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December 10, 2018

Ms. Barcy F. McNeal, Secretary  
Docketing Division  
Ohio Power Siting Board  
180 E. Broad Street, 11<sup>th</sup> Floor  
Columbus, OH 43215

Re: 18-1578-EL-BGN  
Alamo Solar I, LLC

Dear Ms. McNeal:

Accompanying this letter are hard copies of an application by Alamo Solar I, LLC for a Certificate of Environmental Compatibility and Public Need for the Alamo Solar 69.9 MW Solar Electric Generating Facility in Preble County, Ohio. The original application was electronically filed.

In accordance with Rule 4906-2-04 of the Ohio Administrative Code, I would like to make the following declarations:

Name of the applicant:

Alamo Solar I, LLC  
1105 Navasota Street  
Austin, TX 78702

Name and location of the proposed facility:

Alamo Solar 69.9 MW Solar Electric Generating Facility  
Gasper and Washington Townships  
Preble County, Ohio

Ms. Barcy F. McNeal  
Page 2

Name of the authorized representatives:

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Notarized Statement:

See attached Affidavit of Cyrus Tashakkori,  
Officer of Alamo Solar I, LLC

Please note the following information which has been revised by Alamo Solar I, LLC since the issuance of the pre-application notification letter on October 22, 2018. The Alamo Solar Farm is now proposed as a 69.9 MW facility pending a future amendment application to allow for the installation of an additional 20 MW.

Very truly yours,

/s/ Michael J. Settineri

Michael J. Settineri  
Attorney for Alamo Solar I, LLC

Enclosure

**BEFORE  
THE OHIO POWER SITING BOARD**

**In the Matter of the Application                    )  
of Alamo Solar I, LLC for a                            )  
Certificate of Environmental                         )  
Compatibility and Public Need                     )**

**Case No. 18-1578-EL-BGN**

**OFFICER'S AFFIDAVIT**

STATE OF TEXAS                    )  
COUNTY OF TRAVIS               ) SS:

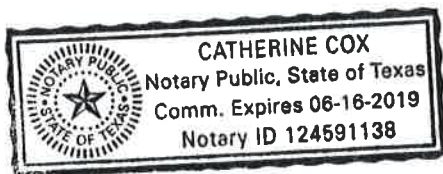
Now comes Cyrus Tashakkori, President of Alamo Solar I, LLC and an officer of Alamo Solar I, LLC, having been first duly sworn, declares and states as follows:

1. I am the highest ranking executive officer in charge of the Alamo Solar Farm to be located in Gasper and Washington Townships in Preble County, Ohio.
2. I have reviewed the Application of Alamo Solar I, LLC for a Certificate of Environmental Compatibility and Public Need to Construct an Electric Generating Facility in Case No. 18-1578-EL-BGN.
3. To the best of my knowledge, the information and statements contained in the Application are true and correct.
4. To the best of my knowledge, the Application is complete.

Signature: \_\_\_\_\_

Cyrus Tashakkori  
President  
Alamo Solar I, LLC

Sworn to before me and signed in my presence this 29<sup>th</sup> day of November, 2018.



Catherine Cox  
Notary Public  
My Commission Expires 6-16-2019

**APPLICATION**  
**TO THE**  
**OHIO POWER SITING BOARD**  
**FOR A**  
**CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED**  
**FOR THE**  
**ALAMO SOLAR FARM**  
Gasper and Washington Townships, Preble County  
**Case No. 18-1578-EL-BGN**  
**December 2018**

*Prepared by:* Alamo Solar I, LLC  
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Exhibit I	Visual Resources Report

## **COMMONLY USED ACRONYMS and ABBREVIATIONS**

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AC	Alternating Current
Board	Ohio Power Siting Board
DC	Direct Current
DSM	Digital Surface Model
EMF	Electromagnetic Field
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
HDD	Horizontal Directional Drilling
ISA	Interconnection Service Agreement
kV	Kilovolt
kW	Kilowatt
LIDAR	Light Detection and Ranging
MW	Megawatt
MW-ac	Megawatt-alternating current
NPDES	National Pollutant Discharge and Elimination System
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
PILOT	Payment in lieu of taxes
PV	Photovoltaic
PJM	PJM Interconnection, LLC
QEP	Qualified Energy Project
SWPA	Source Water Protection Area
SWPPP	Storm-water Pollution Prevention Plan

## I. INTRODUCTION

This Application for a Certificate of Environmental Compatibility and Public Need (“Application”) is submitted to the Ohio Power Siting Board (“Board”) by Alamo Solar I, LLC (“Applicant”) pursuant to Chapters 4906-3 and 4906-4 of the Ohio Administrative Code. The Application seeks a Certificate of Environmental Compatibility and Public Need (“Certificate”) to construct and operate the Alamo Solar Farm, which is a proposed solar-powered electric generation facility of up to 69.9 megawatts (alternating current) in capacity in Preble County, Ohio (“Project”).

Applicant seeks to construct and operate the Project within an approximately 1002.5-acre area (“Project Area”). Note that this Application seeks approval for 69.9 megawatts of installed capacity, but studies panel locations which can accommodate an 89.9 MWac project size in the Project Area which provides the Applicant with flexibility in locating panels after final engineering is complete. The final layout of the 69.9 megawatt Project within the Project Area has yet to be determined. As noted below, the final design will be submitted to the Board prior to the beginning of construction.

At a capacity of 69.9 megawatts (“MW”), the Project will generate power without the need for any pipelines or using any fuel. The Project will not use any appreciable amount of water, and it will not generate any air pollution, water pollution, or hazardous waste. The equipment comprising the Project will have very few moving parts and will make almost no sound. With only minimal disturbance of topsoil and few underground foundations, the Project will require very few changes to the land surface, and will productively utilize existing, open agricultural fields to diversify the income sources of area families.

This Application addresses each of the substantive requirements of Chapter 4906-4. For ease of review, the Application quotes each of the relevant specific regulatory requirements (under the heading “OPSB Application Requirement” and in italics) for each subject addressed in Chapter 4906-4. The Application then provides, under the heading “Response,” information responsive to that specific requirement. In some instances, the Application provides an explanation of why Applicant believes that a particular requirement does not apply to the Project.

## II. PROJECT SUMMARY AND APPLICANT INFORMATION

### A. SUMMARY OF PROPOSED PROJECT

#### OPSB Application Requirement [4906-4-02(A)]:

*“(A) The applicant shall provide a summary of the proposed project. The summary should be suitable as a reference for state and local governments and for the public. The summary shall include the following:*

- (1) A statement explaining the general purpose of the facility.*
- (2) A description of the general location, size, and operating characteristics of the proposed facility.*
- (3) A discussion of the suitability of the site for the proposed facility.*
- (4) An explanation of the project schedule (a Gantt chart is acceptable).”*

#### Response:

##### [4906-4-02(A)(1)]

The general purpose of the Project is to use large arrays of ground-mounted photovoltaic (“PV”) modules, commonly known as solar panels, to generate clean and quiet renewable electricity for ultimate use by consumers in southwestern Ohio. The Project will provide “on peak” power during the high demand period of mid-day and late afternoon. It also will provide employment opportunities throughout the region and State, as well as substantial annual tax revenues to the residents of Preble County.

##### [4906-4-02(A)(2)]

The Project will be located in Preble County, Ohio, approximately 3 miles southwest of Eaton. It will supply wholesale power to the 69-kilovolt (“kV”) “Camden-to-Crystal I” transmission line (“point of interconnection” or “POI”), which is owned and operated by Dayton Power and Light, Inc. (“DPL”). The POI is located approximately 1,000 feet north of Antioch Road just east of its intersection with Call Road. The Project will occupy up to 919 acres of private land within a larger area of approximately 1002.5 acres. It will have the capacity to generate up to 69.9 MW-alternating current (“MWac”) of electricity.

The Project will generate electricity using solar panels. Photons in sunlight will strike the semiconducting material in the solar panels, which will excite electrons and generate direct electric current (“DC”). DC will be converted to alternating electric current (“AC”) and the voltage will be increased. The electricity will be gathered through a network of buried wires at a Project-level electric substation (“Substation”). The Substation will further increase the voltage and deliver the power through a short transmission line to the POI.

[4906-4-02(A)(3)]

The Project Area is ideal for a utility-scale solar farm because it is adjacent to a point in the regional transmission system at which power can be supplied without the need for substantial and costly upgrades to that system. Use of the Project Area will enable the generation of large amounts of solar power because it is generally level, open and dry. The Project also will minimize impacts to natural resources because most of the Project Area is annually disturbed by active cultivation.

[4906-4-02(A)(4)]

The schedule for development of the Project, which began in 2016, is well-advanced. Acquisition of the necessary land rights is complete, and survey and title work are well underway. Natural resources studies and associated field surveys are complete. It is anticipated that the interconnection study process for the Project will be concluded in Q2 2019. An interconnection agreement is expected to be in place by Q3 2019. Pending receipt of the Certificate and other required authorizations, Applicant plans to begin construction of the Project in Q4 of 2019, and construction would proceed throughout 2019 and most of 2020. The Project is expected to start commercial operations no later than December 2020.

**B. FUTURE PLANS FOR ADDITIONAL GENERATION UNITS IN REGION**

*OPSB Application Requirement [4906-4-02(B)]:*

*“(B) The applicant shall provide information regarding its future plans for additional generation units or facilities in the region, if any.*

*(1) The applicant shall provide a description of any plans for future additions of electric power generation units for the site (including the type and timing) and the maximum electric power generation capacity anticipated for the site.*

*(2) The applicant shall provide a brief description of the applicant's history, affiliate relationships and current operations, and a description of the company that will construct and operate the facility, if different from the applicant.”*

Response:

[4906-4-02(B)(1)]

Applicant seeks a Certificate to construct and operate the Project at 69.9 MWac in capacity within the Project Area. Applicant plans to submit an amendment to the Board in 2019 to add 20 MWac of generation to the Project, for a total of 89.9 MWac. Applicant has no current plans for the generation capacity to be constructed within the Project Area to exceed 89.9 MWac. The additional 20 MWac will not increase the size of the Project Area or the maximum acreage or location of acreage potentially impacted by the Project.

[4906-4-02(B)(2)]

Applicant is owned by Blue Planet Renewable Energy, LLC, which in turn is a joint venture partnership between MAP Energy, Inc. (“MAP”) and Open Road Renewables, LLC (“Open Road”) (together, the “Partners”). MAP is one of the most experienced private renewable energy investors in the U.S. with successful investments to date in over 6,000 MWac of operating wind and solar projects. Open Road is a focused developer of utility-scale solar projects whose principals have successfully originated approximately 100 MWac of operating projects in California and a number of operating projects in the regional transmission area served by PJM Interconnection, LLC (“PJM”). Open Road’s principals also developed a 75 MWac project in Maryland. MAP has worked with Open Road’s principals on a variety of utility-scale renewable energy projects for approximately eight (8) years.

The Partners invest in and develop renewable energy projects, but the Applicant is not anticipated to construct and operate the Project. The Applicant anticipates selecting the company that will construct the Project through a competitive process. Likewise, it has not selected the firm that will operate the Project for the Applicant, but plans to make the selection from a well-known group of top tier providers. The Partners have collaborated with most of the leading construction and operation companies active in the utility-scale renewable energy industry in the U.S.

### **III. DETAILED PROJECT DESCRIPTION AND SCHEDULE**

#### **A. DESCRIPTION OF PROJECT AREA**

##### OPSB Application Requirement [4906-4-03(A)]:

*“(A) The applicant shall provide a description of the project area's geography, topography, population centers, major industries, and landmarks.*

*(1) The applicant shall provide a map of at least 1:24,000 scale containing a two-mile radius from the project area and showing the following features:*

*(a) The proposed facility.*

*(b) Population centers and administrative boundaries.*

*(c) Transportation routes and gas and electric transmission corridors.*

*(d) Named rivers, streams, lakes, and reservoirs.*

*(e) Major institutions, parks, and recreational areas.*

*(2) The applicant shall provide the area, in acres, of all owned and leased properties that will be used for construction and/or operation of the project, and the number of properties.”*

##### Response:

##### [4906-4-03(A)(1)]

The Project Area is located in Gasper and Washington Townships in Preble County, Ohio. It is located south of State Route 732, west of U.S. Route 127, north of

Mann Road, and east of Paint Creek Road. The Project Area is in close proximity to the Preble County Sanitary Landfill.

The land within the Project Area has been mostly cleared for agriculture and is extremely level. The predominant industry is agriculture. The Project Area is rural and is largely characterized by medium- to large-sized farms with interspersed pockets of trees. Undeveloped land includes actively cultivated fields, small blocks and rows of trees and other vegetation, and old fields. Existing features in the Project Area include electric transmission lines, a communications tower, public roads, single family homes and farm buildings. The Project Area itself does not include any population centers, major industries or notable landmarks.

A map depicting the two-mile area surrounding the Project Area and including each of the features required above is attached as **Figure 1**. The map, which shows an area that is two (2) miles in radius around the Project Area, includes the following: (1) the proposed facility; (2) population centers; (3) administrative boundaries; (4) transportation routes; (5) electric transmission corridors; (6) named rivers, streams, lakes and reservoirs; and (7) major institutions, parks, and recreation areas. No gas transmission lines occur within a 2-mile radius of the Project Area.

[4906-4-03(A)(2)]

The total area of all properties that are leased (or will be purchased pursuant to options) and that is available for use for construction and/or operation of the Project is approximately 1002.5 acres. This total is comprised of 23 separate properties. Applicant expects to use up to 919 acres of this amount for construction and operation of the Project.

