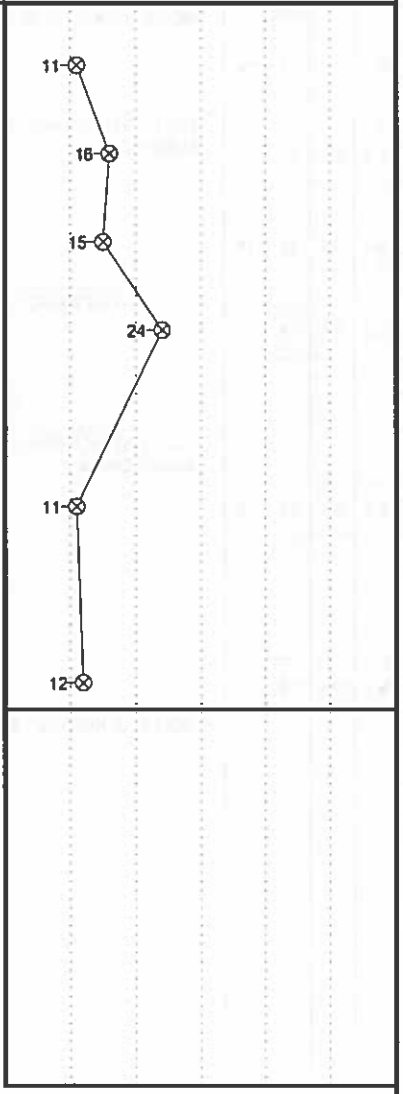
ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown and Reddish Brown, Moist, Stiff to Very Stiff			3 5 6
	S-1	SS	18	18				
								6 7 9
	S-2	SS	18	18				
5					(ML/CL) CLAYEY SILT, Brown and Reddish Brown, Moist, Stiff to Very Stiff			6 7 8
	S-3	SS	18	18				
								9 11 13
	S-4	SS	18	18				
10								
								3 4 7
	S-5	SS	18	18				
15								
								5 6 6
	S-6	SS	18	18				
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 11.2'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S. COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-3	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

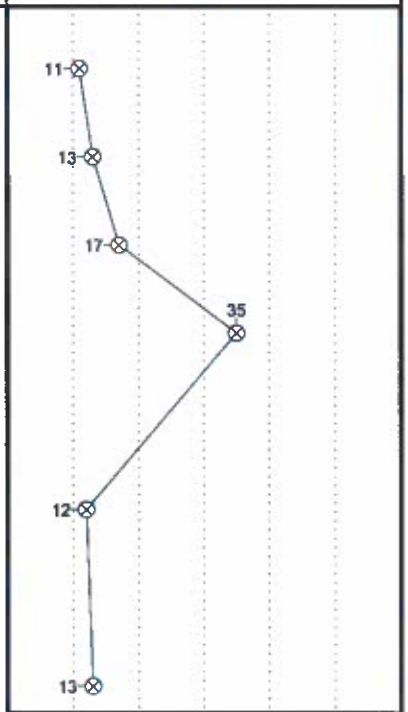
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			5 5 6
	S-2	SS	18	18	(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			4 5 8
5	S-3	SS	18	18				7 7 10
	S-4	SS	18	18	(SC) CLAYEY SAND, Reddish Brown, Moist, Dense			11 15 20
10								
	S-5	SS	18	18	(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			5 6 6
15								
	S-6	SS	18	14				6 6 7
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 13.3'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-4	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

-○- CALIBRATED PENETROMETER TONS/FT²

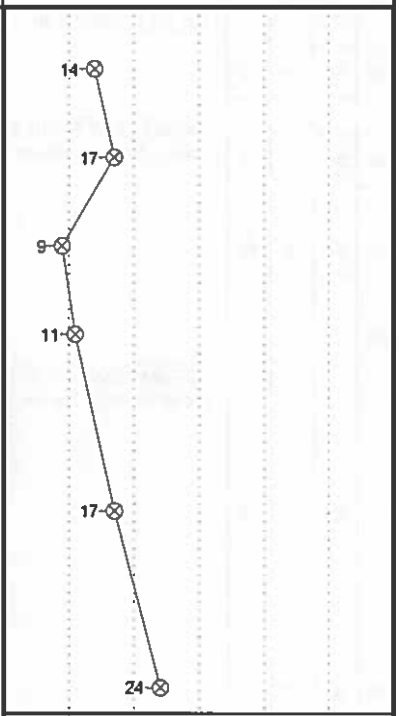
ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS
BOTTOM OF CASING | LOSS OF CIRCULATION
SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	(SC) CLAYEY SAND, Reddish Brown and Tan, Moist, Medium Dense, With Quartz Fragments.			5 8 6
	S-2	SS	18	16				11 9 8
5	S-3	SS	18	18	(SP-SM) SAND WITH SILT, Dark Brown, Moist, Loose to Medium Dense			5 4 5
	S-4	SS	18	18				5 5 6
10	S-5	SS	18	18				6 8 9
15	S-6	SS	18	18	(SP-SM) SAND WITH SILT, Dark Brown, Moist, Dense			22 13 11
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 9.8'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-5	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION

Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING	EASTING	STATION

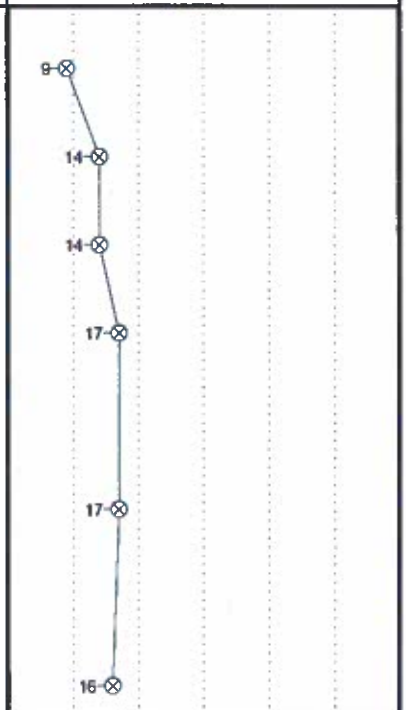
CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% × | WATER CONTENT% ● | LIQUID LIMIT% △

⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL — ENGLISH UNITS BOTTOM OF CASING ➧ LOSS OF CIRCULATION SURFACE ELEVATION	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			3 4 5
	S-1	SS	18	18				
	S-2	SS	18	18	(SC) CLAYEY SAND, Brown and Reddish Brown, Moist, Medium Dense			6 7 7
5								
	S-3	SS	18	18				6 7 7
	S-4	SS	18	18				6 8 9
10					(SP-SM) SAND WITH SILT, Reddish Brown, Moist, Medium Dense			
	S-5	SS	18	18				6 7 10
15								
	S-6	SS	18	18				10 8 8
20					END OF BORING @ 20'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 8.8'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-6	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

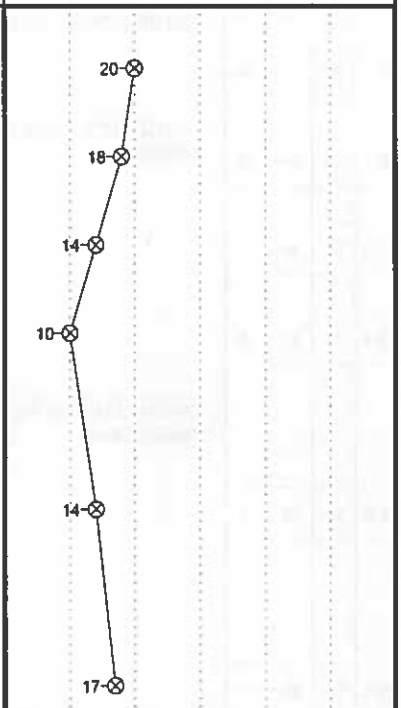
-○- CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			
	S-1	SS	18	18				7 8 12
	S-2	SS	18	18				9 8 10
5	S-3	SS	18	18				8 9 5
	S-4	SS	18	18				4 4 6
10						▽		
	S-5	SS	18	18				6 7 7
15								
	S-6	SS	18	18				6 8 9
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 13.5 WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 7.1'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-7	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

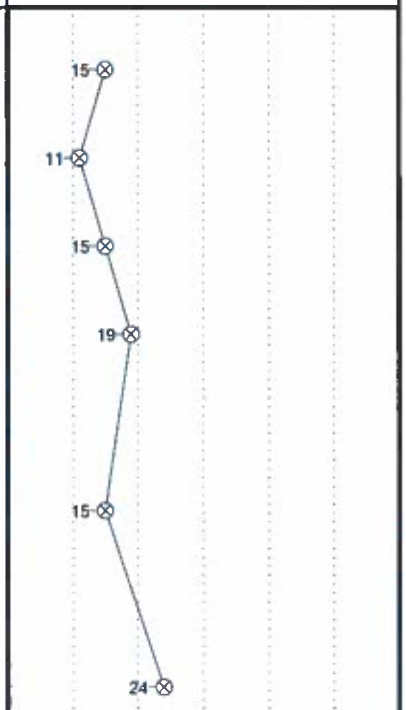
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML) SILT, Brown, Moist, Stiff, With Gravel			5 7 8
	S-1	SS	18	18				
	S-2	SS	18	18	(SC) CLAYEY SAND, Greenish Gray, Moist, Medium Dense			5 5 6
5	S-3	SS	18	18				6 7 8
	S-4	SS	18	18				8 8 11
10					(SP-SM) SAND WITH SILT, Gray, Moist, Medium Dense			
	S-5	SS	18	18				7 7 8
15								
	S-6	SS	18	18				8 12 12
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 12.5'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-8	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

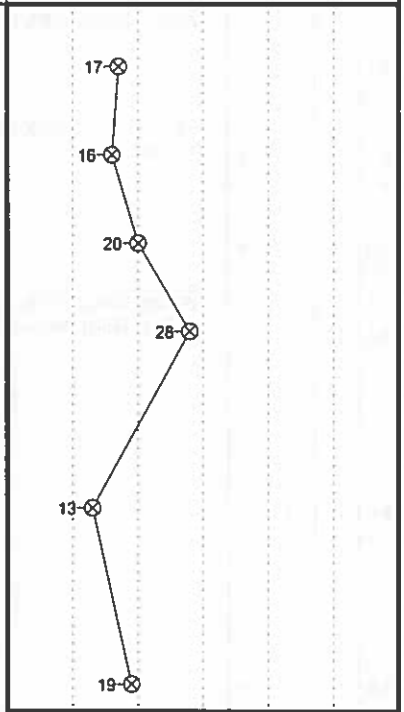
ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS
BOTTOM OF CASING | LOSS OF CIRCULATION
SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Very Stiff			5 6 9
	S-1	SS	18	18				
					(ML) SANDY SILT, Brown, Moist, Very Stiff			5 6 10
	S-2	SS	18	18				
5					(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			7 9 11
	S-3	SS	18	18				
	S-4	SS	18	18				11 13 15
10								
	S-5	SS	18	18				7 6 7
15								
	S-6	SS	18	18				9 9 10
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 8.2'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-9	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