**B. DESCRIPTION OF PROPOSED PROJECT**

**1. DESCRIPTION OF GENERATION EQUIPMENT**

OPSB Application Requirement [4906-4-03(B)(1)]:



*“(1) The applicant shall submit the following for each generation equipment alternative, where applicable:*

*(a) Type, number of units, estimated net demonstrated capacity, heat rate, annual capacity factor, and hours of annual generation.*

*(b) For wind farms, the turbine hub height, tip height, rotor diameter, and blade length for each model under consideration.*

*(c) Fuel quantity and quality (i.e., ash, sulfur, and British thermal unit value).*

*(d) A list of types of pollutant emissions and estimated quantities.*

*(e) Water volume requirement, source of water, treatment, quantity of any discharge and names of receiving streams.”*

Response:

[4906-4-03(B)(1)(a)]

The generation equipment to be used by the Project are solar panels, and no alternatives are being considered. The basic components of the Project will be solar panels mounted on metal racking, inverters to convert DC to AC, transformers to increase electric voltage, a network of buried cables to collect the power, the Substation, a very short transmission line, roads and pyranometers. Each of these components is described below.

*Solar Panels and Racking*

The Project will generate electricity with conventional solar panels, which will be affixed to metal racking. The racking will be mounted on piles that will be driven or rotated into the ground in long rows or “arrays.” The arrays generally will follow the existing topography of the land in the Project Area, although some minor grading may occur. Arrays will be grouped in several large clusters, each of which will be fenced, with locked gates, for equipment security and public safety (“solar field”).

Each of the Project’s arrays will use one of two types of racking: “fixed-tilt” or “tracking.” Fixed-tilt racking will be stationary, and each array will run in an east-west direction. Solar panels mounted on fixed-tilt racking will be oriented or “titled” to the south, with the low (southern) end of the panel one (1) to three (3) feet above the ground surface and the high (northern) end of the panel eight (8) to fourteen (14) feet above the ground

surface. Fixed solar panels will be tilted at an angle based on the latitude of the Project Area to maximize the amount of sunlight that strikes them.

Tracking arrays will run in a north-south direction and be equipped with electric motors that very slowly rotate the panels throughout the day to keep them perpendicular to the angle of the sunlight. Tracking arrays will face east at sunrise, rotate to the west during the day, face west at sunset, and then re-set to the east. At the beginning and ending positions of each day, the low end of the solar panels will be one (1) to three (3) feet, and the high end of the panels will be eight (8) to 14 feet, above the ground surface.

The solar panel technology for the Project will be one of two basic types: crystalline or thin-film. Crystalline modules are silicon-based. Thin-film modules use one of several alternative chemistries (such as cadmium telluride or copper indium gallium selenide). Crystalline modules cost more to manufacture than thin-film modules, but are more efficient. Most racking systems, whether fixed-tilt or tracking, will accommodate either crystalline or thin-film modules.

Although the specific model of solar panel has not been selected, only “Tier 1” equipment will be used for the Project. At a capacity of 69.9 MWac, the Project will use approximately 186,400 to 279,600 solar panels. (There is no heat rate associated with solar panels.) The solar panels will operate 8,760 hours per year, although they will produce no electricity during the night. They also will produce little to no electricity during periods of heavy clouds and during and briefly following significant snowfall. Depending on the choice of racking and the solar panel, the anticipated annual net capacity factor for the Project is anticipated to be from 23% to 25%. Accounting for the total generating capacity of 69.9 MWac, anticipated operating times, and panel capacity factors, the Project will generate between 140,835 to 153,081 megawatt-hours (“MWh”) of electricity each year. The Project’s year one net capacity factor when using industry-leading Tier 1 thin film modules mounted on single axis tracker is projected to be approximately 23.7%, resulting in the generation of 145,121 MWh of electricity.

### *Collection Lines and Inverters*

Within each solar field, a network of electric lines and associated communication lines will collect and transmit the power (“collection lines”). Solar panels will be grouped into series of circuits that are routed, through cable trays on the racking, to combiner boxes. Power from one or more of the combiner boxes then will be transmitted to a group of related components: a DC-to-AC inverter, a step-up transformer that increases the voltage to 34.5 kV, and a cabinet containing power control electronics (“inverter”). The equipment comprising each inverter will be mounted on a pre-fabricated foundation such as a metal skid or a concrete block.

Each inverter will deliver AC power through collection lines to the Substation, which will be separately fenced. Each of these collection lines will originate in one of the solar fields and terminate at the Substation. All portions of the collection lines not within fence lines will be buried at least 36 inches below grade.

### *Substation and Gen-tie*

The Substation will be located adjacent to and immediately east the POI. Among the major components of the Substation will be the following: (1) collection line feeders and breakers; (2) 34.5 kV bus; (3) main power transformer (to increase the voltage from 34.5 kV to 69 kV); (4) high-voltage breaker; (5) metering/relaying transformers; (6) disconnect switches; (7) equipment enclosure containing power control electronics; and (8) a lightning mast. The Substation will be constructed on a concrete foundation that is expected to be a maximum of 50,000 square feet in size (e.g., 200 feet by 250 feet). For equipment security and public safety, a fence with a locked access gate will be installed around the perimeter.

A very short 69 kV transmission line will connect the Substation to the east side of the POI (“gen-tie”). The gen-tie will be a maximum of 300 linear feet in length, and approval of the gen-tie is requested through this Application as an associated facility. A self-supporting, steel structure (known as a “dead-end structure”), which represents the POI, will connect the gen-tie to the 69 kV transmission line. The dead-end structure is expected to be from 20 to 25 feet in height.

### *Roads*

The Project will include a number of unpaved roads and driving aisles within the fence lines comprised of aggregate material and/or grass used to access each solar field. Short driveways will connect these Project-dedicated roads to public roads at one or more points for each solar field. Roads will be used for the operations, maintenance, repair, and replacement of equipment in addition to providing sufficient access for emergency response. Roads will be only as long and as wide as necessary to accommodate construction and operational activities. Roads will be a maximum of 16 feet wide, although some may temporarily be up to 25 feet wide to accommodate construction.

### *Pyranometers*

The Project will include up to five (5) solar meteorological stations, which will include pyranometers that measure solar resource, ancillary meteorological instruments such as an anemometer, a wind vane, a barometer, a rain bucket and a temperature probe, as well as associated communications equipment (“pyranometer”). Each of the instruments comprising a pyranometer will be installed on a pre-fabricated foundation or directly on the ground and will be less than 15 feet in height. Each pyranometer will occupy up to 138 square feet and, if not located within a solar field, will be separately fenced and gated.

### [4906-4-03(B)(1)(b)-(e)]

Subsections (b) through (e) are not applicable to the Project. Subsections (b), (c) and (d) do not apply because the Project will not include wind turbines, use any fuel, or emit any stationary source air emissions. With regard to Subsection (e), the Project will use only an extremely small volume of water for occasional cleaning of solar panels, which will be trucked to the Project or acquired from a nearby source. There will be no discharges of wastewater, wastewater treatment, or receiving streams.

## **2. CONSTRUCTION AND RECLAMATION METHODS**

### OPSB Application Requirement [4906-4-03(B)(2)]:

*“(2) The applicant shall describe, in as much detail as is available at the time of submission of the application, the construction method, site preparation and reclamation method, materials, color and texture of surfaces, and dimensions of all facility components, including the following:*

*(a) Electric power generation plant or wind-powered electric generation turbines, including towers and foundations.*

*(b) Fuel, waste, water, and other storage facilities.*

*(c) Fuel, waste, water, and other processing facilities.*

*(d) Water supply, effluent, and sewage lines.*

*(e) Associated electric transmission and distribution lines and gas pipelines.*

*(f) Electric collection lines.*

*(g) Substations, switching substations, and transformers.*

*(h) Temporary and permanent meteorological towers.*

*(i) Transportation facilities, access roads, and crane paths.*

*(j) Construction laydown areas.*

*(k) Security, operations, and maintenance facilities or buildings.*

*(l) Other pertinent installations.”*

Response:

[4906-4-03(B)(2)(a) & (e)-(j)]

The Project will include one or more of the components listed in subsections (a) and (e) through (j) above.

The method that will be used to construct the Project will be similar to that generally used in the U.S. to construct similar, large-scale, ground-mounted solar facilities generating wholesale power. The primary steps will be the following: (1) securing of the perimeter of each of the areas in which construction will occur; (2) installation of storm-water and erosion management controls; (3) clearing vegetation; (4) minor grading, if any; (5) construction of roads; and (6) installation of equipment (racking, solar panels, collection lines, inverters, pyranometers, the Substation and fencing).

Other than the Substation, and because the solar panels will be affixed to racking largely using hand tools, the major equipment used to construct the Project will include bulldozers and dump trucks (primarily to build roads), pile drivers (primarily to install piles), trenchers (primarily to lay the buried portions of the collection lines), and possibly a directional drilling system (to place portions of the collection lines under water bodies). A more detailed description of the steps comprising construction is provided below in connection with the schedule for the Project.

For several reasons, the land within the Project Area that will host the equipment will require relatively little work to prepare it for construction. First, relatively little land will need to be cleared of vegetation. Most of the Project Area consists of previously disturbed land that has been in active cultivation for many years. Also, the design of the solar fields will obviate the need to remove the vast majority of trees in the Project Area, particularly those associated with wetlands or containing potential wildlife habitat. Finally, only minimal grading will be required because the Project Area already is extremely level. Specific methods to be used to remove trees and vegetation and perform minimal grading have not been determined but will be standard, accepted methods for the commercial construction industry. The vast majority of the land surface within each solar field, including almost all of the area below the arrays themselves, will be planted with a robust, low-growing seed mix, primarily native grasses and other low-maintenance varieties.

The construction of the Project is expected to require a number of temporary laydown areas, also referred to in the Figures as laydown yards, for construction staging, equipment storage, and parking for workers. The laydown areas generally will be located adjacent to public roads, and usually will be located adjacent to the entrances to the solar fields. Each of the laydown areas will range from approximately one (1) to five (5) acres in size, and collectively are expected to occupy up to 16 acres. Up to approximately 11 acres of the laydown yards are temporary features associated with the construction of the Project and will be restored following construction to the extent the area does not host components of the Project.

The proposed Project includes several narrow corridors of land to host the collection lines outside of fence lines. The collection lines will be buried at a minimum

depth of three (3) feet. The collection lines will be installed via open cut method or horizontal directional drilling (“HDD”), depending on the location. HDD will be used to install collection lines under perennial streams.

Up to 11.8 miles of access roads will be utilized for construction, operation and maintenance of the Project. Roads will be comprised of aggregate material and/or grass. Roads will be only be as long and as wide as necessary to accommodate construction and operational activities. All permanent Access Roads will be a maximum of 16 feet wide, though a number of roads may temporarily be up to 25 feet wide to accommodate construction activities.

The specific materials, and the associated textures and colors, to be used in the components of the Project have not yet been determined, but will be typical of other large-scale, ground-mounted solar projects in the U.S. Racking will be largely metal, such as aluminum, and will have a smooth texture and be of a grey or silver color. Panels will be comprised of the materials previously described, with the exterior layer consisting of a glass cover within a metal frame. Generally, panels have a relatively smooth texture and are black or another dark color. Buried electrical and communication lines will be made of copper or other materials standard in the electric utility industry. Fencing is expected largely to be standard, chain-link material. The dimensions of the components of the Project have been provided in Section III.B.1 of the Application, above.

Applicant holds land rights to operate the Project for up to 40 years, and the Project is expected to operate for at least that period of time. At the end of that period, Applicant would expect to either re-power the Project with state-of-the-art PV technology, which would require the consent of the participating land owners, or remove the Project and return the land to approximately its original condition. If the Project is removed, then the materials would be reused or recycled to the extent possible, and the remaining materials disposed of in a sanitary landfill. With very few concrete foundations, the equipment less than three (3) feet below grade can be removed and the land restored to essentially its original condition. If the participating land owners prefer, the land can be returned to cultivation.

[4906-4-03(B)(2)(b)-(d), (k) & (l)]

Subsections (b), (c), (d) and (k) are not applicable to the Project. Specifically, the Project does not include any of the following: (1) fuel, waste, water or other storage facilities; (2) fuel, waste, water or other processing facilities; (3) water supply, effluent and sewage lines; or (4) buildings. Regarding subsection (l), there are no significant installations associated with the Project not otherwise addressed above.

### **3. NEED FOR NEW TRANSMISSION**

OPSB Application Requirement [4906-4-03(B)(3)]:

*“(3) The applicant shall submit a brief description of the need for new electric transmission lines(s) or gas pipelines associated with the proposed facility.”*

Response:

[4906-4-03(B)(3)]

The only new transmission line associated with the Project will be the gen-tie, which will be less than 300 feet in length. The gen-tie line will transmit the energy from the Substation to the POI, and approval of the gen-tie is requested through this Application as an associated facility. The Project will not use natural gas or include any gas pipelines.

### **4. PROJECT MAP**

OPSB Application Requirement [4906-4-03(B)(4)]:

*“(4) The applicant shall supply a map of at least 1:12,000 scale of the project area, showing the following features:*

*(a) An aerial photograph.*

*(b) The proposed facility, including all components listed in paragraph (B)(2) of this rule.*

*(c) Road names.*



*(d) Property lines.”*

Response:

[4906-4-03(B)(4)]

Applicant seeks authorization to construct the Project, at a maximum capacity of 69.9 MWac, within the Project Area. The Project Area is divided into three (3) different use categories. First, the Substation will be located on a specific parcel of land adjacent to and immediately east of the POI. Second, several narrow strips of land will host only buried portions of collection lines located outside fence lines. Finally, the remaining portions of the Project Area are available to host the solar fields, which will include all of the remaining components of the Project: solar panels, inverters, collection lines, roads, and pyranometers.

A map with a satellite-generated aerial photograph background showing a maximum layout of the Project is attached as **Figure 2**. The map shows the locations of the parcel hosting the Substation, the corridors for the collection lines and the solar fields. The map also shows the road names, property lines, and each of the major features of the Project in relation to the above three categories of land.<sup>1</sup>

Prior to the start of construction, Applicant will submit to the Board for its review final designs for the Project. These final designs will address all of the following:

- (1) the location of the Substation and gen-tie and the termination of the collection lines within the parcel hosting the Substation;
- (2) the location of the collection lines within the corridors outside fence lines;
- (3) the perimeters of each solar field;
- (4) the orientation (north-south or east-west) of the arrays within each solar field;

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<sup>1</sup> The solar fields are depicted at their maximum aerial extent, but in one or more areas may not extend as far as indicated. Similarly, the depictions of the specific components within each solar field are illustrative only; the final locations will be determined in the final design of the Project.

(5) the location of the arrays, the collection lines, the inverters, and the roads within each solar field;

(6) the type of racking (fixed-tilt and/or tracking);

(7) the solar panel technology (crystalline and/or thin-film);

(8) the location of the roads within the Project Area; and

(9) the specific component manufacturers and equipment vendors.

The Application has been prepared to present the Project at its maximum aerial extent within the Project Area and, therefore, its broadest and most significant impact. Applicant has conducted the necessary studies for the Project Area to facilitate the use of any portion of it for the Project. To illustrate the maximum possible impact of the Project from any vantage point in the general area, **Figure 2** depicts potential solar array areas (i.e., the maximum extent of north-south running arrays using tracking technology with thin-film panels), the Substation, and representative locations of collection lines, roads, pyranometers, and construction laydown yards (staging areas).

Although not reflected in the scale of the above map, most of the land surface within each solar field will be open space. Open space between arrays is necessary to preclude them from blocking sunlight to each other. Space around arrays and inverters also is needed to allow for the cleaning of panels, the performance of routine inspection, maintenance, and the repair, and the replacement of major components. Finally, open space is needed to maintain the ground cover.

### **C. PROJECT SCHEDULE**

#### *OPSB Application Requirement [4906-4-03(C)]:*

*“(C) The applicant shall provide a detailed project schedule.*

*(1) The applicant shall provide a proposed project schedule in Gantt chart format covering all major activities and milestones, including:*

*(a) Acquisition of land and land rights.*

*(b) Wildlife and environmental surveys/studies.*

*(c) Receipt of grid interconnection studies and other critical path milestones for project construction.*

*(d) Preparation of the application.*

*(e) Submittal of the application for certificate.*

*(f) Issuance of the certificate.*

*(g) Preparation of the final design.*

*(h) Construction of the facility.*

*(i) Placement of the facility in service.*

*(2) The applicant shall describe the proposed construction sequence.*

*(3) The applicant shall describe the potential impact of critical delays on the in-service date.”*

**Response:**

**[4906-4-03(C)(1)]**

A detailed schedule for the Project in Gantt chart format that includes each of the elements listed above is attached as **Figure 3**.

**[4906-4-03(C)(2)]**

The proposed sequence of construction of the Project is as follows:

- (1) surveying and staking of sensitive areas, perimeters, foundations for roads, and equipment locations;
- (2) clearing, ground leveling, compaction and grading;
- (3) installation of drainage and erosion control;
- (4) installation of perimeter fencing and lighting;
- (5) construction of roads;
- (6) installation of temporary power;
- (7) delineation of temporary storage and construction areas;

- (8) installation of temporary facilities;
- (9) installation of foundations (for the Substation, inverters, and pyranometers);
- (10) installation of the Substation and gen-tie;
- (11) installation of supports, racking and modules;
- (12) installation of inverters;
- (13) installation of collection lines;
- (14) installation of pyranometers;
- (15) installation of lighting and signage;
- (16) clean-up of work areas; and
- (17) landscaping.

Many of the above activities may occur concurrently.

[4906-4-03(C)(3)]

Certain critical delays in the development of the Project may have a material, adverse effect on Applicant's efforts to secure equity investment for it and finance its construction by the planned in-service date. These critical delays could include Applicant's inability to timely acquire solar panels, racking, inverters or transformers, permitting delays, and labor shortages. Postponement of the start of construction could affect the Project's eligibility for certain financial incentives, such as the full value of the federal Investment Tax Credit.

#### **IV. PROJECT AREA SELECTION AND SITE DESIGN**

##### **A. SELECTION OF PROJECT AREA**

OPSB Application Requirement [4906-4-04(A)]:

*“(A) The applicant shall describe the selection of the project area.*

*(1) The applicant shall provide a description of the study area or the geographic boundaries of the area considered for development of the project, including the rationale for the selection.*

*(2) The applicant shall provide a map of suitable scale that depicts the boundary of the study area and the general sites which were evaluated.*

*(3) The applicant shall provide a comprehensive list and description of all qualitative and quantitative siting criteria utilized by the applicant, including any weighting values assigned to each.*

*(4) The applicant shall provide a description of the process by which the applicant utilized the siting criteria to determine the proposed project area and any alternative area(s).*

*(5) The applicant shall provide a description of the project area(s) selected for evaluation, and the factors and rationale used by the applicant for selecting the proposed project area and any alternative area(s)."*

Response:

[4906-4-04(A)(1) & (2)]

Applicant chose to develop the Project in southwestern Ohio for several reasons including an attractive combination of strong electricity demand, a robust transmission system, and a strong solar resource. First, the Project is in close proximity to the metropolitan areas of Cincinnati and Dayton, which represent a strong regional demand for electricity. A map depicting the general location of the Project Area is attached as **Figure 4**. Second, transmission resources in the area have sufficient capacity to accommodate development of the Project. Finally, as shown on the map attached as **Figure 5**, the solar resource in southwestern Ohio is among the best in the State.

Within this region, the study area was determined largely by the location of the POI substation. Economically feasible solar facilities must be located where the power can be injected without costly upgrades to the transmission system. Applicant's preliminary studies indicated that delivering power through the POI would be highly cost-effective. As addressed further below, this has been confirmed by the transmission studies conducted by PJM Interconnection, Inc ("PJM").

A map depicting the study area boundary and general sites that were evaluated for the Project is attached as **Figure 6**. The selection of the POI as the point to inject

power necessarily limited the study area to the properties within a radius of approximately three (3) miles of the POI. Siting the Project in proximity to the POI avoided the need to construct a transmission line connecting the solar panels to the transmission system. It also reduced the potential electrical losses of collecting the power far from the POI.

[4906-4-04(A)(3), (4) & (5)]

Once the POI was selected as the point of interconnection, the location of the Project largely was determined by several siting criteria. First, the land needed to be relatively level, previously disturbed, and dry. Second, the land needed to be contiguous to or in close proximity to other, similarly suitable parcels. Third, Applicant wanted to minimize any impacts to sensitive features such as streams, wetlands and potential wildlife habitat. Finally, individual property owners made their own personal decisions on whether to host the Project. These criteria were not assigned particular weights; rather, each played a similar role in determining the location of the Project within the study area.

As noted above, the critical factor in determining the study area was the identification of the POI as a promising point of interconnection in southwest Ohio. Having made this determination, the siting process was to determine the location of the Project, within the study area, based on the more parcel-specific criteria set forth above. From this two-step process, Applicant decided to pursue development of the Project within the Project Area.

Applicant is not presenting for consideration any alternative locations for the Project, either within the study area or southwestern Ohio generally. Rather, the only proposed location for the Project is the Project Area.

**B. PROCESS OF DESIGNING PROJECT LAYOUT**

OPSB Application Requirement [4906-4-04(B)]:

*“(B) The applicant shall describe the process of designing the facility layout.*

*(1) The applicant shall provide a constraint map showing setbacks from residences, property lines, utility corridors, and public rights-of-way, and any other constraints of the site design.*

*(2) The applicant shall provide a description of the criteria used to determine the facility layout and site design, and a comparison of any site design alternatives considered, including equipment alternatives where the use of such alternatives influenced the site design.*

*(3) The applicant shall provide a description of how many and what types of comments were received.”*

Response:

[4906-4-04(B)(1)]

A map showing constraints that influenced the design of the Project is provided in **Figure 7**. The constraints shown on the map include those listed above: setbacks from residences, property lines, utility corridors, and public rights-of-way. The map also shows additional constraints Applicant considered, such as streams, wetlands, and larger woodlots that could be potential wildlife habitat.

[4906-4-04(B)(2)]

The Project Area was designed to work with willing land owners to accommodate solar panels that will produce electricity at the lowest cost while also accounting for a variety of site-specific constraints. The specific parcels chosen to host the Project reflect the same factors that favored the Project Area within the large study area: (1) relatively level, previously cleared and disturbed, and dry; (2) close to other parcels; and (3) avoidance or minimization of impacts to sensitive features (such as streams, wetlands and larger blocks of potential wildlife habitat). Also, the layout necessarily was significantly influenced by the decisions of individual property owners whether to participate.

Because ground-mounted solar panels are modular in nature, they are well-suited to accommodating a variety of spatial site constraints. It was not necessary, therefore, for Applicant to consider alternative site designs or equipment. Rather, within the larger areas

surrounding the Project Area, which is generally level, cleared and dry, it was merely necessary for the Project Area to conform to the various constraints.

[4906-4-04(B)(3)]

In compliance with Board requirements, Applicant held a public informational meeting regarding the Project on November 13, 2018. The meeting was held at the Preble County Fairgrounds in Eaton, which is the county seat. In addition to visual displays about the Project and general information about solar energy, Applicant displayed the required map showing the proposed Project at a scale sufficient to allow affected property owners to identify their property in relation to it.

No written comments raising concerns about the proposed Project were submitted during the meeting. Applicant received oral comments raising concerns related to the Project's visual appearance and potential mitigation measures. These issues are addressed in this Application. Specifically, questions related to visual appearance and potential mitigation measures are discussed in Section VIII.D.

## **V. ELECTRIC GRID INTERCONNECTION**

### **A. CONNECTION OF PROJECT TO REGIONAL ELECTRIC GRID**

OPSB Application Requirement [4906-4-05(A)]:

*"(A) The applicant shall describe how the facility will be connected to the regional electric grid."*

Response:

[4906-4-05(A)]

The Project will connect to the regional electric grid through a new connection to the POI, specifically through the gen-tie for which the Applicant is seeking approval through this Application as an associated facility. From the POI, the power will be supplied to the service territory of DP&L, which covers Dayton and a substantial portion of



southwestern Ohio, and is part of the multi-state, regional transmission system managed by PJM.

## **B. INFORMATION ON INTERCONNECTION OF PROJECT**

OPSB Application Requirement [4906-4-05(B)]:

*“(B) The applicant shall provide information on interconnection of the facility to the regional electric power grid.*

*(1) The applicant shall provide information relating to their generation interconnection request, including interconnection queue name, number, date, and website.*

*(2) The applicant shall provide system studies on their generation interconnection request. The studies shall include, but are not limited to, the feasibility study and system impact study.”*

Response:

[4906-4-05(B)(1)]

Applicant applied in 2017 to PJM to interconnect 49.9 MWac of solar generation, through the POI, to the DP&L system. PJM assigned the application Queue No. AC2-067 under the name “Camden-Crystal I 69 kV.” In 2017, Applicant also applied to PJM to interconnect an additional 20 MWac of solar generation through the POI to the DP&L system. PJM assigned this application Queue No. AC2-068 under the name “Camden-Crystal II 69 kV.” These two queue applications, totaling 69.9 MWac, is the basis on which the current Application has been filed. In 2018, Applicant applied to PJM to interconnect an additional 20 MWac of solar generation through the POI to the DP&L system. PJM assigned this application Queue No. AE1-007 under the name “Camden-Crystal III 69 kV.” As noted above, Applicant expects to file an application to formally incorporate this queue position into the Project. Information on these queue positions is available at:

<https://www.pjm.com/planning/services-requests/interconnection-queues.aspx>

[4906-4-05(B)(2)]

PJM completed the Generation Interconnection Feasibility Study Report for PJM Generation Interconnection Request Queue Position AC2-067 Camden-Crystal I 69 kV (“49.9 MWac Feasibility Study Report”) for the Project in July 2017. It completed the Generation Interconnection System Impact Study Report for PJM Generation Interconnection Request Queue Position AC2-067 Camden-Crystal I 69 kV (“49.9 MWac System Impact Report”) for the Project in February 2018. Copies of these reports are attached as part of **Exhibit A** and **Exhibit B**, respectively, and the PJM website locations for them is as follows:

[https://www.pjm.com/pub/planning/project-queues/feas\\_docs/ac2067\\_fea.pdf](https://www.pjm.com/pub/planning/project-queues/feas_docs/ac2067_fea.pdf)

[https://www.pjm.com/pub/planning/project-queues/impact\\_studies/ac2067\\_imp.pdf](https://www.pjm.com/pub/planning/project-queues/impact_studies/ac2067_imp.pdf)

PJM completed the Generation Interconnection Feasibility Study Report for PJM Generation Interconnection Request Queue Position AC2-068 Camden-Crystal II 69 kV (“69.9 MWac Feasibility Study Report”) for the Project in July 2017. It completed the Generation Interconnection System Impact Study Report for PJM Generation Interconnection Request Queue Position AC2-068 Camden-Crystal II 69 kV (“69.9 MWac System Impact Report”) for the Project in February 2018. Copies of these reports also are attached as part of **Exhibit A** and **Exhibit B**, respectively, and the PJM website locations for them is as follows:

[https://www.pjm.com/pub/planning/project-queues/feas\\_docs/ac2068\\_fea.pdf](https://www.pjm.com/pub/planning/project-queues/feas_docs/ac2068_fea.pdf)

[https://www.pjm.com/pub/planning/project-queues/impact\\_studies/ac2068\\_imp.pdf](https://www.pjm.com/pub/planning/project-queues/impact_studies/ac2068_imp.pdf)

These reports confirm that the Project can be constructed and operated with a generating capacity up to 69.9 MWac without requiring costly “network upgrades” to the regional transmission system. PJM currently is conducting a combined “facility study” for these two queue positions, which is expected to be completed in Q1 2019.