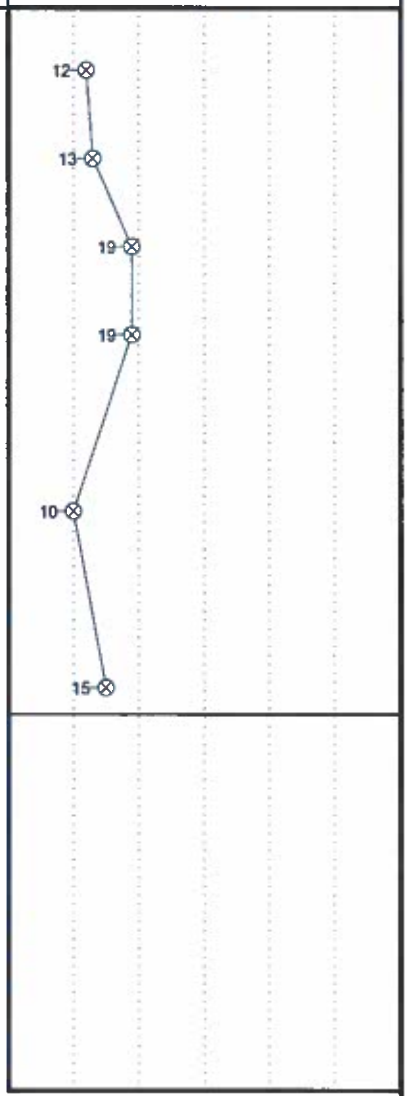
PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			4 6 6
	S-1	SS	18	18				
	S-2	SS	18	18	(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			5 6 7
5								7 9 10
	S-3	SS	18	18				
	S-4	SS	18	18	(SP-SM) SAND WITH SILT, Reddish Brown and Tan, Moist, Medium Dense			8 8 11
10								
	S-5	SS	18	18				5 5 5
15								
	S-6	SS	18	18				7 7 8
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 12.3'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-10	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

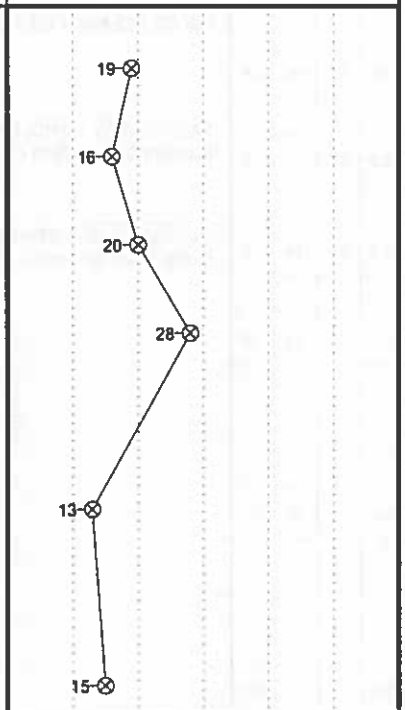
CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS; BOTTOM OF CASING; LOSS OF CIRCULATION; SURFACE ELEVATION)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(SC) CLAYEY SAND, Brown and Reddish Brown, Moist, Medium Dense			6 12 7
	S-1	SS	18	18				
	S-2	SS	18	18				6 7 9
5					(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense, With Gravel			
	S-3	SS	18	18				9 9 11
	S-4	SS	18	18				10 13 15
10								
	S-5	SS	18	18				6 6 7
15					(SP-SM) SAND WITH SILT, Reddish Brown, Moist, Medium Dense, With Gravel			
	S-6	SS	18	18				5 7 8
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 11.5'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-11	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION

Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING	EASTING	STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			4 5 7
	S-1	SS	18	18				12
	S-2	SS	18	18	(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense, With Gravel			6 7 7 14
5	S-3	SS	18	18	(SP-SM) SAND WITH SILT, Reddish Brown, Moist, Medium Dense, With Gravel			5 6 8 14
	S-4	SS	18	18				7 7 11 18
10								
	S-5	SS	18	18				6 7 9 16
15								
	S-6	SS	18	18				12 11 9 20
20					END OF BORING @ 20.0'			
25								
30								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 8.5'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-12	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					BOTTOM OF CASING ➤ LOSS OF CIRCULATION (100)			
					SURFACE ELEVATION			
					(ML/CL) CLAYEY SILT, Moist, Medium Stiff			3 4 4
	S-1	SS	18	18				
	S-2	SS	18	18				4 4 4
5					(CL/ML) SILTY CLAY, Brown and Gray, Moist, Medium Stiff to Stiff			
	S-3	SS	18	18				4 3 4
	S-4	SS	18	18				4 5 6
10					(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense to Dense			
	S-5	SS	18	18				6 7 10
15						▽		
	S-6	SS	18	18				6 9 15
20					END OF BORING @ 20.0'			
25								
30								

8 - 8 - 7 - 11 - 17 - 24

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 18.5 WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 12.5'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-13	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

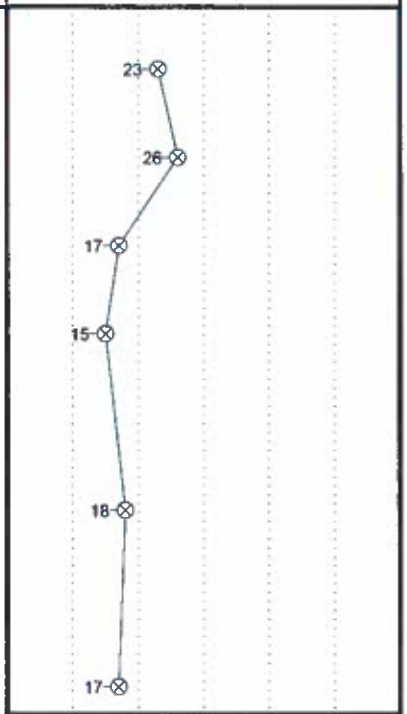
ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS
BOTTOM OF CASING | LOSS OF CIRCULATION
SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Very Stiff			
	S-1	SS	18	18				10 10 13
	S-2	SS	18	18				8 11 15
5					(SC) CLAYEY SAND, Greenish Reddish Brown, Moist, Medium Dense			
	S-3	SS	18	18				7 8 9
	S-4	SS	18	18				4 7 8
10								
	S-5	SS	18	18		▽		6 8 10
15								
	S-6	SS	18	18				6 8 9
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 14.5 WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 8.9'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-14	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [12.00"]			
	S-1	SS	18	18	(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			3 5 9
	S-2	SS	18	18				5 7 10
5					(SP-SM) SAND WITH SILT, Tan and Brown, Moist, Medium Dense			
	S-3	SS	18	14				9 10 12
	S-4	SS	18	18				7 7 10
10								
	S-5	SS	18	18				4 5 7
15						▽		
	S-6	SS	18	16				4 7 8
20					END OF BORING @ 20.0'			
25								
30								

14 — 17 — 22 — 17 — 12 — 15

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL 17.0 WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 9.9'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-15	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

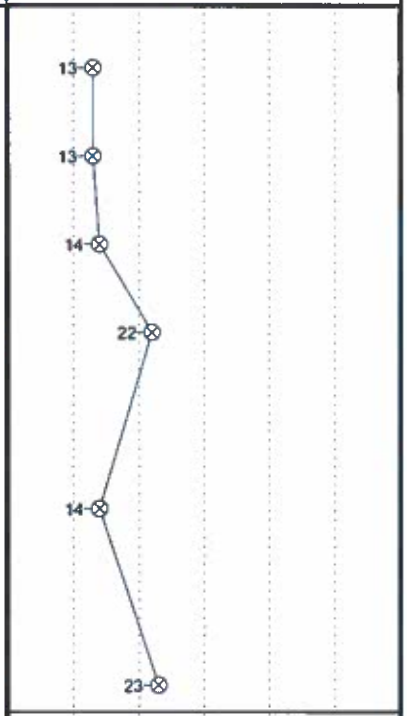
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			4 6 7
	S-1	SS	18	18				
	S-2	SS	18	18	(SP-SM) SAND WITH SILT, Brown and Reddish Brown, Moist, Medium Dense			4 7 6
5	S-3	SS	18	18				5 7 7
	S-4	SS	18	18				6 11 11
10								
	S-5	SS	18	18				6 6 8
15					(SP-SM) SAND WITH SILT, Brown and Reddish Brown, Moist, Medium Dense, With Rock Fragments.			
	S-6	SS	18	18				12 12 11
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 7.1'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-16	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

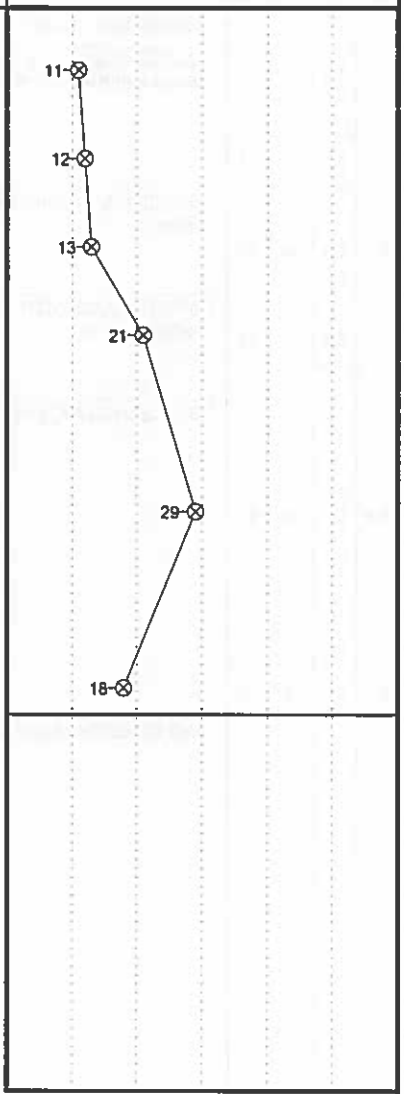
ROCK QUALITY DESIGNATION & RECOVERY
ROD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION | ENGLISH UNITS

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			4 5 6
	S-1	SS	18	18				
					(SM) SILTY SAND, Reddish Brown, Moist, Medium Dense			4 6 6
	S-2	SS	18	18				
5					(SC) CLAYEY SAND, Reddish Brown, Moist, Medium Dense			7 6 7
	S-3	SS	18	18				
	S-4	SS	18	18				8 9 12
10					(SC) CLAYEY SAND, Reddish Brown, Moist, Dense to Medium Dense, With Quartz Fragments.			
	S-5	SS	18	18				11 15 14
15								
	S-6	SS	18	18				5 9 9
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 14.2'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-17	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