PJM also is expected to complete the Feasibility Study Report for Queue No. AE1-007 in the near future, after which PJM will commence the System Impact Study for this queue position. A copy of the Feasibility Study Report and the System Impact Study

Report for Queue Position AE1-007 will be provided to the Board in support of the future application to add 20 MWac to the Project.

## **VI. ECONOMIC IMPACT AND PUBLIC INTERACTION**

### **A. CURRENT AND PROPOSED OWNERSHIP STATUS OF PROJECT**

OPSB Application Requirement [4906-4-06(A)]:

*“(A) The applicant shall state the current and proposed ownership status of the proposed facility, including leased and purchased land, rights-of-way, structures, and equipment.”*

Response:

[4906-4-06(A)]

Applicant owns all of the assets that comprise the Project or will be used to construct, own and operate the Project. Applicant holds all the development rights (lease, easements and options-to-purchase) for over 90% of the land in the Project Area and rights of access to the remainder. Applicant has either the right to buy the land or exclusively occupy it for 40 years to build and operate the Project. Other assets comprising the Project include contracts, solar data, studies, and reports. All structures and equipment that will comprise the Project will be acquired in the future.

Applicant will own the Project but plans to hire third parties to construct and to operate it.

### **B. CAPITAL AND INTANGIBLE COSTS**

OPSB Application Requirement [4906-4-06(B)]:

*“(B) The applicant shall provide information regarding capital and intangible costs.*

*(1) The applicant shall provide estimates of applicable capital and intangible costs for the various alternatives. The data submitted shall be classified according to federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for utility companies, unless the applicant is not an electric light company, a gas*

company or a natural gas company as defined in Chapter 4905 of the Revised Code (in which case, the applicant shall file the capital and intangible costs classified in the accounting format ordinarily used by the applicant in its normal course of business).

(2) The applicant shall provide a comparison of the total costs per kilowatt with the applicant's similar facilities, and explain any substantial differences.

(3) The applicant shall provide a tabulation of the present worth and annualized cost for capital costs and any additional cost details as required to compare capital cost of alternates (using the start of construction date as reference date), and describe techniques and all factors used in calculating present worth and annualized costs."

Response:

[4906-4-06(B)(1)]

The Project's total estimated capital and intangible costs is expected to range between approximately \$[REDACTED]/kW to \$[REDACTED]/kW, inclusive of intangible costs and dependent on the models of solar panel, racking, and inverters used. These costs are broken out in the table below, with assumed cost of the Project in the middle of the estimated range.

Expense Description	Cost (\$/kW)
<u>Tangible Costs</u>	
Modules and Racking	\$[REDACTED]
Balance of Plant & Civil	\$[REDACTED]
Substation and Gen-Tie	\$[REDACTED]
Interconnection Upgrades	\$[REDACTED]
<i>Total Tangible Costs</i>	<i>\$[REDACTED]</i>
<u>Intangible Costs</u>	
Legal & Development Costs	\$[REDACTED]
Financing & Transaction Fees	\$[REDACTED]
Other	\$[REDACTED]
<i>Total Intangible Costs</i>	<i>\$[REDACTED]</i>
<i>Total Capital Expenses</i>	<i>\$[REDACTED]</i>

As described above, Applicant is not proposing alternatives to the Project Area. Therefore, no cost comparisons between alternatives is included.

[4906-4-06(B)(2)]

Installed project costs compiled by Lazard's Levelized Cost of Energy Analysis – Version 10.0 indicate that the capital costs of the Project are consistent with recent industry trends (Lazard, 2016). Lazard indicates that solar facilities installed in 2016 using thin-film technology have a capital cost between \$1,300 to \$1,450 per kW. By way of further comparison, the costs of solar generation projects under development by the Partners in other states in the mid-Atlantic region have similar capital costs averaging \$ [REDACTED] per kW. Variances in capital costs across the projects are due to a variety of factors, including solar resource, topography and other site-specific characteristics, project scale, proximity to equipment suppliers, and climate.

[4906-4-06(B)(3)]

Capital costs for the Project will include development costs, construction design and planning, equipment costs, and construction related costs. The costs will be incurred within two (2) years of start of construction. Therefore, a present worth analysis is essentially the same as the costs presented above. Because alternatives to the Project are not under consideration, the capital cost information presented is limited to the Project.

**C. OPERATION AND MAINTENANCE EXPENSES**

OPSB Application Requirement [4906-4-06(C)]:

*“(C) The applicant shall provide information regarding operation and maintenance expenses.*

*(1) The applicant shall provide applicable estimated annual operation and maintenance expenses for the first two years of commercial operation. The data submitted shall be classified according to federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for utility companies, unless the applicant is not an electric light company, a gas company or a natural gas company as defined in Chapter 4905. of the Revised Code (in which case, the applicant shall file*

*the operation and maintenance expenses classified in the accounting format ordinarily used by the applicant in its normal course of business).*

*(2) The applicant shall provide a comparison of the total operation and maintenance cost per kilowatt with applicant's similar facilities and explain any substantial differences.*

*(3) The applicant shall provide a tabulation of the present worth and annualized expenditures for operating and maintenance costs as well as any additional cost breakdowns as required to compare alternatives, and describe techniques and factors used in calculating present worth and annualized costs."*

Response:

[4906-4-06(C)(1)]

For the first two (2) years of commercial operation, the annual operations and maintenance cost of the Project are expected to be approximately \$ [REDACTED], or \$ [REDACTED]/kW. These costs can be categorized as solar plant O&M, balance of plant O&M, site maintenance, and unplanned maintenance reserves. Solar plant O&M is expected to cost between \$ [REDACTED] and \$ [REDACTED] per year, balance of plant is expected to cost between \$ [REDACTED] and \$ [REDACTED] per year, site maintenance is expected to cost between \$ [REDACTED] and \$ [REDACTED] per year, and unplanned maintenance reserves are expected to cost between \$ [REDACTED] to \$ [REDACTED] per year.

[4906-4-06(C)(2)]

Operations and maintenance expenses are significant components of the overall cost of solar projects and can vary widely among facilities. As with capital costs, annual operations and maintenance expenses vary across geographies and by project scale. Key activities include monitoring and supervision, grid regulation, corrective maintenance, preventative maintenance, and site maintenance.

Solar facilities recently installed often enjoy lower operations and maintenance costs than industry reports indicate. Industry competition and consolidation of operations and maintenance providers has led to significant cost reductions as the solar industry continues to mature. The Sandia National Laboratory reported in 2016 that utility scale

solar facilities in 2015 signed operations and maintenance contracts for between \$20.50/kW for fixed-tilt crystalline silicon facilities to \$21.50/kW for facilities using thin film solar modules, on average (Sandia, 2015). The use of single axis trackers typically adds roughly \$1.00/kW to operations and maintenance costs. The National Renewable Energy Laboratory estimates that due to optimized project layouts, economies of scale, and component improvements, operations and maintenance for utility scale solar PV projects will be approximately \$8/kW-year in 2020 (NREL 2016).

The annual operations and maintenance costs for the Project are estimated to be approximately \$[REDACTED]/kW in the first year of operations and increase at a rate of approximately 2% per annum through the life of the Project. These estimated costs exclude property taxes, land rent payments, and other ongoing expenses not directly related to the efficient operation of the Project. The operations and maintenance costs are similar to costs expected at other facilities under development by the Partners in other states in the mid-Atlantic region of between \$[REDACTED]/kW to \$[REDACTED]/kW and will likely be lower on a per kW cost than the costs reported by Sandia National Laboratory.

[4906-4-06(C)(3)]

The annual operation and maintenance costs itemized above will be subject to real and inflationary increases. Therefore, these costs are expected to increase with inflation throughout the life of the Project. The net present value of the operation and maintenance costs per kW, using an inflation rate of 2% and assuming a 7% discount rate, is between \$[REDACTED]/kW and \$[REDACTED]/kW. Because alternatives to the Project are not under consideration, the above operation and maintenance cost information is limited to the Project.

**D. COST FOR A DELAY**

OPSB Application Requirement [4906-4-06(D)]:

*“(D) The applicant shall submit an estimate of the cost for a delay prorated to a monthly basis beyond the projected in-service date.”*

Response:

[4906-4-06(D)]

The cost of month-to-month delays beyond the anticipated in-service date would depend on a number of factors. If the delay were to occur during project development (including the process for obtaining the Certificate), the losses would primarily be those attributable to the time value of money associated with the delayed earning of power sale revenue. Such a loss is estimated to be approximately \$ [REDACTED] per month. Delays beyond the planned in-service date also could incur costs pursuant to one or more power purchase agreements under which the Project is expected to deliver power on a date certain. Finally, delays that extended the in-service date could jeopardize the Project's expected eligibility for the full value (30%) of the federal Investment Tax Credit.

#### **E. ECONOMIC IMPACT OF PROJECT**

OPSB Application Requirement [4906-4-06(E)]:

*“(E) The applicant shall provide information regarding the economic impact of the project.*

*(1) The applicant shall provide an estimate of the annual total and present worth of construction and operation payroll.*

*(2) The applicant shall provide an estimate of the construction and operation employment and estimate the number that will be employed from the region.*

*(3) The applicant shall provide an estimate of the increase in county, township, and municipal tax revenue accruing from the facility.*

*(4) The applicant shall provide an estimate of the economic impact of the proposed facility on local commercial and industrial activities.”*

Response:

[4906-4-06(E)(1) & (2)]

Applicant retained the Economics Center of the University of Cincinnati (“University”) to estimate the economic and fiscal impact of the construction and operation of the Project. The University provides unbiased, non-partisan economic data and



analyses for non-profit organizations, government agencies, and corporate stakeholders. A copy the University's report, which is entitled "Economic and Fiscal Impact of the Alamo Solar Facility" dated November 2018 ("Socioeconomic Report"), is attached as **Exhibit C**.

The University projected jobs that the Project would create including both direct and indirect employment. It estimates that depending on the Applicant's ability to source content manufactured in Ohio, the Project will create between 515 to 986 direct and indirect construction-related jobs with corresponding payroll of \$24 million to \$49 million. For the operation phase of the Project, depending on the percentage of locally sourced content for maintenance activities, the University estimates that the Project will create 13 direct and indirect jobs with corresponding annual payroll of approximately \$673,000.

Applicant intends that at least 80% of the full-time equivalent employees who are employed for the construction or installation of the Project be domiciled in Ohio. Applicant estimates that a substantial portion of the total figure employed will be from the general region in which the Project is located. In particular, many of the construction jobs calling for general trade skills, such as laborers and electricians, will be available to those in the region. These general skills include those sufficient to fulfill positions for the construction of roads and fencing, the performance of landscaping services, performing general labor and providing security. Many of the positions requiring more specialized skills, such as panel assemblers, operators of specialized excavators, and high-voltage electrical specialists, are likely to be filled by those outside the general region, although many are expected to live in Ohio.

[4906-4-06(E)(3)]

The Socioeconomic Report (Exhibit C) also estimates the Project's contributions to local tax revenues. Applicant expects to be successful in designating the Project as a "qualified energy project" ("QEP") and securing a related agreement for payment in lieu of taxes ("PILOT") with Preble County pursuant to Section 5727.75 of the Ohio Revised Code and procedures developed by the Ohio Development Services Agency. Based on an assumption of a PILOT of \$7,000/MWac for 69.9 MWac, it is estimated that the Project will generate \$489,300 in revenue annually to area schools and Gasper and Washington Townships, with an increase to \$629,300 annually after the amendment to raise the Project capacity to 89.9 MWac.

[4906-4-06(E)(4)]

The Project is expected to have a number of positive economic impacts on commercial activities in the local area. The Socioeconomic Report (Exhibit C) estimates that, during the construction phase, the Project is expected to generate new economic output of approximately \$58 million to \$151 million during construction and \$1.2 million to \$1.5 million annually from operation. A substantial portion of this total is expected to represent induced impacts, which in part reflects spending in local commercial establishments of substantial construction-related wages. Additional local employment during the construction period is expected in supporting commercial sectors, such as in restaurants and hotels. Similar induced impacts benefiting local commerce are expected to occur from operation-related employment and tourism-related spending, albeit to a much smaller degree than during construction. Finally, land lease payment to land owners participating in the Project are expected to augment local income, which will result in increased demand for local commercial services.

**F. PUBLIC RESPONSIBILITY**

**1. PUBLIC INTERACTION**

OPSB Application Requirement [4906-4-06(F)(1)]:

*“(1) The applicant shall describe the applicant's program for public interaction during the siting, construction, and operation of the proposed facility. This description shall include detailed information regarding the applicant's public information and complaint resolution programs as well as how the applicant will notify affected property owners and tenants about these programs at least seven days prior to the start of construction.”*

Response:

[4906-4-06(F)(1)]

Applicant's interaction with the public about the siting of the Project, which continues, has consisted primarily of one-on-one outreach to individual property owners near the Project Area. As part of determining the best location for the Project, Applicant communicated with a number of property owners in the study area. Applicant also conferred with several local officials as part of its due diligence in making the original siting decision, including County Commissioners and economic development personnel.

With regard to the anticipated construction of the Project, Applicant presented at the public informational meeting a map showing the location of the Project as well as the location of each parcel of property either (1) within the Project Area; or (2) contiguous to the Project Area. This map was of sufficient scale to enable affected property owners and tenants to identify their property in relation to the Project. Applicant solicited written comments on the Project at the public information meeting but received only verbal comments and questions regarding construction methods and impacts, viewshed, and wildlife. Applicant discusses construction impacts in Section III.B.2 “Construction and Reclamation Methods”, viewshed concerns in Section VIII.D.4 “Visual Impacts” and **Exhibit I**, and wildlife concerns in Section VIII.B “Ecological Resources” and **Exhibit G**.

Applicant will require the general contractor hired to construct the Project to identify a person to address any complaints, concerns or comments from the public during construction. Applicant also will require that information be posted to provide the public with contact information to submit complaints, concerns or comments regarding construction and that prompt responses be made to any such complaints, concerns or comments (for which a response either is requested or clearly implied). Finally, Applicant

will require the contractor to make commercially reasonable efforts to expeditiously resolve any complaints or concerns.

No later than seven (7) days prior to the start of construction, Applicant will mail a notice of construction to the following persons: (1) affected property owners and tenants who were provided notice of the public information meeting; (2) attendees of the public information meeting who requested updates regarding the Project and provided a mailing address for that purpose; and (3) any other person who requests updates regarding the Project and provides a mailing address for that purpose. The notice of construction will summarize upcoming construction activities, describe where construction will occur, including the main routes of equipment delivery, and provide the name and contact information of a Project representative to whom any complaints, concerns or comments may be addressed.

Applicant will require that the company retained to operate the Project post its contact information at or near the entrance of each solar field and the Substation. Applicant also will require that information be posted to provide the public with contact information to submit complaints, concerns or comments regarding operation and that a prompt response be made to any for which a response either is requested or clearly implied. The operator also will be required to make commercially reasonable efforts to expeditiously resolve any complaints or concerns.

## **2. INSURANCE**

OPSB Application Requirement [4906-4-06(F)(2)]:

*“(2) The applicant shall describe any insurance or other corporate programs for providing liability compensation for damages to the public resulting from construction, operation, or decommissioning of the proposed facility.”*

Response:

[4906-4-06(F)(2)]

Applicant will maintain a comprehensive package of liability insurance to protect the public in connection with the Project. Throughout the construction, operation and

decommissioning of the Project, Applicant will maintain insurance against claims and liability for personal injury, death and property damage arising from the construction, operation or decommissioning of the Project. At a minimum, the coverage limits of such insurance will be \$1 million per occurrence and \$2 million in the aggregate. Applicant also will maintain umbrella insurance coverage against claims and liability for personal injury, death and property damage arising from the construction, operation or decommissioning of the Project in the amounts of \$10 million per occurrence and \$10 million in the aggregate.

Applicant also is prepared to post a road bond or similar surety, if needed, to ensure the repair of any roads damaged by construction of the Project. Applicant will work with the local authorities to develop a common understanding for the use and protection of area roads. This may include a road agreement (or a similar document) providing that any construction-related damages to roads be expeditiously repaired. As part of that arrangement, Applicant stands ready to establish appropriate surety to guarantee funds to fulfill those obligations.

### **3. TRANSPORTATION IMPACTS**

OPSB Application Requirement [4906-4-06(F)(3)]:

*“(3) The applicant shall evaluate and describe the anticipated impact to roads and bridges associated with construction vehicles and equipment delivery. Describe measures that will be taken to improve inadequate roads and repair roads and bridges to at least the condition present prior to the project.”*

Response:

[4906-4-06(F)(3)]

Applicant retained Hull and Associates (“Hull”) to evaluate the anticipated impact of the construction of the Project on road and bridges and any needed improvements prior to construction or likely repairs needed following construction. Hull also was retained to advise Applicant regarding any required transportation-related permits and local traffic coordination. Dublin, Ohio-based Hull is experienced in performing these assessments

for proposed electric generation projects in Ohio, with a particular focus in certain economic sectors, including renewable energy. A copy of Hull's report, which is entitled "Route Evaluation Study for the Alamo Solar Project" ("Transportation Report"), is attached as **Exhibit D**.

Hull conducted an on-site study of the transportation routes to the Project Area and the conditions of the local roads adjacent to and near the Project Area. With certain exceptions, it concluded that the roads and bridges generally were in good condition, that they are of a type and width sufficient to accommodate the deliveries for the construction of the Project, and that no major repairs or upgrades are needed for construction. Hull advised that certain bridges on Antioch Road are in poor condition and should be avoided and that the use of Camden, Call and Gasper Roads should be minimized due to their poor condition. Some of the smaller roads in the Project Area are in only fair condition, with some cracking and potholes noted and some culverts potentially in need of repair or replacement. Hull believes that these can readily be addressed with local authorities so that their post-construction condition is as good as or better than now. Applicant will work with local officials to repair any damage to roads resulting from construction.

Anticipated impacts during construction will likely include increased vehicle traffic on main and ancillary roads due to material deliveries and movement of the construction workforce to and around the Project Area. With the exception of those on Antioch Road, Hull did not identify any bridges on the expected delivery routes or in the vicinity of the Project Area that will be impacted by the Project. The Applicant will work with the Preble County Engineer, Trustees for the impacted townships, and ODOT to ensure that any impacts to road surface conditions and traffic flow are accounted for and rectified. Where possible, deliveries on single lane roads to the Project will be limited despite low traffic volumes in and around the Project Area.

#### **4. TRANSPORTATION PERMITS**

OPSB Application Requirement [4906-4-06(F)(4)]:

*"(4) The applicant shall list all transportation permits required for construction and operation of the project, and describe any necessary*

*coordination with appropriate authorities for temporary or permanent road closures, lane closures, road access restrictions, and traffic control necessary for construction and operation of the proposed facility.”*

Response:

[4906-4-06(F)(4)]

Hull also examined whether the construction or operation of the Project would necessitate any transportation-related permits. It concluded that no special hauling permits would be needed because all of the vehicles needed for construction are anticipated to be within legal heights, weights and widths for the applicable roads and bridges. It noted that driveway permits would be required for the road entrances and utility permits would be required for any crossings of roads with buried electrical lines. As with any roads and culvert repairs and traffic coordination, Hull advised that these routine permits can be secured through consultation with the appropriate State and local officials.

The Transportation Report also describes Hull's efforts to examine current traffic conditions in and near the Project Area and address the effect of the likely volume of construction-related traffic. Hull concluded that the travelling public is likely to experience, at most, minor delays and inconveniences during the construction of the Project. It concluded that these matters can be readily addressed by Applicant in cooperation with local authorities.

## **5. DECOMMISSIONING**

OPSB Application Requirement [4906-4-06(F)(5)]:

*“(5) The applicant shall describe the plan for decommissioning the proposed facility, including a discussion of any financial arrangements designed to assure the requisite financial resources.”*

Response:

[4906-4-06(F)(5)]

The Project will have only modest impacts to the land and will be relatively easy to decommission. The solar panels and racking will be installed on simple posts driven or

rotated into the ground, likely to a depth of less than ten (10) feet. Inverters and pyranometers will be installed on pre-fabricated foundations, which can be lifted out of place. The Substation will be installed on poured concrete but will not cover a large area. Roads will be constructed of aggregate material or covered in grass, not paved, and participating land owners may choose to retain roads for their own use following decommissioning. Buried portions of collection lines will be more than three (3) feet below grade and, therefore, need not be removed to return farm fields to cultivation.

Decommissioning the Project should not require any soil or groundwater remediation. Operation of the Project will not create any hazardous waste or wastewater. The only materials that may be left on the Project Area are roads desired by land owners, buried collection lines, and possibly piles that break off more than three (3) feet below grade. Solar panels typically contain only very small amounts of hazardous materials, all of which are safely encased in glass. Even if damaged by breakage or fire, solar panels are exceedingly unlikely to release any material necessitating soil or water remediation.

Applicant will prepare a comprehensive plan specifying the responsible parties, schedules, and projected costs for decommissioning and restoring the Project Area to substantially its pre-construction condition ("Decommissioning Plan"), a copy of which will be provided to the Board separate from this application. It will provide for the removal and sale, re-use, recycling or proper disposal of all components of the Project, including components containing rare or valuable materials. Decommissioning is expected to take six (6) to nine (9) months.

The Decommissioning Plan will prioritize reuse and recycling over land disposal as waste. Most of the materials used in state-of-the-art solar generating facilities are reusable or recyclable. Given recent and expected trends, it is likely that the percentage of reusable/recyclable components will only increase over time. Solar panels are comprised mostly (almost 80%) of commonly recycled materials: glass, aluminum and copper. Although little recycling has occurred to date due to the relative youth of the solar industry, the Solar Energy Industry Association launched a national recycling program in 2016 with the goal of making the solar industry in the U.S. landfill-free. (SEIA, 2016). One of the top U.S.-based solar panel manufactures is a leader in the field (First Solar, 2013).



Even if the Project's solar panels are not fully recyclable in 30-40 years, it is unlikely they will constitute "hazardous" or dangerous waste at disposal. Suppliers of most solar panel have demonstrated that their products pass U.S. EPA's "Toxic Leaching Characteristic Procedure" qualifying them as routine waste. This includes the Ohio-made solar panels based on cadmium telluride chemistry (Lagunas, January 2017). As a result, solar panels generally may be disposed of in standard landfills.

The Decommissioning Plan will require that the contractor leading the decommissioning effort work closely with manufacturers, local subcontractors, and waste management firms to segregate—based on the prevailing standards and practices at the time—materials that can be reused and recycled from those that must be land-disposed as waste.

The Decommissioning Plan also will require that the Project Area be restored to use for cultivation, unless circumstances prevailing shortly in advance of the start of decommissioning indicate that another use is more appropriate or explicitly desired by the land owner. Restoration will include a return to the same or functionally similar pre-construction drainage patterns, including farm drainage tiles, decompaction of soil, and seeding with an appropriate, low-growing vegetative cover, such as clover, to stabilize soil, enhance soil structure, and increase soil fertility. As addressed with respect to impacts to agricultural resources, the Decommissioning Plan also will repair any damage to drain tile systems.

Applicant also will provide for financial security to ensure that funds are available for decommissioning. Prior to construction, an independent and registered professional engineer licensed to practice in Ohio and retained by Applicant will estimate the total cost of fully implementing the Decommissioning Plan. This will consist of estimates of (1) the gross cost of decommissioning, without regard to the salvage value of the components, plus 10% to cover contingencies; less (2) salvage value, less 10% to cover contingencies ("Net Decommissioning Cost"). A professional engineer will re-calculate the Net Decommissioning Costs approximately every five (5) years over the life of the Project.

If and when the Net Decommissioning Cost is a positive number, Applicant will post and maintain a surety bond or similar financial assurance instrument in the amount

of the Net Decommissioning Cost. If and when a subsequent estimate of the Net Decommissioning Cost increases the New Decommissioning Cost, the financial assurance instrument will be increased to that amount. Except as it may be drawn upon to implement the Decommissioning Plan, the amount of the financial assurance will not be reduced.

## **VII. COMPLIANCE WITH AIR, WATER, SOLID WASTE, AND AVIATION REGULATIONS**

### **A. PURPOSES OF RULE**

OPSB Application Requirement [4906-4-07(A)]:

*“(A) The information requested in this rule shall be used to determine whether the facility will comply with regulations for air and water pollution, solid and hazardous wastes, and aviation. Where appropriate, the applicant may substitute all or portions of documents filed to meet federal, state, or local regulations. Existing data may be substituted for physical measurements.”*

Response:

[4906-4-07(A)]

Because of the nature of utility-scale solar facilities, several of the requirements on these subjects, especially with regard to air regulations, do not apply to the Project. The specific instances in which a particular requirement does not apply are identified below.

### **B. AIR QUALITY**

#### **1. PRECONSTRUCTIOIN AIR QUALITY AND PERMITS**

OPSB Application Requirement [4906-4-07(B)(1)]:

*“(1) The applicant shall submit information regarding preconstruction air quality and permits.*

*(a) Provide available information concerning the ambient air quality of the proposed project area and any proposed alternative project area(s).*

*(b) Describe the air pollution control equipment for the proposed facility.*

*Stack gas parameters including temperature and all air pollutants regulated by the federal or state environmental protection agency shall be described for each proposed fuel. These parameters shall be included for each electric power generation unit proposed for the facility. Include tabulations of expected efficiency, power consumption, and operating costs for supplies and maintenance. Describe the reliability of the equipment and the reduction in efficiency for partial failure.*

*(c) Describe applicable federal and/or Ohio new source performance standards (NSPS), applicable air quality limitations, applicable national ambient air quality standards (NAAQS), and applicable prevention of significant deterioration (PSD) increments.*

*(d) Provide a list of all required permits to install and operate air pollution sources. If any such permit(s) have been issued more than thirty days prior to the submittal of the certificate application, the applicant shall provide a list of all special conditions or concerns attached to the permit(s).*

*(e) Except for wind farms, provide a map of at least 1:100,000 scale containing:*

*(i) The location and elevation (ground and sea level) of Ohio environmental protection agency primary and secondary air monitoring stations or mobile vans which supplied data used by the applicant in assessing air pollution potential.*

*(ii) The location of major present and anticipated air pollution point sources.*

*(f) Describe how the proposed facility will achieve compliance with the requirements identified in paragraphs (B)(1)(c) and (B)(1)(d) of this rule."*

Response:

[4906-4-07(B)(1)(a)]

The Project will be located in Preble County, which is located about a 30-minute drive west of Dayton and a 45-minute drive north of Cincinnati. The ambient air in Preble County currently complies with all applicable air quality requirements. The air quality in the Cincinnati area, however, fails to meet current national ambient air quality standards promulgated by the U.S. EPA for ground-level ozone (OEPA, 2015). With the continued growth of the city's economy and population, it is possible that the air quality in Preble County will soon fail to attain the same standard.

Urban ozone problems chiefly result from emissions into the air of nitrogen oxides and volatile organic compounds from a variety of stationary and mobile sources, including factories, chemical plants and motor vehicles. These precursor pollutants mix in the atmosphere, in the presence of sunlight, to form ground-level ozone, which is commonly known as “smog.” Traditional electric generation using coal or natural gas contributes to this problem primarily due to emissions of nitrogen oxides resulting from combustion. The Project will help provide electricity to Preble County and the surrounding region, including Cincinnati, without also exacerbating the ozone problem. Over time, a transition to non-polluting energy sources such as solar facilities may contribute to the attainment of ozone goals even in Cincinnati.