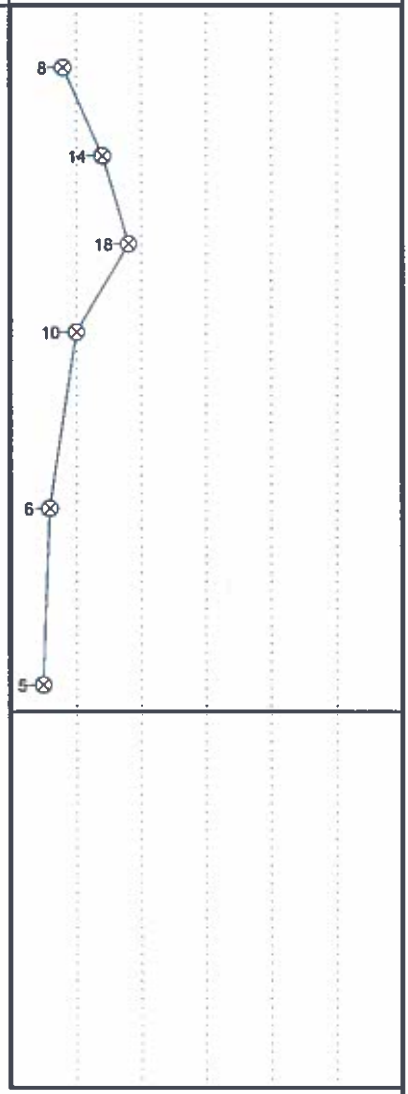
CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [14.00"]		
	S-1	SS	18	12	(ML/CL) CLAYEY SILT, Brown and Gray, Moist, Medium Stiff to Very Stiff		2 3 5
	S-2	SS	18	18			4 6 8
5	S-3	SS	18	18	(SC) CLAYEY SAND, Gray, Moist, Medium Dense		5 8 10
	S-4	SS	18	18	(SP-SM) SAND WITH SILT, Gray, Moist, Medium Dense		3 5 5
10					(CL) LEAN CLAY, Gray, Moist, Medium Stiff		
	S-5	SS	18	18			1 2 4
15							
	S-6	SS	18	18			2 2 3
20					END OF BORING @ 20.0'		
25							
30							



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 9.0 WS ☐ WD ☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 12.4'
WL(SHW) WL(ACR) 8.8	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-18	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION

Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

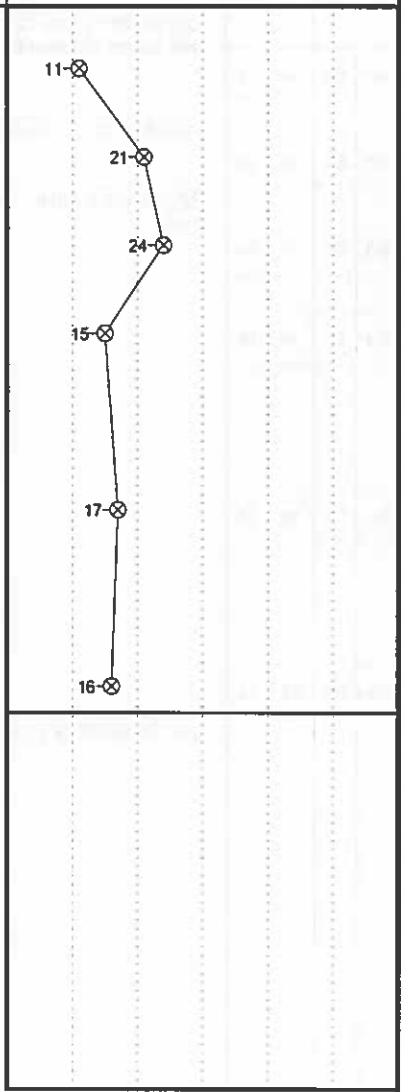
PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [10.00"]			
	S-1	SS	18	18	(SC) CLAYEY SAND, Brown, Moist, Medium Dense			3 4 7
	S-2	SS	18	16				6 9 12
5					(SC) CLAYEY SAND, Tan and Brown, Moist, Medium Dense, With Gravel			
	S-3	SS	18	15				7 10 14
					(SP-SM) SAND WITH SILT, Tan and Reddish Brown, Moist, Medium Dense, With Gravel			
	S-4	SS	18	18				5 8 7
10								
	S-5	SS	18	18				6 8 9
15								
	S-6	SS	18	18				6 7 9
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN SITU THE TRANSITION MAY BE GRADUAL

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 14.8'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-19	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

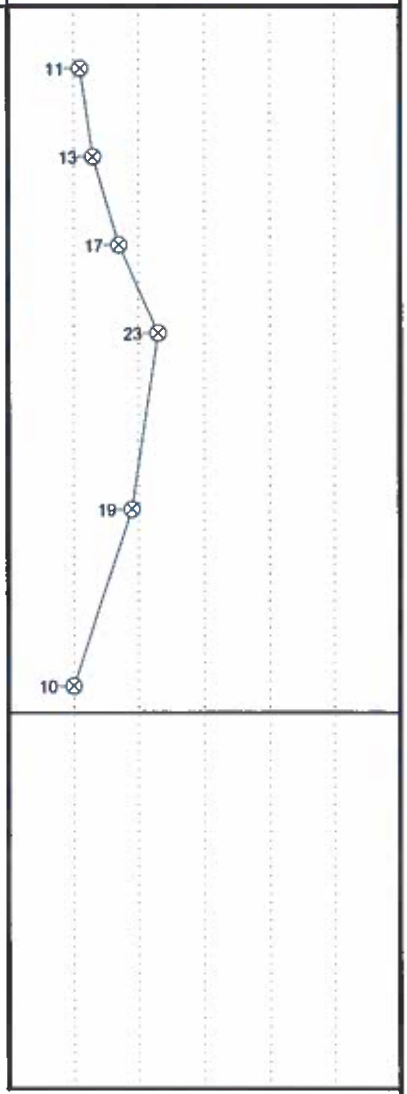
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	BLOWS/6"
0							
	S-1	SS	18	18	(CL) SANDY LEAN CLAY, Brown, Moist, Stiff, With Quartz Fragments		7 6 5
	S-2	SS	18	18	(CL) LEAN CLAY, Brown, Moist, Stiff		5 6 7
5	S-3	SS	18	18	(SC) CLAYEY SAND, Tan Gray, Moist, Medium Dense		6 8 9
	S-4	SS	18	18			10 10 13
10	S-5	SS	18	18			8 10 9
15	S-6	SS	18	18		▽	4 5 5
20					END OF BORING @ 20.0'		
25							
30							



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 19.0 WS ☐ WD ☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 9.3'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN S.COOMBS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-20	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS; BOTTOM OF CASING; LOSS OF CIRCULATION; SURFACE ELEVATION)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT
0					Topsoil Depth [12.00"]				
	S-1	SS	18	14	(ML/CL) CLAYEY SILT, Greenish Gray, Moist, Stiff			3 5 8	13
					(CL) LEAN CLAY, Gray, Moist, Very Stiff to Stiff				
	S-2	SS	18	16				3 5 6	11
5									
	S-3	SS	18	18				5 7 9	16
	S-4	SS	18	18				3 5 6	11
10									
	S-5	SS	18	18				3 4 5	9
15									
	S-6	SS	18	18				3 5 7	12
20					END OF BORING @ 20.0'				
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 14.9'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-21	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

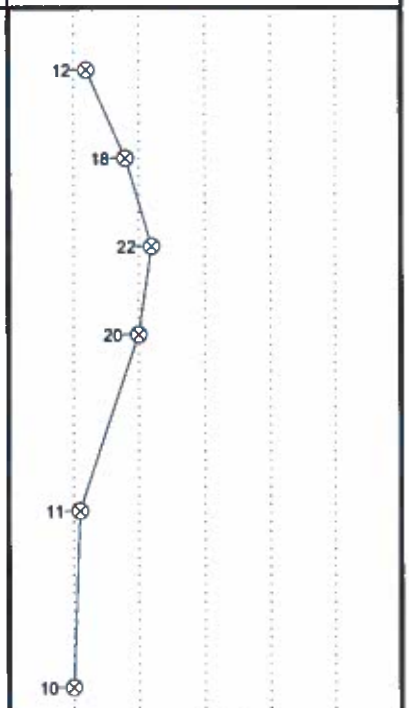
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [12.00"]			
	S-1	SS	18	6	(ML/CL) CLAYEY SILT, Brown, Moist, Stiff to Very Stiff			3 5 7
	S-2	SS	18	16				8 8 10
5					(SC) CLAYEY SAND, Brown, Moist, Medium Dense			
	S-3	SS	18	16				6 9 13
	S-4	SS	18	16				5 8 12
10					(CL) LEAN CLAY, Dark Gray, Moist, Stiff			
	S-5	SS	18	18				4 5 6
15								
	S-6	SS	18	18				4 5 5
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 15.5'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-22	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

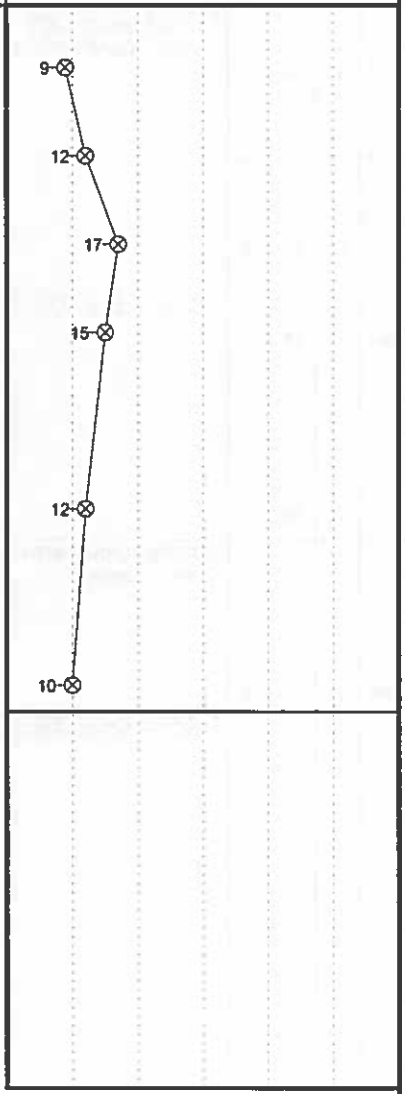
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [14.00"]			
	S-1	SS	18	12	(CL/ML) SILTY CLAY, Gray and Orange, Moist, Stiff			3 4 5
					(CL) LEAN CLAY, Gray and Yellow, Moist, Stiff			
	S-2	SS	18	18				3 5 7
5	S-3	SS	18	18				4 7 10
	S-4	SS	18	18				5 7 8
10	S-5	SS	18	18				4 5 7
15	S-6	SS	18	18				3 4 6
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 16.6'
WL(SHW) WL(ACR) DRY	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-23	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION | ENGLISH UNITS