[4906-4-07(B)(1)(b)-(f)]

Subsections (b) through (f) do not apply to the Project because the Project will not include any air pollution point sources or produce any air emissions from stationary or point sources of air pollution. As a result, the Project will not require any preconstruction air quality permits and will not include any stationary source air pollution control equipment. As to subsection (e), although the regulations state that except for wind farms, a map of air monitoring stations should be provided, the Project is a renewable energy project that will not produce any air pollution. As such, this figure is not applicable. Solar panels and their associated infrastructure produce electricity without any stationary source air pollution.

## **2. AIR EMISSIONS AND DUST DURING CONSTRUCTION**

OPSB Application Requirement [4906-4-07(B)(2)]:

*“(2) The applicant shall describe plans to control emissions and fugitive dust during the site clearing and construction phase.”*

Response:

[4906-4-07(B)(2)]

Some emissions of fugitive dust necessarily will be generated by the construction of the Project, particularly roads. The amount of dust generated, however, will be relatively low for the Project's acreage because relatively little topsoil will be removed and there will be minimal grading and other earth-moving activities, and virtually no excavation except for efficient trenching. As with other construction activities, dust emissions will be localized to the area of activity and temporary. Best management practices in the construction industry will be used to minimize the amount of dust created by construction. These will include the following: (1) retention of licensed construction firms that are knowledgeable about the importance of minimizing dust creation during construction activities; (2) maintenance of construction vehicles in proper working condition; and (3) use of water and/or dust suppressant on unpaved roads as needed to reduce dust creation.

### **3. AIR QUALITY FOR OPERATION**

#### OPSB Application Requirement [4906-4-07(B)(3)]:

*"(3) Except for wind farms, the applicant shall provide information regarding air quality for the operation of the proposed facility.*

*(a) Describe ambient air quality monitoring plans for air pollutants regulated by the federal or state environmental protection agency.*

*(b) On a map of at least 1:24,000 scale, show three isopleths of estimated concentrations that would be in excess of the U.S. environmental protection agency-defined "significant emission rates" when the facility is operating at its maximum rated output. The intervals between the isopleths shall depict the concentrations within a five-mile radius of the proposed facility. A screening analysis may be used to estimate the concentrations.*

*(c) Describe procedures to be followed in the event of failure of air pollution control equipment, including consideration of the probability of occurrence, expected duration and resultant emissions."*

#### Response:

#### [4906-4-07(B)(3)]

This requirement, including the map required in subsection (b), does not apply to the Project because it will not include any air pollution point sources or produce any air

emissions from stationary or point sources of air pollution. As a result, the Project will not include any quality monitoring or experience any failure of air pollution control equipment. The only air emissions resulting from operation will be from mobile sources, which will consist of the emissions from the regular, but occasional, use of highway-qualified motor vehicles and the infrequent use of heavier mobile vehicles for equipment replacement.

## **C. WATER QUALITY**

### **1. PRECONSTRUCTION WATER QUALITY AND PERMITS**

OPSB Application Requirement [4906-4-07(C)(1)]:

*“(1) The applicant shall provide information regarding preconstruction water quality and permits.*

*(a) Provide a list of all permits required to install and operate the facility, including water pollution control equipment and treatment processes.*

*(b) On a map of at least 1:24,000 scale, show the location and sampling depths of all water monitoring and gauging stations used in collecting preconstruction survey data. Samples shall be collected by standard sampling techniques and only in bodies of water likely to be affected by the proposed facility. Information from U.S. geological survey (USGS), Ohio environmental protection agency, and similar agencies may be used where available, but the applicant shall identify all such sources of data.*

*(c) Describe the ownership, equipment, capability, and sampling and reporting procedures of each station.*

*(d) Describe the existing water quality of the receiving stream based on at least one year of monitoring data, using appropriate Ohio environmental protection agency reporting requirements.*

*(e) Provide available data necessary for completion of any application required for a water discharge permit from any state or federal agency for this project. Comparable information shall be provided for the proposed site and any proposed alternative site(s).”*

Response:

[4906-4-07(C)(1)(a)]

The Project will not create any identifiable, water-related discharges of the kind typically associated with other electric generation and industrial facilities. Accordingly, it will include no water pollution control equipment or wastewater treatment processes. The Project does not require a traditional National Pollution Discharge Elimination System (“NPDES”) permit of the kind issued by the U.S. EPA or the Ohio EPA.

The Project will seek certain water protection-related permits. First, it is expected to utilize a limited number of “nationwide permits” issued by the U.S. Army Corps of Engineers under Section 404 of the federal Clean Water Act for crossings of certain “waters of the U.S.” Second, in connection with those nationwide permits, the Project will seek a water quality certification from Ohio EPA pursuant to Section 401 of the federal Clean Water Act. Finally, the Project will seek coverage under an Ohio EPA construction stormwater general NPDES permit, which requires development of a proposed storm-water pollution prevention plan (“SWPPP”) for erosion control and storm-water management.

[4906-4-07(C)(1)(b)-(e)]

Subsection (b) through (e) are inapplicable to the Project because it will not generate any wastewater. As there will be no impacts to water quality due to construction and operation, water quality monitoring was not necessary for pre-construction surveys. As such, the figure required by subsection (b) is not applicable. The Project, therefore, does not require any traditional wastewater discharge permits and will not include any water pollution control equipment or treatment processes. There will be no water monitoring or gauging stations, receiving streams or associated sampling data.

## **2. WATER QUALITY DURING CONSTRUCTION**

*OPSB Application Requirement [4906-4-07(C)(2)]:*

*“(2) The applicant shall provide information regarding water quality during construction.”*

*(a) Indicate, on a map of at least 1:24,000 scale, the location of the water monitoring and gauging stations to be utilized during construction.*

*(b) Provide an estimate of the quality and quantity of aquatic discharges from the site clearing and construction operations, including runoff and siltation from dredging, filling, and construction of shoreside facilities.*

*(c) Describe any plans to mitigate the above effects in accordance with current federal and Ohio regulations.*

*(d) Describe any changes in flow patterns and erosion due to site clearing and grading operations.*

*(e) Describe the equipment proposed for control of effluents discharged into bodies of water and receiving streams.”*

Response:

[4906-4-07(C)(2)]

Although it will cover a relatively large area, construction will involve only limited activities requiring the management of storm-water related pollutants. Construction will necessitate little earth-moving and grading because the Project Area is relatively level. Construction will include only the occasional clearing of trees, and the Project's design will avoid the need to clear large blocks of active wildlife habitat. Construction also will necessitate little excavation, which will be limited primarily to the creation of road beds and efficient trenching for collection lines. Nonetheless, the Project will implement an approved SWPPP for erosion control and the management of storm-water.

As a result, the above requirements do not apply to the Project. No water monitoring and gauging stations are proposed to be utilized for construction because it will not cause any aquatic discharges and the Project will not include any shoreline facilities. There are no anticipated changes in flow patterns and erosion because the Project Area already is level and very little, if any, grading will be needed. No equipment is proposed to control effluents discharged to water bodies and receiving streams because no such discharges are expected to occur.



### 3. WATER QUALITY DURING OPERATION

OPSB Application Requirement [4906-4-07(C)(3)]:

*“(3) The applicant shall provide information on water quality during operation of the facility.*

*(a) Indicate, on a map of at least 1:24,000 scale, the location of the water quality monitoring and gauging stations to be utilized during operation.*

*(b) Describe the water pollution control equipment and treatment processes planned for the proposed facility.*

*(c) Describe the schedule for receipt of the national pollution discharge elimination system permit.*

*(d) Provide a quantitative flow diagram or description for water and water-borne wastes through the proposed facility, showing the following potential sources of pollution, including:*

*(i) Sewage.*

*(ii) Blow-down.*

*(iii) Chemical and additive processing.*

*(iv) Waste water processing.*

*(v) Run-off and leachates from fuels and solid wastes.*

*(vi) Oil/water separators.*

*(vii) Run-off from soil and other surfaces.*

*(e) Describe how the proposed facility incorporates maximum feasible water conservation practices considering available technology and the nature and economics of the various alternatives.”*

Response:

[4906-4-07(C)(3)(a)-(d)]

Subsection (a) through (d) are not applicable because operation will not consume an appreciable amount of water or generate any wastewater. The Project will not include any water quality monitoring stations, water pollution control equipment and treatment processes, or a NPDES permit for any point source discharge. The Project will not generate any water or water-borne waste, including sewage, blow-down, chemical and

additive processing, waste water processing, run-off and leachates from fuel or solid wastes, or oil-water separators and other surfaces.

[4906-4-07(C)(3)(e)]

Opportunities to employ water conservation practices are limited because the only material use of water will be to occasionally clean the panels. Operation will use virtually no water and will produce no wastewater discharges. The Project will use water only for occasional cleaning of panels to reduce inefficiency in electric generation due to accumulated soiling. Cleaning is expected to occur only a few times annually, and potentially less frequently depending on rainfall. All water used for this purpose will be trucked to the Project or acquired locally. The Project will not include an operations and maintenance building; rather, operational personnel will office off-site.

**D. SOLID WASTE**

**1. SOLID WASTE IN PROJECT AREA**

OPSB Application Requirement [4906-4-07(D)(1)]:

*“(1) The applicant shall provide information regarding preconstruction solid waste.*

*(a) Describe the nature and amount of debris and solid waste in the project area.*

*(b) Describe any plans to deal with such wastes.”*

Response:

[4906-4-07(D)(1)]

The Project Area is rural in character and comprised chiefly of farm fields with a relatively low population density and only a modest number of structures. The general area is relatively free of debris and other solid waste. It is therefore highly unlikely that significant land contamination, especially with hazardous wastes, is present in the area. Prior to construction, however, Applicant will retain an experienced and qualified firm to

perform a Phase 1 Environmental Site Assessment survey of the Project Area (“Phase 1 ESA”), a copy of which will be provided to the Board. The Phase 1 ESA will be conducted pursuant to appropriate standards adopted by the American Society for Testing and Materials and regulations promulgated by U.S. EPA for “All Appropriate Inquiries” under the Comprehensive, Environmental Response, Compensation and Liability Act. It is expected that the Phase 1 ESA will be completed in Q3 2019. Applicant fully expects that the Project’s final design can avoid any “recognized environmental condition” that may be identified by the Phase 1 ESA.

## **2. CONSTRUCTION**

OPSB Application Requirement [4906-4-07(D)(2)]:

*“(2) The applicant shall provide information regarding solid waste during construction.*

*(a) Provide an estimate of the nature and amounts of debris and other solid waste generated during construction.*

*(b) Describe the proposed method of storage and disposal of these wastes.”*

Response:

[4906-4-07(D)(2)]

Construction of the Project will generate very limited amounts of non-hazardous, solid waste, which will be reused, recycled, or disposed of accordance with applicable requirements. These wastes may include package-related materials, such as crates, nails, boxes, containers, and packing materials, damaged or otherwise unusable parts or materials, and occasional litter and miscellaneous debris generated by workers. Construction will not generate any hazardous wastes; waste not reused or recycled will be disposed of in a municipal landfill.

## **3. OPERATION**

OPSB Application Requirement [4906-4-07(D)(3)]:

*“(3) The applicant shall provide information regarding solid waste during operation of the facility.*

*(a) Provide an estimate of the amount, nature, and composition of solid wastes generated during the operation of the proposed facility.*

*(b) Describe proposed methods for storage, treatment, transport, and disposal of these wastes.”*

Response:

[4906-4-07(D)(3)]

Operation of the Project will generate only exceedingly small amounts of non-hazardous, solid waste, which will be reused, recycled, or be disposed of accordance with applicable requirements. These wastes are expected to be of the same general nature as those generated from construction, but in far smaller quantities. Operation will not generate any hazardous wastes. Waste not reused or recycled may be accumulated in small amounts in appropriate trash receptacles prior to disposal but will not require any treatment and will be disposed of in a sanitary landfill.

#### **4. PERMITS**

OPSB Application Requirement [4906-4-07(D)(4)]:

*“(4) The applicant shall describe its plans and activities leading toward acquisition of waste generation, storage, treatment, transportation and/or disposal permits. If any such permit(s) have been issued more than thirty days prior to the submittal of the certificate application, the applicant shall provide a list of all special conditions or concerns attached to the permit(s).”*

Response:

[4906-4-07(D)(4)]

This requirement does not apply to the Project because it will not generate any waste that requires a permit to generate, store, treat, transport or dispose.

## **E. AVIATION**

### OPSB Application Requirement [4906-4-07(E)]:

*“(E) The applicant shall provide information on compliance with aviation regulations.*

*(1) List all public use airports, helicopter pads, and landing strips within five miles of the project area and all known private use airports, helicopter pads, and landing strips or property within or adjacent to the project area, and show these facilities on a map(s) of at least 1:24,000 scale. Provide confirmation that the owners of these airports have been notified of the proposed facility and any impacts it will have on airport operations.*

*(2) Provide the FAA filing status of each airport and describe any potential conflicts with air navigation or air traffic communications that may be caused by the proposed facility.”*

### Response:

#### [4906-4-07(E)(1)]

There are no public use airports, helicopter pads, or landing strips within five (5) miles of the Project Area. Although there are no private use landing strips within or adjacent to the Project Area, there are two private use landing strips within the 5-mile study area. These private use landing strips are Mite Airport and Morningstar North, which are located approximately two (2) and five (5) miles away from the Project Area, respectively.

#### [4906-4-07(E)(2)]

The Federal Aviation Administration (“FAA”) requires that proponents of solar generation projects at airports notify it so that an aeronautical study of the proposed facility can be conducted. Such a study would analyze the potential effect of “reflectivity” (also known as “glint” and/or “glare”) to ensure that the facility will not cause brief losses of vision for pilots during landing or air traffic controllers. The FAA has explained that solar panels may be more compatible for airports than other solar energy generation technologies because among several factors, they are “designed to absorb sunlight

(rather than reflect it), minimizing potential impacts of glare,” and also noted that “many airports are currently employing solar PV and reporting reliable and safe performance” (FAA Guidance, 2010).