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [5.00"]			
	S-1	SS	18	6	(ML/CL) CLAYEY SILT, Brown, Moist, Stiff			4 6 7
	S-2	SS	18	18				3 5 7
5	S-3	SS	18	18				4 6 9
	S-4	SS	18	18	(CL/CH) LEAN TO FAT CLAY, Gray, Moist, Stiff			4 6 8
10	S-5	SS	18	18		▼		3 4 6
15					(SP-SM) SAND WITH SILT, Brown, Wet, Medium Dense	▼		
	S-6	SS	18	16				4 5 6
20					END OF BORING @ 20.0'			
25								
30								

13 12 15 14 10 11

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 16.0 WS ☐ WD ☒	BORING STARTED 11/23/16		CAVE IN DEPTH @ 13.9'
▽ WL(SHW) ▼ WL(ACR) 13.7	BORING COMPLETED 11/23/16		HAMMER TYPE Auto
▽ WL	RIG ATV	FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-24	1 OF 1

PROJECT NAME	ARCHITECT ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

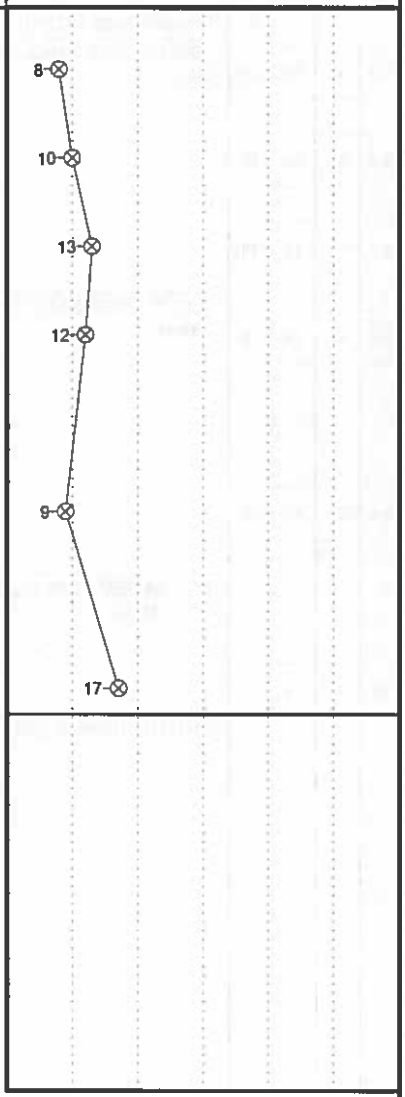
-○- CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

PLASTIC LIMIT% ✕ — ● — △ LIQUID LIMIT%

⊗ STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [12.00"]			
	S-1	SS	18	16	(CL) LEAN CLAY, Brown, Moist, Medium Stiff to Stiff			2 3 5
	S-2	SS	18	18				3 4 6
5	S-3	SS	18	18				4 6 7
	S-4	SS	18	18				3 5 7
10					(SC) CLAYEY SAND, Gray, Moist, Loose to Medium Dense	▽		
	S-5	SS	18	18				3 4 5
15								
	S-6	SS	18	18				5 7 10
20					END OF BORING @ 20.0'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 13.0 WS☐ WD☒	BORING STARTED 11/22/16	CAVE IN DEPTH @ 15.1'
▽ WL(SHW) ▽ WL(ACR) 12.8	BORING COMPLETED 11/22/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN D. PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-25	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

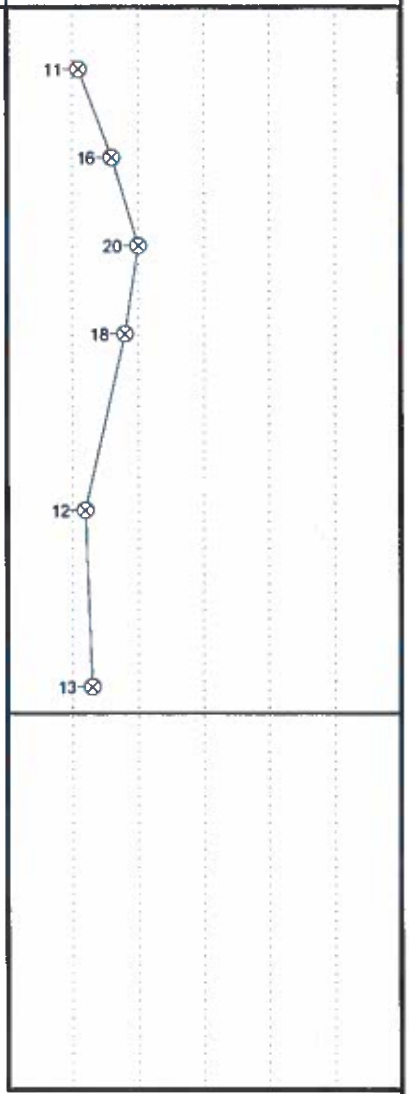
ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% ——

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION | ENGLISH UNITS

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Depth [10.00"]			
	S-1	SS	18	12	(SC) CLAYEY SAND, Brown, Moist, Medium Dense			2 5 6
	S-2	SS	18	16				5 7 9
5	S-3	SS	18	18				6 8 12
	S-4	SS	18	18	(SC) CLAYEY SAND, Brown, Moist, Medium Dense			5 7 11
10	S-5	SS	18	18				4 5 7
15					(CL) SANDY LEAN CLAY, Reddish Orange and Gray, Moist, Stiff	▽		
	S-6	SS	18	18				4 6 7
20					END OF BORING @ 20'			
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 18.0 WS☐ WD☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 15.4'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN D.PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
H & B Solutions, LLC	02:8291	B-26	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Morgnec Road Solar Farm	H & B Solutions, LLC

SITE LOCATION: Morgnec Road and Brickyard Lane, Chestertown, Kent County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
ROD% - - - REC% ——

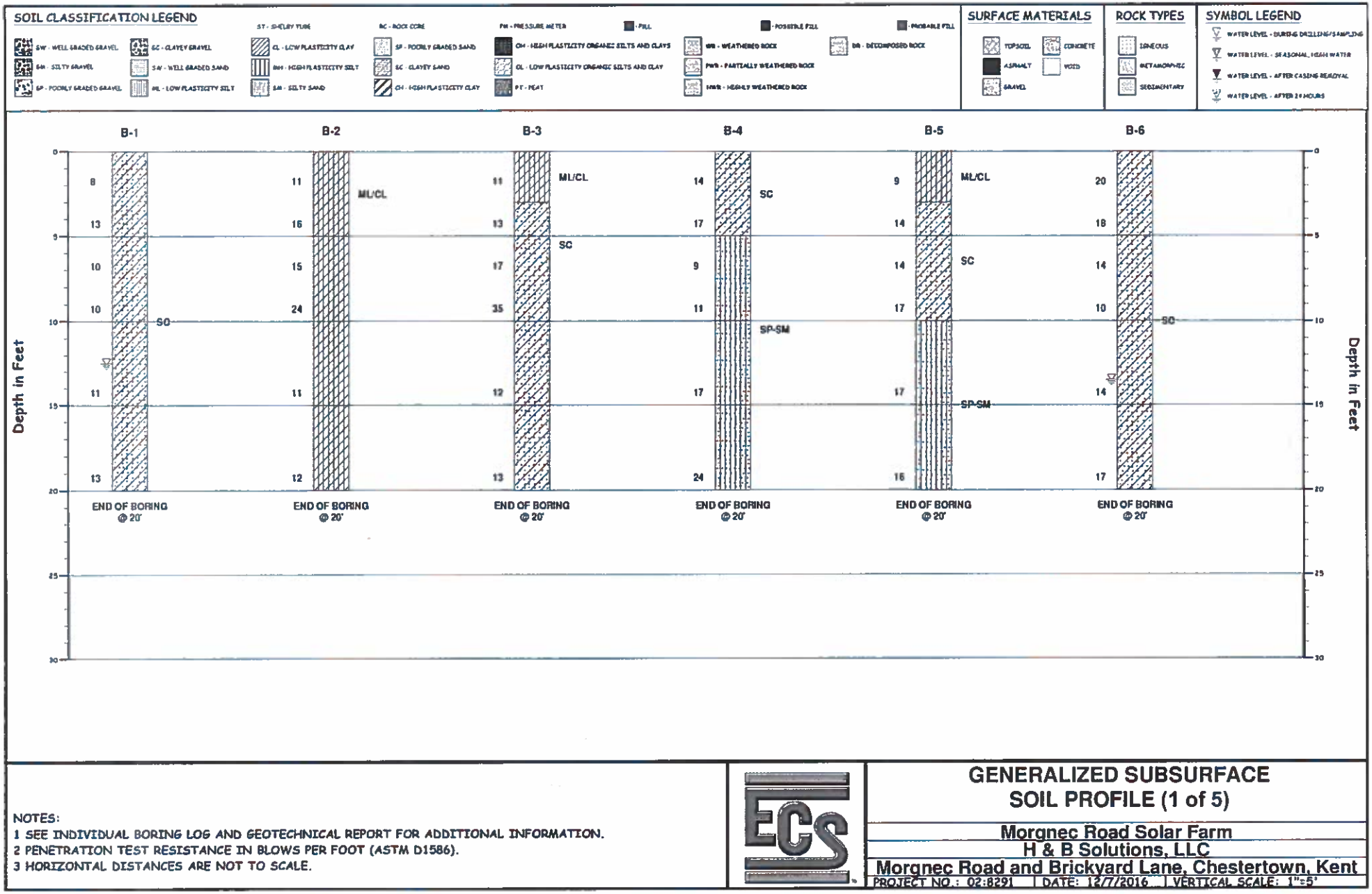
PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS; BOTTOM OF CASING; LOSS OF CIRCULATION; SURFACE ELEVATION)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT
0					Topsoil Depth [12.00"]				
	S-1	SS	18	18	(SC) CLAYEY SAND, Brown, Moist, Medium Dense			3 4 6	10
	S-2	SS	18	18				4 7 8	15
5					(SP-SM) SAND WITH SILT, Reddish Brown, Moist, Medium Dense				
	S-3	SS	18	18				5 8 10	18
					(ML/CL) CLAYEY SILT, Gray, Moist, Very Stiff				
	S-4	SS	18	18				5 9 10	19
10					(SC) CLAYEY SAND, Brown, Wet, Medium Dense				
	S-5	SS	18	18		▽		6 8 11	19
15									
	S-6	SS	18	18				5 8 10	18
20					END OF BORING @ 20'				
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN SITU THE TRANSITION MAY BE GRADUAL

▽ WL 17.0 WS ☐ WD ☒	BORING STARTED 11/23/16	CAVE IN DEPTH @ 12.9'
▽ WL(SHW) ▽ WL(ACR) DRY	BORING COMPLETED 11/23/16	HAMMER TYPE Auto
▽ WL	RIG ATV FOREMAN D.PRICE	DRILLING METHOD HSA

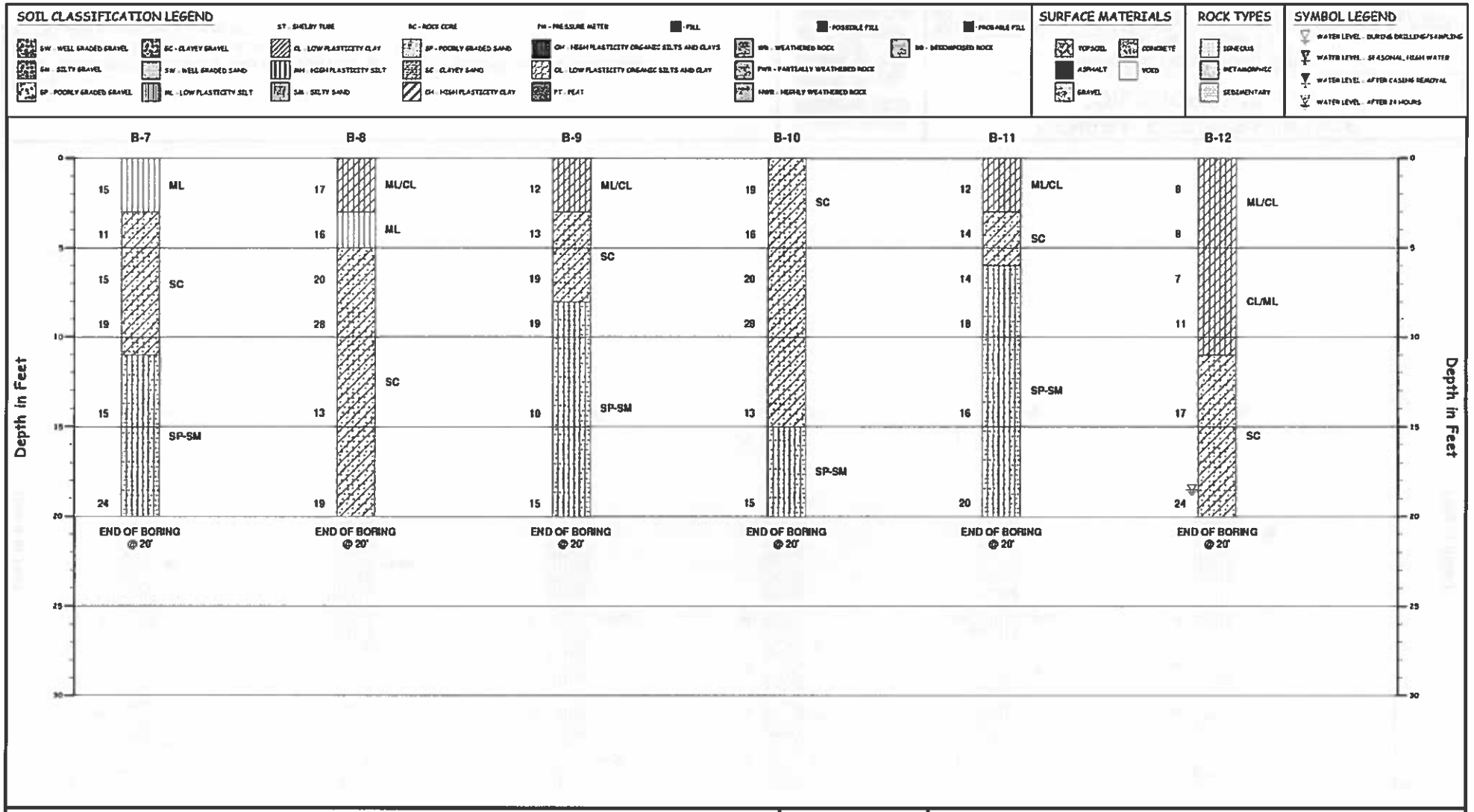


NOTES:
1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
3 HORIZONTAL DISTANCES ARE NOT TO SCALE.

GENERALIZED SUBSURFACE SOIL PROFILE (1 of 5)

Morgnec Road Solar Farm
H & B Solutions, LLC
Morgnec Road and Brickyard Lane, Chestertown, Kent

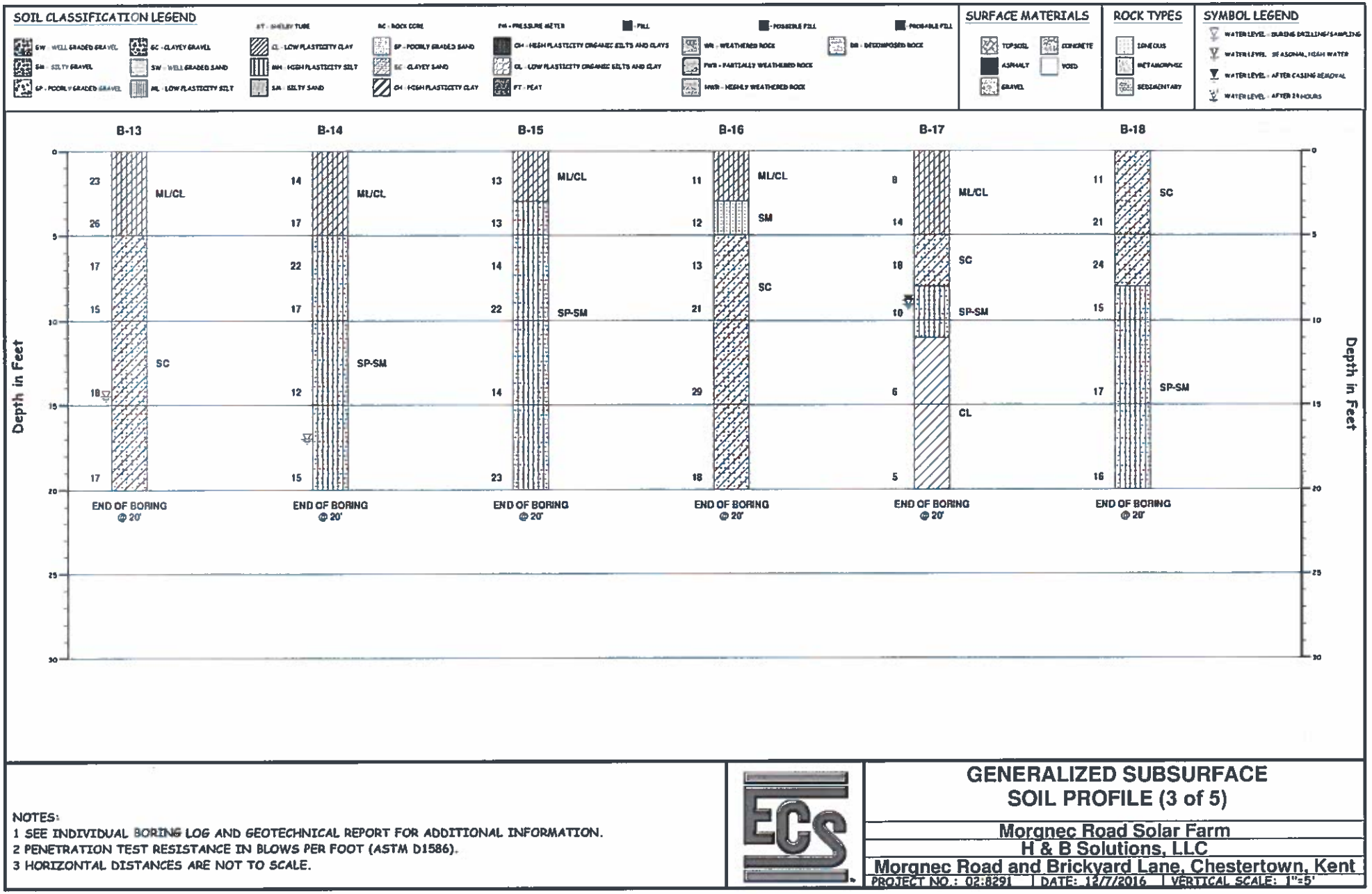
PROJECT NO.: 02:8291 | DATE: 12/7/2016 | VERTICAL SCALE: 1"=5'



NOTES:
1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
3 HORIZONTAL DISTANCES ARE NOT TO SCALE.

GENERALIZED SUBSURFACE SOIL PROFILE (2 of 5)

Morgnec Road Solar Farm
H & B Solutions, LLC
Morgnec Road and Brickyard Lane, Chestertown, Kent
PROJECT NO.: 02:8291 | DATE: 12/7/2016 | VERTICAL SCALE: 1"=5'