The FAA also encourages facilities proposed “in the vicinity” of a federally-obligated airport to notify the FAA for a possible aeronautical study, but it has acknowledged that it is not clear to what facilities this applies. On the subject of off-airport solar generation facilities proposed at locations than that at an airport itself, the FAA guidance states the following:

“Solar projects constructed off-airport are proposed and managed by private developers and public agencies. They include a wide variety of technologies (PV, solar thermal, and concentrated solar power) and sizes (residential, commercial, and utility-scale or grid-fed). While projects proposed on-airport have a direct link with FAA authority and NEPA responsibilities, the need for FAA airspace review is less clear the farther away projects are from the airport fence. The FAA has broad authority for airspace review and the evaluation of any solar project that could pose a potential hazard to air navigation.

The clearest trigger for FAA review is a physical penetration of airspace. It is well-established that structures rising 200 feet or greater above the land surface must be reviewed by the FAA. Tall structures, such as wind turbines, cell towers, and communication antennae customarily rise above 200 feet and proponents know that an airspace review is required. The FAA will review the location of structures and, depending on their proximity to existing airports, will either limit their height to remain out of flight paths or condition their approval to day and night obstruction lighting. Concentrated solar power projects with power towers may rise to a height of 200 feet or greater, triggering an airspace review. Many other solar projects including parabolic trough and V farms will not and therefore the need to file a notice with the FAA may not be clear.

Currently, no defined thresholds for project size, type, or distance from the airport are available that automatically trigger FAA airspace review. However, proximity to the airport and CSP technology are two indicators of likely FAA interest in a solar project.

....

How the FAA is notified about potential impacts to airspace, or how it hears about pending solar projects, varies. However, it is the responsibility of local governments, solar developers, and other stakeholders in the vicinity of an airport to check with the airport sponsor and the FAA to ensure there are no potential safety or navigational problems with a proposed solar facility, especially if it is a large facility. Likewise, sponsors must be aware of nearby off-airport activities that could have a negative effect on the safe and efficient operation of the airport. Sponsors should notify the FAA when such activities are proposed and the FAA needs to participate in public meetings or permitting processes” (emphasis added, FAA Guidance, 2010).

There is no need for an aeronautical study of the Project as it is not “in the vicinity” of a federally-obligated airport. The FAA’s data shows that the nearest federally-obligated airport to the Project is the Richmond (Indiana) Municipal Airport, which is approximately ten (10) miles away from the Project Area. The Project will not be visible to, and will present no risk of glare, to pilots making final approaches to this airport.

## **VIII. HEALTH AND SAFETY, LAND USE AND ECOLOGICAL INFORMATION**

### **A. HEALTH AND SAFETY**

#### **1. SAFETY AND RELIABILITY OF EQUIPMENT**

##### *OPSB Application Requirement [4906-4-08(A)(1)]:*

*“(1) Equipment safety. The applicant shall provide information on the safety and reliability of all equipment.*

*(a) Describe all proposed major public safety equipment.*

*(b) Describe the reliability of the equipment.*

*(c) Provide the generation equipment manufacturer's safety standards. Include a complete copy of the manufacturer's safety manual or similar document and any recommended setbacks from the manufacturer.*

*(d) Describe the measures that will be taken to restrict public access to the facility.*

*(e) Describe the fire protection, safety, and medical emergency plan(s) to be used during construction and operation of the facility, and how such plan(s) will be developed in consultation with local emergency responders.”*

Response:

[4906-4-08(A)(1)(a)]

The only aspect of the Project that may constitute major safety equipment is perimeter fencing with locked gates, which will surround all above-ground features of the Project. This includes the Substation, the solar fields, and, if not located within the perimeter of a solar field, each pyranometer. Appropriate warning signage will be posted throughout the Project. The general public will be prohibited from entering the Project.<sup>2</sup> In addition, warnings about high-voltage equipment will be displayed on appropriate signage throughout the Project Area. Accordingly, the general public will have no access to any potential hazards associated with the Project, and also will be warned about them.

[4906-4-08(A)(1)(b) & (c)]

The Project's equipment will be highly reliable as Applicant will select only leading suppliers. The manufacturers' safety standards, including complete copies of their safety manuals or similar documents, will be provided to the Board as part of the final construction plans, and a waiver has been requested to allow for that submittal. Applicant also will identify any setbacks recommended by the manufacturers once the models have been selected. The solar panels themselves are highly unlikely to present any safety concerns. Also, as discussed above, the general public will not be come into contact with the equipment because they will be either fenced or buried.

[4906-4-08(A)(1)(d)]

To provide an appropriate separation between the equipment and the public, each solar field will incorporate certain setbacks. These will include (1) a 25-foot setback between the perimeter fence and the edge of any public road; (2) a 40-foot setback between the above-ground equipment and the edge of any public road; (3) a 10-foot

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<sup>2</sup> Guided tours of the Project by qualified personnel may allow designated members of the public to enter one or more of the solar fields for limited periods of time.



setback between the perimeter fence and the property line of any parcel whose owner is not participating in the Project; (4) a 25-foot setback between any above-ground equipment and any parcel whose owner is not participating in the Project; and (5) a 100-foot setback between any above-ground equipment and any habitable residence located on a parcel whose owner is not participating in the Project.

In addition to these setbacks, the public will be prohibited from coming into contact any of the equipment. All of the above-ground equipment will be located behind fences with locked gates. To further protect the public, appropriate warning signs will be posted and maintained throughout the Project.

[4906-4-08(A)(1)(e)]

Prior to construction, Applicant will develop an emergency response plan for fire with potentially affected local officials and emergency personnel. These will include, for each county, personnel specialized in engineering, law enforcement, fire, medical and ambulance. The emergency response plan will include information on the type and location of equipment, potential hazards (including potential hazards to emergency responders), locations of access gates, and emergency contact information.

## **2. FAILURE OF AIR POLLUTION CONTROL EQUIPMENT**

OPSB Application Requirement [4906-4-08(A)(2)]:

*“(2) Air pollution control. Except for wind farms, the applicant shall describe in conceptual terms the probable impact to the population due to failures of air pollution control equipment.”*

Response:

[4906-4-08(A)(2)]

This requirement does not apply to the Project because it will not include any stationary sources of air emissions and, therefore, no air pollution control equipment.

### 3. NOISE FROM CONSTRUCTION AND OPERATION

OPSB Application Requirement [4906-4-08(A)(3)]:

*“(3) Noise. The applicant shall provide information on noise from the construction and operation of the facility.*

*(a) Describe the construction noise levels expected at the nearest property boundary. The description shall address:*

*(i) Blasting activities.*

*(ii) Operation of earth moving equipment.*

*(iii) Driving of piles, rock breaking or hammering, and horizontal directional drilling.*

*(iv) Erection of structures.*

*(v) Truck traffic.*

*(vi) Installation of equipment.*

*(b) Describe the operational noise levels expected at the nearest property boundary. The description shall address:*

*(i) Operational noise from generation equipment. In addition, for a wind facility, cumulative operational noise levels at the property boundary for each property adjacent to or within the project area, under both day and nighttime operations. The applicant shall use generally accepted computer modeling software (developed for wind turbine noise measurement) or similar wind turbine noise methodology, including consideration of broadband, tonal, and low-frequency noise levels.*

*(ii) Processing equipment.*

*(iii) Associated road traffic*

*(c) Indicate the location of any noise-sensitive areas within one mile of the facility, and the operational noise level at each habitable residence, school, church, and other noise-sensitive receptors, under both day and nighttime operations. Sensitive receptor, for the purposes of this rule, refers to any occupied building*

*(d) Describe equipment and procedures to mitigate the effects of noise emissions from the proposed facility during construction and operation, including limits on the time of day at which construction activities may occur.*

*(e) Submit a preconstruction background noise study of the project area that includes measurements taken under both day and nighttime conditions.”*

Response:

[4906-4-08(A)(3)(a)]

Applicant retained Hessler Associates, Inc. (“Hessler”) to study the pre-construction sound in the Project Area and model the Project’s noise and assess its impact. Hessler has been working in the acoustics field for approximately 40 years, and has prepared noise assessments for several proposed electric generation facilities for which the Board has issued a Certificate. A copy of Hessler’s report, which is entitled “Existing Conditions Background Sound Survey and Noise Impact Assessment” (“Noise Report”), is attached as **Exhibit E**.

The Noise Report concludes that although construction will intermittently generate the types and levels of noise common at large construction sites, it will not feature many of the most significant noise-generating activities common during construction of other facilities. The Project will not involve extensive excavation or other earth-moving work or construction of significant concrete foundations. Although numerous piles will be driven, they likely will be only to a depth of less than ten (10) feet and the activity will be relatively brief at any particular location. HDD is expected to be used for the Project, but only on a very limited number of occasions. Table 6.0.1 of the Noise Report (Exhibit E) provides representative sound levels from construction equipment at 50 feet, which may be conservatively interpreted as the site property boundary; levels as high as 85 dBA (A-weighted decibel) could be temporarily produced. However, at the nearest house, sound from concrete pouring for the base of the Substation could produce sounds of around 52 dBA. This sound would occur intermittently during the day and last for only a few days. In general, Hessler concluded that construction-related noise would be modest and intermittent, and would result in only minimal, unavoidable impacts.

Especially in comparison to an electric facility powered by fossil fuels, a large-scale solar facility comes close to operating silently. The Project’s operation will generate only very small amounts of noise because it entails no fuel movement, no combustion, no waste movement, and very few moving parts. The only equipment that will result in any

discernable noise--even immediately at the source--are the Inverters and small electric motors. The noise generated by these sources rapidly dissipates to background levels at short distances. The operation of the Project will produce no sound at night.

Operation-related noise related to maintenance, repairs, and replacements will be very small. Major equipment repairs or replacement, which are expected to be very rare, will generate occasional noise, but not unlike common construction activities. The use of highway-rated vehicles to occasionally access each solar field will not add appreciably to routine road traffic noise.

[4906-4-08(A)(3)(b)]

The noise generated by the solar fields will be minimal and should not be a concern for any off-site receptors. The electric motors that power tracking racks are very small, operate very slowly, and operate only in daylight hours. The inverters also will generate noise only when the Project is generating electricity, which is during the day. As Hessler notes, the noise that inverters and their associated step-up transformers generate is inaudible at a distance of 50 to 150 feet from the source. The Project will be designed to site the inverters within the solar fields to ensure they do not cause material, adverse impacts to any sensitive, off-site receptors.

As the only significant source of new noise, Hessler modeled noise from the Substation in the context of the existing noise from the 69kV POI transmission line and other area sources. The residence nearest to the POI is over 700 feet away, and the Substation will be constructed on the opposite side of a wooded creek from the residence. Modeling demonstrated that any sound emissions from Substation will be significantly lower than the current natural background sound level, making it generally inaudible all of the time at these few nearby residences.<sup>3</sup> Hessler concluded that no adverse community noise impact is expected from the operation of the Substation.

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<sup>3</sup> Because the Substation will operate only during the day, nighttime sound conditions are not relevant to the analysis.

[4906-4-08(A)(3)(c)]

Only the Substation is expected to generate any material, off-site noise from operation of the Project. Therefore, the only noise-sensitive receptors that may be affected by the operation of the Project are two (2) residences located more than 700 feet away. The impacts at those locations during the day are expected to be minimal. Because the Project will not operate during the night, it will produce no sound during that particularly sensitive period. The noise generated by equipment in the solar fields will be minimal and should not be a concern for any off-site receptors.

[4906-4-08(A)(3)(d)]

To mitigate noise during construction as much as reasonable possible, Applicant will employ best management practices for the construction industry. These measures will include the following: (1) limiting construction activities to 7:00 a.m. to 7:00 p.m., or until dusk when sunset occurs after 7:00 p.m.; (2) maintaining construction-related vehicles in proper working condition; and (3) working with the local community to advise residents of those periods when sustained construction activity is expected to take place in relatively close proximity to their homes. Because Substation noise it is expected to be so limited, no mitigation is planned.

[4906-4-08(A)(3)(e)]

The Noise Report prepared by Hessler (Exhibit E) includes the results of a preconstruction background noise study that it conducted for the Project. Measurements were taken during both daytime and nighttime conditions, although the latter is not relevant to the Project as it will operate only during the day. The methodology for the study is described in Section 2.0 and the results it produced are set forth in Section 3.0 of the Noise Report.

#### 4. WATER IMPACTS

OPSB Application Requirement [4906-4-08(A)(4)]:

*“(4) Water impacts. The applicant shall provide information regarding water impacts*

*(a) Provide an evaluation of the impact to public and private water supplies due to construction and operation of the proposed facility.*

*(b) Provide an evaluation of the impact to public and private water supplies due to pollution control equipment failures.*

*(c) Provide existing maps of aquifers, water wells, and drinking water source protection areas that may be directly affected by the proposed facility.*

*(d) Describe how construction and operation of the facility will comply with any drinking water source protection plans near the project area.*

*(e) Provide an analysis of the prospects of floods for the area, including the probability of occurrences and likely consequences of various flood stages, and describe plans to mitigate any likely adverse consequences.”*

Response:

[4906-4-08(A)(4)(a)]

Applicant retained Hull and Associates, Inc. (“Hull”) to review the available geologic, hydrogeologic, and geotechnical data for the Project Area. A copy of Hull’s report, which is entitled “Groundwater Hydrogeological and Geotechnical Desktop Document Review Summary Report for the Proposed Alamo Solar Farm Project located in Preble County, Ohio” (“Geotechnical-Hydrogeology Report”), is attached as **Exhibit F**.