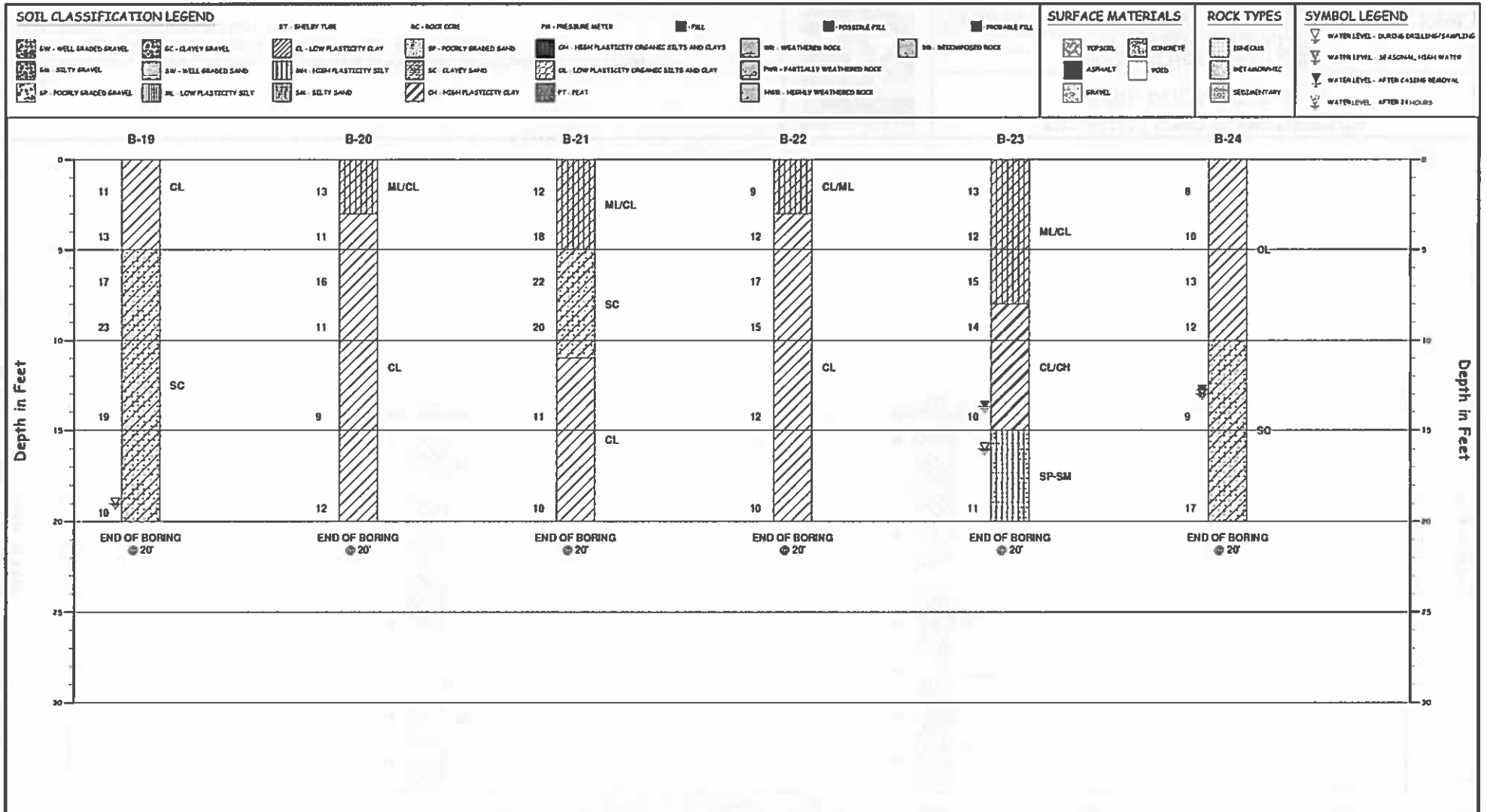


NOTES:
1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
3 HORIZONTAL DISTANCES ARE NOT TO SCALE.

GENERALIZED SUBSURFACE SOIL PROFILE (3 of 5)

Morgnec Road Solar Farm
H & B Solutions, LLC
Morgnec Road and Brickyard Lane, Chestertown, Kent

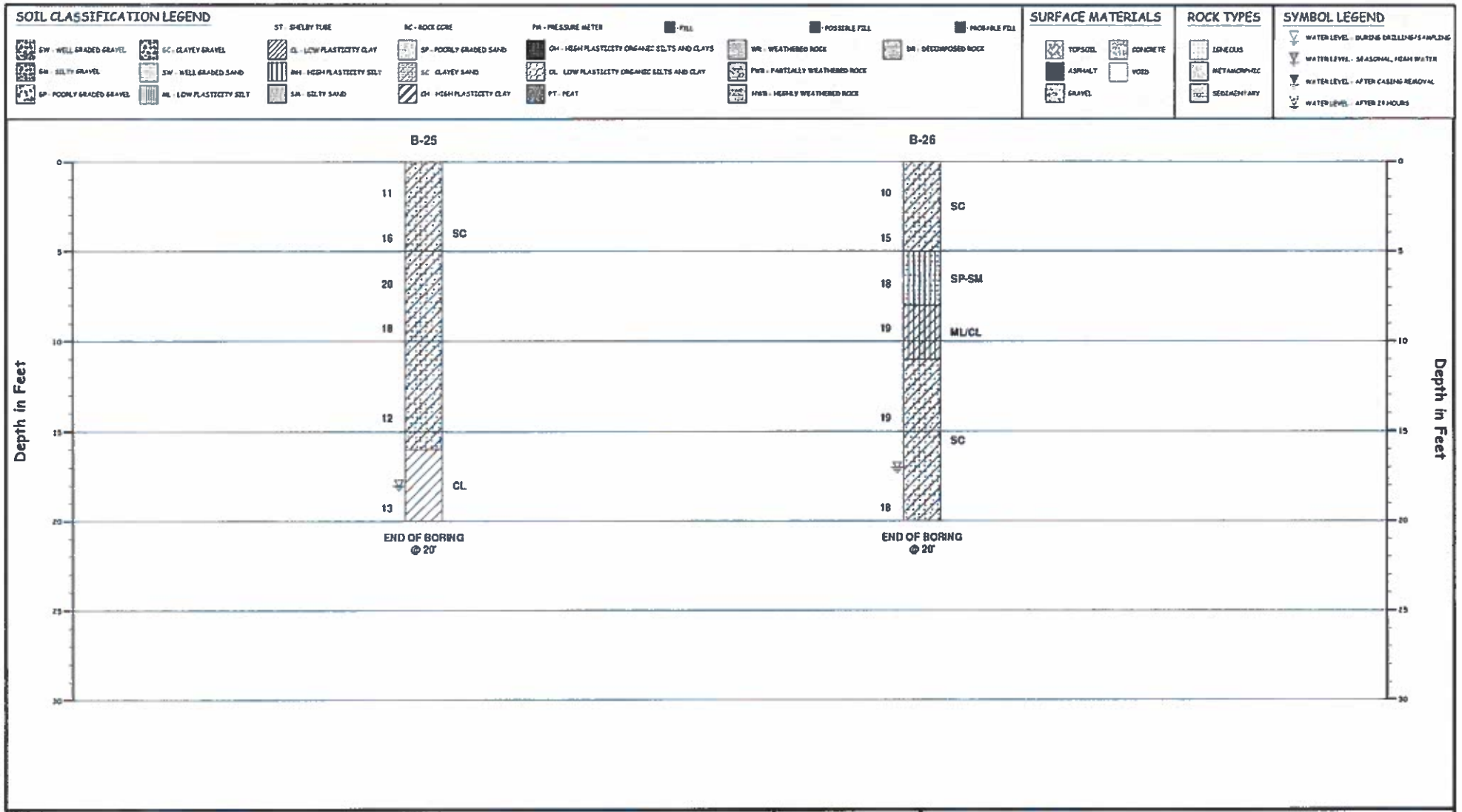
PROJECT NO.: 02:8291 | DATE: 12/7/2016 | VERTICAL SCALE: 1"=5'



NOTES:
1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
3 HORIZONTAL DISTANCES ARE NOT TO SCALE.

GENERALIZED SUBSURFACE SOIL PROFILE (4 of 5)

Morgnec Road Solar Farm
H & B Solutions, LLC
Morgnec Road and Brickyard Lane, Chestertown, Kent
PROJECT NO.: 02:8291 | DATE: 12/7/2016 | VERTICAL SCALE: 1"=5'



NOTES:
1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
3 HORIZONTAL DISTANCES ARE NOT TO SCALE.

GENERALIZED SUBSURFACE SOIL PROFILE (5 of 5)

Morgnec Road Solar Farm
H & B Solutions, LLC
Morgnec Road and Brickyard Lane, Chestertown, Kent

PROJECT NO.: 02:8291 | DATE: 12/7/2016 | VERTICAL SCALE: 1"=5'

Boring Location Diagram

MORGNEC ROAD SOLAR FARM

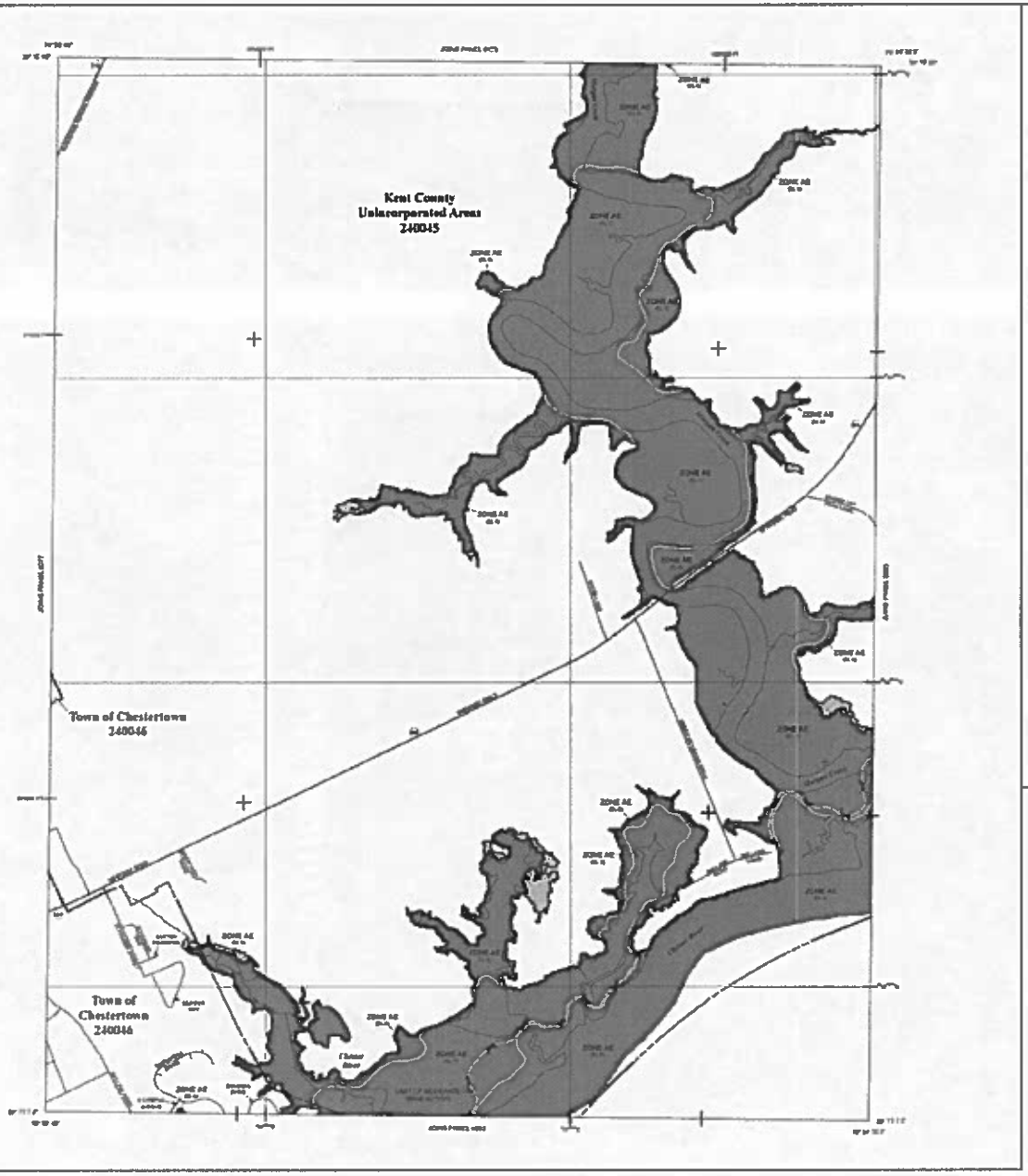
H&B SOLUTIONS
CHESTERTOWN MD

ENGINEER	ZLA
SCALE	1 " = 1,500 '
PROJECT NO.	02:8291
SHEET	1 OF 1
DATE	11/16/2016

APPENDIX 4

FEMA
Flood Insurance Rate Map

NOTES TO USERS



LEGEND

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

KENT COUNTY,
MARYLAND
AND INCORPORATED AREAS

PANEL 231 OF 430

MAP NUMBER
24029C0231D

EFFECTIVE DATE
JUNE 9, 2014

Federal Emergency Management Agency

APPENDIX 5

Critical Area Commission Confirmation Memo


CREEK
E.D.2
E.D.1
P48
P174
P178
P478

Melissa Hall

From:	Nick Kelly -DNR-
Sent:	Thursday, November 10, 2016 12:56 PM
To:	dbauer@hallandbauer.com
Cc:	Charlotte Shearin -DNR-; Claudia Jones -DNR-; mhall@hallandbauer.com
Subject:	Fwd: Confirmation of Critical Area for Solar Projects
Attachments:	TM37P40.jpg

Dane,

Claudia Jones forwarded me your email. I looked up the three parcels using our GIS data. It appears that only TM 37, Parcel 40 has Critical Area (Resource Conservation Area) on the property. The other two parcels do not include Critical Area. I have attached an aerial showing the location of the Critical Area.

If you have any questions, please let me know.

Thank you
Nick Kelly

Nick Kelly, PhD
Regional Program Chief
Critical Area Commission for the Chesapeake and Atlantic Coastal Bays
1804 West Street, Suite 100
Annapolis, MD 21401
(410) 260-3483
nick.kelly@maryland.gov

---------- Forwarded message ----------
From: **Claudia Jones -DNR-** <claudia.jones@maryland.gov>
Date: Thu, Nov 10, 2016 at 12:39 PM
Subject: Fwd: Confirmation of Critical Area for Solar Projects
To: nick.kelly@maryland.gov, charlotte.shearin@maryland.gov

Hi Charlotte and Nick,
I think one or more of you handles Kent County - that is why I'm forwarding you this email.
Thanks!
CJ

Begin forwarded message:

From: Dane Bauer <dbauer@hallandbauer.com>
Date: November 10, 2016 at 9:15:33 AM EST
To: Claudia Jones -DNR- <claudia.jones@maryland.gov>
Cc: Melissa Hall <mhall@hallandbauer.com>
Subject: Confirmation of Critical Area for Solar Projects

Claudia:

We represent Urban Grid Holdings, LLC who is pursuing a number of utility scale solar projects on the Eastern Shore. As we have done on their other sites, we have used the available resource maps and determined that the property listed below are not within the Critical Area .

Could you please review and confirm our findings?

Morgnec Road, Kent County:

TM 37, Parcel 40

TM 37, Parcel 174

TM 37, Parcel 232

As part of the ERD/CPCN submittal we need to confirm that the projects are not located within the Critical Area.

Thank you for your assistance in these regards.

--

Dane S. Bauer
410.812.9109

37534 Oliver Dr.
Selbyville, DE 19975

APPENDIX 6

Environmental Resources Inc. Report

ENVIRONMENTAL RESOURCES, INC.

38173 DUPONT BOULEVARD
P.O. BOX 169
SELBYVILLE, DE 19975
PHONE: 302-436-9637
FAX: 302-436-9639

December 5, 2016 ERI 0788#0664

Attn.: Ms. Melissa Hall
H & B Solutions, LLC
37534 Oliver Dr.
Selbyville, DE 19975

Re: Preliminary Wetlands Review
Morgnec Road, Kent County, Maryland

Dear Ms. Hall:

On behalf of Urban Grid, Environmental Resource, Inc. (**ERI**) completed a preliminary wetlands review at the noted project site as requested by H & B Solutions, LLC (**HBS**). The land under review is identified as Tax Map 37, Parcels 40, 174, and 232. This is only an initial review of the site to assist state and federal regulators regarding jurisdictional ditches and wetlands. Mr. Chris Pajak, MDE's representative for this area, made a site visit along with HBS and ERI on November 21, 2016. At that time, crops had been harvested and the fields disked (**Photograph 1**) making a number of smaller features visible for review.

A main reason for this review of the site is to avoid regulated impacts to wetlands, waters and their buffers. Work is proposed within the existing farm fields, outside of the Critical Area, that make up the majority of this site. To minimize delineation time in the field, a 35 foot buffer has been extended into field from the drip line of the woods to avoid possible buffer impacts. HBS will make sure that the solar panels, inverter pads, and other facilities are not constructed anywhere within the wetlands, waters or buffers. Further, directional drilling will be used to connect to the substation and any other subsurface wiring so that no wetlands, waters or their buffers will be impacted. Davis, Bowen & Friedel, Inc. (DBF) has prepared a project plan that illustrates these potential wetlands, waters, and buffers.

From USGS mapping dated 1953 the limit of the fields was greater than the extent currently being farmed. From the time of the pre- Clear Water Act (**CWA**) mapping to the present, woods have been allowed to expand such that the blue line features are now within the forest. That is, the fields were cleared, manipulated and farmed prior to the CWA. As a result, the normal condition is that these active agricultural fields are typically viewed as non-jurisdictional. Further, as noted in your Site Feasibility Report most of the soil mapped in the fields is better drained and not hydric. As a result most of the field area should not be regulated as wetlands.

During the visit on November 21 all crops had been harvested so we were able to review a number of grassed waterways that were noted on aerial photography. Precipitation for the year prior to this visit had been slightly above average based on NOAA data and all in-field drainage features were dry. Mr.

Pajak indicated that the many grassed waterways would not be identified as jurisdictional waters. An example of such a feature is provided in **Photograph 2** that is located in the west central field and grades east toward a blue line feature in the woods. There is one jurisdictional ditch at southwest corner of the property (**Photograph 3**); the 35 foot buffer will be added from the top of the ditch bank.

National Wetlands Inventory (NWI) mapping units are present onsite. These units are within the wooded portion of the tract. The NWI does not map any farmed wetlands (Pf), but on the Merlin wetland layer there is a Pf unit between Morgnec Road and the farmstead. Some hydric soil is mapped in this area. Available historic photos with regard to the mapped farmed wetland do not support this classification as it appears to be regularly farmed beginning prior to the CWA and not typically ponded with water for extended periods during the growing season. As a result, the grassed waterway in this area drains only upland field and is not jurisdictional; similar to the other grassed waterways. This grassed waterway grades to one of the two wildlife impoundments (**Photograph 4**) in the eastern field that are likely jurisdictional. Most of each impoundment is within the Critical Area; no work is proposed in the Critical Area portion of the property.

In summary, there are a few jurisdictional features within the active farming area. Buffers have been added and these features should be able to be avoided during design. The perimeter areas which can be designated as jurisdictional can be easily avoided. It is noted that Urban Grid typically purchases significant more acreage than is required for their solar project; therefore, the recommendation would be to delineate a limit of disturbance using setbacks and buffers in order to avoid any impacts. DBF has prepared a plan illustrating the site conditions reviewed in this letter.

Do not hesitate to call me regarding this report or any issue that may help us improve our service to you and your client. Thank you for having ERI assist you with this regulatory review.

Sincerely,
ENVIRONMENTAL RESOURCES, INC.

Thomas D. Nobile
Professional Wetland Scientist 000389
Certified Professional Soil Scientist 03297

Encl: site photos

Morgnec Road, Kent County, Maryland

Photo 1: Fields had been harvested and disked by the time of the November 21, 2016 visit. Also in this photo is a grassed waterway on a steep slope.

Photo 2: A grassed waterway, not jurisdictional per field review by Mr. Pajak, located upgradient of a blue line that is located within the woods.

Morgnec Road, Kent County, Maryland

Photo 3: In the southwest corner of the field, there is a short jurisdictional ditch that drains under Morgnec Road.

Photo 4: Some of the non-jurisdictional grassed waterways drain toward the wildlife impoundments in the eastern field.

APPENDIX 7

MDE
Jurisdictional Nontidal Wetlands
Confirmation Memo

MEMORANDUM

To: Dane Bauer/Melissa Hall; cc: Tom Noble

From: Chris M. Pajak/Project Reviewer
Maryland Department of the Environment/Nontidal Wetlands Division

Date: December 13, 2016

Re: Tax Map 37, Parcels 40, 174 and 232 – Morgnec Road, Kent County, Maryland

The Maryland Department of the Environment, Nontidal Wetlands Division has reviewed the project limits of disturbance and nontidal wetlands noted for a proposed solar facility at the subject location. The Department is in agreement with the wetlands delineation and that the project shall have no impacts to jurisdictional areas of the State, including regulated 25 foot buffer areas. The Department also concurs with the December 5, 2016 letter provided by Environmental Resources, Inc. regarding the project. If this project does not disturb wetlands or wetland buffers, then no authorization from this office is necessary. It is our desire to see that these types of projects can take place without sacrificing any wetland functions that might exist on potential sites within the region. The Department is pleased that these specific projects have been designed to avoid such wetland losses. If I can be of further assistance, please feel free to contact me at chris.pajak@maryland.gov or at 443-463-9810.

Chris Pajak

APPENDIX 8

ForgeSolar Glare Analysis

FORGESOLAR GLARE ANALYSIS

Project: **Morgnec**
Site configuration: **Morgnec**
Analysis conducted by Erin Walkowiak (erin@urbangridco.com) at 16:01 on 13 Nov, 2018.

U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
Flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

Default glare analysis parameters and observer eye characteristics (for reference only):

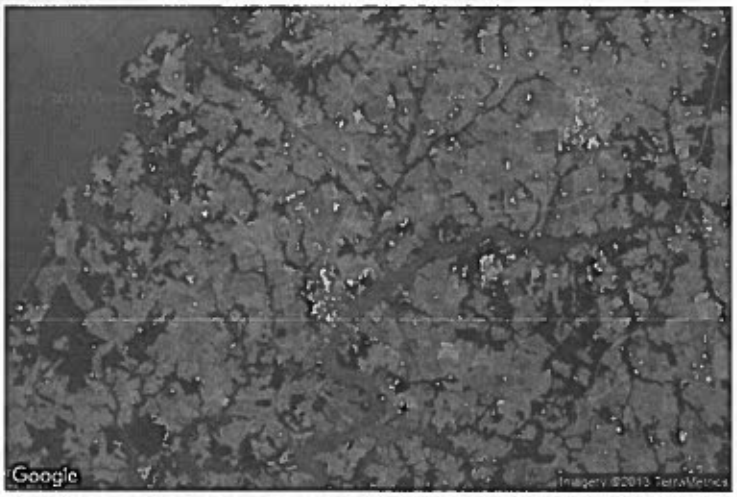
- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

SITE CONFIGURATION

Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 22661.3946



PV Array(s)

Name: Morgnec Solar
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.226348	-76.058547	28.41	0.00	28.41
2	39.232399	-76.062109	70.32	0.00	70.32
3	39.235025	-76.061036	55.78	0.00	55.78
4	39.231202	-76.058246	72.00	0.00	72.00
5	39.231235	-76.057796	70.60	0.00	70.60
6	39.235340	-76.060585	64.32	0.00	64.32
7	39.236221	-76.058912	65.34	0.00	65.34
8	39.235920	-76.057814	64.81	0.00	64.81
9	39.234132	-76.056153	54.91	0.00	54.91
10	39.233815	-76.055890	48.08	0.00	48.08
11	39.233198	-76.056622	50.44	0.00	50.44
12	39.232714	-76.056338	55.47	0.00	55.47
13	39.232789	-76.056080	59.81	0.00	59.81
14	39.233665	-76.053709	53.55	0.00	53.55
15	39.234106	-76.053902	55.94	0.00	55.94
16	39.234372	-76.052980	59.47	0.00	59.47
17	39.234820	-76.052282	51.74	0.00	51.74
18	39.235519	-76.052465	27.79	0.00	27.79
19	39.236225	-76.050254	28.20	0.00	28.20
20	39.235926	-76.050061	31.12	0.00	31.12
21	39.234928	-76.050104	32.91	0.00	32.91
22	39.233748	-76.048109	25.35	0.00	25.35
23	39.233782	-76.046414	18.98	0.00	18.98
24	39.233449	-76.045727	18.89	0.00	18.89
25	39.233566	-76.045019	20.69	0.00	20.69
26	39.234181	-76.045405	18.93	0.00	18.93
27	39.234712	-76.043517	20.30	0.00	20.30
28	39.233782	-76.042916	17.94	0.00	17.94
29	39.232286	-76.042959	17.16	0.00	17.16

Flight Path Receptor(s)

Name: FP 1
Description:
Threshold height: 50 ft
Direction: 156.7°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.203613	-76.025877	56.16	50.00	106.16
Two-mile	39.230174	-76.040635	17.08	642.53	659.62

Name: FP 2
Description:
Threshold height: 50 ft
Direction: 337.6°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.203580	-76.025877	56.19	50.00	106.20
Two-mile	39.176851	-76.011636	47.02	612.63	659.65

Name: FP 3
Description:
Threshold height: 50 ft
Direction: 129.6°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.276986	-76.062485	79.74	50.00	129.74
Two-mile	39.295435	-76.091277	76.67	606.52	683.19

Name: FP 4
Description:
Threshold height: 50 ft
Direction: 311.1°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.277003	-76.062506	79.56	50.00	129.57
Two-mile	39.257992	-76.034332	0.00	683.02	683.02

Name: FP 5
Description:
Threshold height: 50 ft
Direction: 165.6°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.274764	-76.010167	66.09	50.00	116.10
Two-mile	39.302774	-76.019435	62.95	606.61	669.55

Name: FP 6
Description:
Threshold height: 50 ft
Direction: 342.3°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	39.274697	-76.010124	66.10	50.00	116.10
Two-mile	39.247160	-75.998731	37.17	632.38	669.55

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
Morgnec Solar	0.0	180.0	0	0	-

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
FP 1	0	0
FP 2	0	0
FP 3	0	0
FP 4	0	0
FP 5	0	0
FP 6	0	0

Results for: Morgnec Solar

Receptor	Green Glare (min)	Yellow Glare (min)
FP 1	0	0
FP 2	0	0
FP 3	0	0
FP 4	0	0
FP 5	0	0
FP 6	0	0

Flight Path: FP 1

0 minutes of yellow glare
0 minutes of green glare

Flight Path: FP 2

0 minutes of yellow glare
0 minutes of green glare

Flight Path: FP 3

0 minutes of yellow glare
0 minutes of green glare

Flight Path: FP 4

0 minutes of yellow glare
0 minutes of green glare

Flight Path: FP 5

0 minutes of yellow glare
0 minutes of green glare

Flight Path: FP 6

0 minutes of yellow glare
0 minutes of green glare

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

APPENDIX 9

FAA Notice Criteria Tool Report

Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2014 2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	39 Deg 13 M 44.6 S N ▼
Longitude:	76 Deg 03 M 20.8 S W ▼
Horizontal Datum:	NAD83 ▼
Site Elevation (SE):	85 (nearest foot)
Structure Height :	20 (nearest foot)
Traverseway:	No Traverseway ▼ (Additional height is added to certain structures under 77.9(c)) User can increase the default height adjustment for Traverseway, Private Roadway and Waterway
Is structure on airport:	◉ No ○ Yes

Results

You do not exceed Notice Criteria

APPENDIX 10

MHT Response Letter

MARYLAND DEPARTMENT OF
PLANNING
MARYLAND HISTORICAL TRUST

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Wendi W. Peters, Secretary
Ewing McDowell, Deputy Secretary

September 8, 2016

Mr. Tim Kellerman
Triad Engineering, Inc.
1075 D Sherman Avenue
Hagerstown, MD 21740

Re: MHT Review of Proposed Morgnec Solar Electrical Generation Station Project
Kent County, Maryland

Dear Mr. Kellerman:

Thank you for providing the Maryland Historical Trust (MHT) with preliminary project information and site location maps for the above-referenced undertaking. In response to your request, we are reviewing the proposed undertaking to assess potential effects on historic properties in accordance with the Maryland Historical Trust Act, §§ 5A-325 and 5A-326 of the State Finance and Procurement Article. We understand that the construction of the proposed solar facility on the 370-acre site will require a CPCN license from the Maryland Public Service Commission (PSC) and is therefore subject to state historic preservation law. Below are our preliminary comments and recommendations regarding potential effects on historic properties.

The Morgnec Solar Electrical Generation Station (SEGS) undertaking is proposed on approximately 370 acres located at 616 Morgnec Road, Chestertown. The ground mounted solar panels will be approximately 10 - 12 feet above grade. To better identify potential historic properties please provide the MHT with an area of potential effects (APE) for this undertaking. The APE is defined before the identification of any historic properties and is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties", if any such properties exist. The APE should reflect the potential visual, auditory, and physical effects to the setting of historic properties. The APE should also take into account topography and existing vegetation. Once a defensible APE is identified all resources over 50 years of age within that boundary must be identified and evaluated for listing in the National Register of Historic Places.

Historic Built Environment: With respect to the historic built environment MHT should be provided with the following information, which will allow us to identify historic properties that might be affected by the undertaking and begin assessing the possible effects of the project on them as the proposed undertaking could be adversely affect the resources by changing their setting and view. The following resources must be evaluated for the National Register using the MHT's Determination of Eligibility (DOE) form.

- Any structures over 50 years of age within the APE.

DOE forms must contain sufficient description of buildings, structures, areas of land use, and the overall landscape of a property to evaluate its significance under National Register Criterion C and its historic integrity. This should include

information about feature age, form, stylistic elements, methods of construction, materials, and condition. Forms must also contain sufficient historical context to evaluate a property under National Register Criteria A and B. This should include information derived from historic maps and land records; examination of the existing buildings, structures, and landscape as historical sources; and relevant information from existing reports and other secondary sources. All DOE forms must be completed by a qualified architectural historian, preservationist, or historian and be accompanied by supporting materials as described in *General Guidelines for Compliance-Generated Determinations of Eligibility* and *Standards and Guidelines for Architectural and Historical Investigations in Maryland.*

Archeology: As noted in the project submittal, two 18th century farmsteads – the Hopewell Farm (K-205) and Blackhal's Hermitage (K-121) once stood within the central portion of the project area. Blackhal's Hermitage was built during the late 1700's, while the earliest component of the Hopewell farmstead (originally part of a grant made to Richard and Joseph Hopewell in 1686) was built in the early 1700's. While the majority of the structures associated with these farmsteads have been razed, it is likely that archeological deposits have remained intact. In addition to the presence of these 18th century farmstead sites, MHT files also indicate that several prehistoric archeological sites (18KE15, 18KE16, 18KE134, 18KE135, etc.) have been identified just east of the project area along Morgan Creek.

Given the proximity of the prehistoric sites and the presence of the two 18th century farmstead sites, it is our opinion that the Morgnec Solar project area has a moderate to high potential for containing archeological deposits that have not yet been identified. We are therefore recommending that a Phase I archeological investigation take place in all planned disturbance areas prior to any ground-disturbing activities associated with the installation of the solar facility. The Phase I survey work must be carried out by a qualified professional archeologist and performed in accordance with the *Standards and Guidelines for Archeological Investigations in Maryland* (Shaffer and Cole 1994). Upon our review of the survey results, additional (Phase II) investigations of identified sites may be necessary.

Upon our receipt of this information, MHT will be able to continue our review and provide informed recommendations regarding the project's potential effects on significant cultural resources. We look forward to receiving the information requested above and to further coordination as project planning proceeds. Additional information regarding the historic preservation review process and the *Standards and Guidelines* can be found on our website at http://mht.maryland.gov. If you have any questions or we may be of assistance, please do not hesitate to contact either Dixie Henry (regarding archeological resources) at dixie.henry@maryland.gov /410-514-7638 or me (regarding historic buildings and landscapes) at amanda.apple@maryland.gov. Thank you for providing us with this opportunity to comment.

Sincerely,

Amanda R. Apple
Preservation Officer
Maryland Historical Trust

DLH/ARA/201603270
cc: John Sherwell (DNR)

APPENDIX 11

DNR Wildlife and Heritage Response Letter

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Joanne Throwe, Deputy Secretary

August 3, 2016

Mr. Timothy J. Kellerman
Triad Engineering, Inc.
1075-D Sherman Avenue
Hagerstown, Maryland 21740

RE: Environmental Review for Morgnec Solar Electrical Generation Station, 616 Morgnec Road, Chestertown, Triad Project No. 03-16-0233, Tax Map 37, p/o Parcels 40 & 174, Kent County, Maryland.

Dear Mr. Kellerman:

The Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area shown on the map provided. As a result, we have no specific concerns regarding potential impacts or recommendations for protection measures at this time. Please let us know however if the limits of proposed disturbance or overall site boundaries change and we will provide you with an updated evaluation.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2016.1022.ke
Cc: F. Kelley, DNR
K. Charbonneau, CAC