The Project will not have any impact to public or private water supplies because the construction of the Project is unlikely to involve work more than ten (10) feet below the ground surface, will use very little water, and will not generate any wastewater discharges. As noted below, area aquifers and water wells in the Project Area for which there is public information have been identified. In addition, Attachment A of the Geotechnical-Hydrogeology Report includes the results of a well survey of the land owners participating in the Project. This information on wells that was not publicly available provides Applicant with ample information to ensure its construction activities will not adversely affect area drinking water supplies.

[4906-4-08(A)(4)(b)]

The Project will not impact public and private water supplies due to failures of pollution control equipment because the Project will not include any such equipment.

[4906-4-08(A)(4)(c)]

**Figure 8** depicts aquifers, water wells, and Source Water Protection Areas (“SWPA”) near the Project Area. The Geotechnical-Hydrogeology Report also includes a map (Figure 7 of Exhibit F) that depicts within and near the Project Area the locations of the aquifers and water wells based on information provided by ODNR, Ohio EPA and local health agencies. Based on data from the Ohio EPA, the nearest SWPA is the Lakengren Water Authority, a community system located approximately one-third mile from the Project Area and ranked as moderately susceptible by the Ohio EPA. Due to the minimal impacts beyond ten (10) feet below ground surface, minimal water use, and lack of wastewater discharges, the Project is not expected to directly affect any aquifers, water wells or SWPAs, including Lakengren.

[4906-4-08(A)(4)(d)]

Ohio EPA and other regulatory agencies have adopted regulations that restrict specific activities within SWPAs. Hull has reviewed the rules and regulations related to the presence of SWPAs and has concluded that construction of the Project will not be considered an activity that would be restricted within either a surface water or groundwater SWPA.

[4906-4-08(A)(4)(e)]

Hull determined that there are no 100-year floodplains outside of the surface water bodies in the Project Area or in the surrounding areas (Exhibit F). Soils in the Project Area range from very poorly-draining to moderately well-draining, and so there is some

potential for localized, rainfall-driven event flooding that may affect the Project by impeding the travel and work of operational personnel. Such events will be fully accounted for in the SWPPP for the Project. Given the largely passive nature of the infrastructure and the lack of any storage of fluids or potentially hazardous materials, such events should not be of concern to the community or environment.

## **5. GEOLOGICAL FEATURES, TOPOGRAPHY AND WELLS**

OPSB Application Requirement [4906-4-08(A)(5)]:

*“(5) The applicant shall provide a map of suitable scale showing the proposed facility, geological features of the proposed facility site, topographic contours, existing gas and oil wells, and injection wells. The applicant shall also:*

*(a) Describe the suitability of the site geology and plans to remedy any inadequacies.*

*(b) Describe the suitability of soil for grading, compaction, and drainage, and describe plans to remedy any inadequacies and restore the soils during post-construction reclamation.*

*(c) Describe plans for the test borings, including closure plans for such borings. Plans for the test borings shall contain a timeline for providing the test boring logs and the following information to the board:*

*(i) Subsurface soil properties.*

*(ii) Static water level.*

*(iii) Rock quality description.*

*(iv) Percent recovery.*

*(v) Depth and description of bedrock contact.”*

Response:

[4906-4-08(A)(5)]

The Project does not have stringent requirements for subsurface conditions because of the very limited degree to which the equipment will be constructed below grade. Piles are expected to reach a maximum depth of ten (10) feet below grade



collection lines will be buried at a minimum depth of at least three (3) feet below grade. Similarly, the Project does not have stringent soil requirements because the Project Area is level and the solar panels will largely follow the existing terrain. Equipment installation will be designed avoid all known and active wells in addition to drainage tile. In the event that drainage tile is knowingly or inadvertently damaged during the construction or operation of the Project will be fixed or replaced with an equivalent or improved method of drainage.

**Figure 9** depicts the location of the proposed Project, geological features of the proposed Project Area, and topographic contours. According to ODNR data, there are no existing gas and oil wells within or adjacent to the Project Area. Maps showing various subsurface features, including geologic features and topographic contours, are also included in the Geotechnical-Hydrogeology Report (see Exhibit F). There are no active oil and gas wells or injection wells in the immediate vicinity of the Project Area.

[4906-4-08(A)(5)(a)]

The site geology is highly suitable for the Project because the Project's subsurface impact will be very shallow, and bedrock is not expected to be encountered. Accordingly, there are no geology-related inadequacies to remedy in connection with the Project. Hull analyzed available information to estimate the depth to bedrock throughout the Project Area and concluded that it ranges from between approximately 45 to 140 feet below the surface. Little difficulty with bedrock is expected since the depth of the vast majority of the piles, and all the collection lines, will be less than eight (8) feet.

[4906-4-08(A)(5)(b)]

The soils in the Project Area, which consist primarily of silt loams with some gravel and clay loams, is suitable for grading, compaction and drainage for the Project, and there are no soil-related inadequacies to remedy in connection with the Project. Importantly, the Project will necessitate only very limited grading and compaction, primarily in connection with the construction of the Substation and roads. The Project Area is very

level, obviating the need for substantial grading. The racking and panels will be installed without removing significant quantities of top soil, and the arrays generally will follow the (very limited) contours of the surface. The limited amounts of soil removed for construction of the Project will be used for establishing ground cover or retained by the land owner.

[4906-4-08(A)(5)(c)]

Applicant expects to need to conduct only limited test borings in connection with construction of the Project. A waiver has been submitted to allow the Applicant to submit its plan for such borings, including appropriate closure plans, to the Board no more than 30 days prior to the commencement of the field work and after the Project layout has been finalized. Within 60 days following the receipt of all relevant data from the borings, Applicant will provide the Board with all of the information required above: subsurface soil properties, static water level, rock quality description, percent recovery, and depth and description of bedrock contact.

## **6. HIGH WINDS**

OPSB Application Requirement [4906-4-08(A)(6)]:

*“(6) Wind velocity. The applicant shall provide an analysis of the prospects of high winds for the area, including the probability of occurrences and likely consequences of various wind velocities, and describe plans to mitigate any likely adverse consequences.”*

Response:

[4906-4-08(A)(6)]

This requirement does not apply to the Project because, apart from tornado-force winds, its components generally are not susceptible to damage from high winds. All project equipment will be installed, given the site-specific soil conditions, at sufficient depths to preclude any adverse influence from wind.

## **7. BLADE SHEAR**

OPSB Application Requirement [4906-4-08(A)(7)]:

*“(7) Blade shear. The applicant shall evaluate and describe the potential impact from blade shear at the nearest property boundary and public road.”*

Response:

[4906-4-08(A)(7)]

This requirement does not apply to the Project because it will not include blades.

## **8. ICE THROW**

OPSB Application Requirement [4906-4-08(A)(8)]:

*“(8) Ice throw. The applicant shall evaluate and describe, by providing a site-specific ice throw risk analysis and assessment study, the potential impact from ice throw at the nearest property boundary and public road.”*

Response:

[4906-4-08(A)(8)]

This requirement does not apply to the Project because it will not include any unenclosed, moving parts that potentially could throw ice. Any ice “drop” from elevated equipment would fall only short distances and wholly within the fence lines.

## **9. SHADOW FLICKER**

OPSB Application Requirement [4906-4-08(A)(9)]:

*“(9) Shadow flicker. For a wind farm, the applicant shall evaluate and describe the potential cumulative impact from shadow flicker at the property boundary and sensitive receptors within a distance of ten rotor diameters or at least one-half mil, whichever is greater, of a turbine, including its plans to minimize potential impacts.”*

Response:

[4906-4-08(A)(9)]

This requirement does not apply to the Project because it does not include any wind turbines and the Project will not include any moving parts that potentially could produce shadow flicker at any habitable residence.

## **10. TV AND RADIO RECEPTION**

OPSB Application Requirement [4906-4-08(A)(10)]:

*“(10) Radio and TV reception. The applicant shall evaluate and describe the potential for the facility to interfere with radio and TV reception and describe measures that will be taken to minimize interference.”*

Response:

[4906-4-08(A)(10)]

The Project is not expected to have any material impact on radio or TV reception because it lacks tall structures and exposed moving parts, and it will generate only very weak electromagnetic fields (“EMFs”), and only during the day, that will dissipate rapidly within short distances. “PV arrays generate EMF in the same extremely low frequency (ELF) range as electrical appliances and wiring found in most homes and buildings” (MDER, 2015). In a recent study of several solar arrays in Massachusetts, electric fields levels measured along the boundary were not elevated above background (Massachusetts Clean Energy Center, 2012). Applicant is aware of no research that indicates that the Project has the potential to interfere with radio or television reception.

## **11. RADAR SYSTEMS**

OPSB Application Requirement [4906-4-08(A)(11)]:

*“(11) Radar interference. The applicant shall evaluate and describe the potential for the facility to interfere with military and civilian radar systems and describe measures that will be taken to minimize interference.”*

Response:

[4906-4-08(A)(11)]

The Project is not expected to have any material impact on military or civilian radar systems because it lacks tall structures that could potentially block radar signals. It also lacks exposed moving parts and it will generate only very weak EMFs that will dissipate rapidly within short distances. The FAA has concluded that solar arrays do not cause radar interference:

“Radar interference occurs when objects are placed too close to a radar sail (or antenna) and reflect or block the transmission of signals between the radar antenna and the receiver (either a plane or a remote location).

. . .

Due to their low profiles, solar PV systems typically represent little risk of interfering with radar transmissions. In addition, solar panels do not emit electromagnetic waves over distances that would interfere with radar signal transmissions, and any electrical facilities that do carry concentrated current are buried beneath the ground and away from any signal transmission.

. . .

Off-airport solar projects are even more unlikely [than on-airport solar projects] to cause radar interference unless located close to airport property and within the vicinity of a radar equipment and transmission pathways” (FAA Guidance, 2010).

Applicant is aware of no research that indicates that the Project has the potential to interfere with any radar systems.

## **12. NAVIGABLE AIRSPACE INTERFERENCE**

### OPSB Application Requirement [4906-4-08(A)(12)]:

*“(12) Navigable airspace interference. The applicant shall evaluate and describe the potential for the facility to interfere with navigable airspace and describe measures that will be taken to minimize interference. The applicant shall coordinate such efforts with appropriate state and federal agencies.”*

Response:

[4906-4-08(A)(12)]

The Project is not expected to have any adverse impact on navigable airspace because it lacks any tall structures with the potential to interfere with aircraft navigation. The only structure at the Project at an appreciable height will be a single lightning mast at the Substation. Applicant is aware of no information that suggests that the Project would cause interference with any navigable airspace.

### **13. MICROWAVES**

OPSB Application Requirement [4906-4-08(A)(13)]:

*“(13) Communication interference. The applicant shall evaluate and describe the potential for the facility to interfere with microwave communication paths and systems and describe measures that will be taken to minimize interference. Include all licensed systems and those used by electric service providers and emergency personnel that operate in the project area.”*

Response:

[4906-4-08(A)(13)]

The Project is not expected to have any adverse impact on microwave communication paths because it lacks any tall structures with the potential to block those paths. The only structure at the Project at an appreciable height will be a single lightning mast at the Substation. The lightning mast will not interfere with any microwave transmissions because it will be too narrow. Applicant is aware of no information that suggests that the Project would cause, interference with any microwave transmissions.

## **B. ECOLOGICAL RESOURCES**

### **1. ECOLOGICAL RESOURCES IN PROJECT AREA**

OPSB Application Requirement [4906-4-08(B)(1)]:

*“(1) Ecological information. The applicant shall provide information regarding ecological resources in the project area.*

*(a) Provide a map of at least 1:24,000 scale containing a one half-mile radius from the project area, showing the following:*

- (i) The proposed facility and project area boundary.*
- (ii) Undeveloped or abandoned land such as wood lots or vacant tracts of land subject to past or present surface mining activities, not used as a registered game preserve or in agricultural production.*
- (iii) Wildlife areas, nature preserves, and other conservation areas.*
- (iv) Surface bodies of water, including wetlands, ditches, streams, lakes, reservoirs, and ponds.*
- (v) Highly-erodible soils and slopes of twelve percent or greater.*
- (b) Provide the results of a field survey of the vegetation and surface waters within one-hundred feet of the potential construction impact area of the facility. The survey should include a description of the vegetative communities, and delineations of wetlands and streams. Provide a map of at least 1:12,000 scale showing all delineated resources.*
- (c) Provide the results of a literature survey of the plant and animal life within at least one-fourth mile of the project area boundary. The literature survey shall include aquatic and terrestrial plant and animal species that are of commercial or recreational value, or species designated as endangered or threatened.*
- (d) Conduct and provide the results of field surveys of the plant and animal species identified in the literature survey.*
- (e) Provide a summary of any additional studies which have been made by or for the applicant addressing the ecological impact of the proposed facility.”*

Response:

[4906-4-08(B)(1)(a)]

Applicant retained Cardno, Inc. (“Cardno”) to catalog the ecological resources in the Project Area, conduct field surveys of vegetation and surface waters located within 100-feet of the potential construction impact zone, perform a literature review of the plant and animal life located within one-fourth mile of the Project Area, and conduct field surveys of the plant and animal species identified in the literature review. Cardno is a professional infrastructure and environmental service company that has conducted ecological assessments for several electric generation facilities that have been issued a

Certificate. A copy of Cardno's report, which is entitled "Ecological Assessment" ("Ecology Report") is attached as **Exhibit G**.

A map depicting the above-listed ecological resources located within one-half mile of the Project Area is attached as **Figure 10**. This map shows the following: (1) the Project and its component parts and the boundary of the Project Area; (2) undeveloped or abandoned land (e.g., wood lots and shrubland); (3) wildlife areas (there are no nature preserves or other conservation areas); (4) surface water, including wetlands; and (5) highly-erodible soils and slopes of 12% or more grade. This map was prepared using a variety of desktop sources but has been field-verified by Cardno.

[4906-4-08(B)(1)(b)]

Cardno conducted a comprehensive field survey of the vegetation and surface waters located within 100-feet of the potential construction impact zone within the Project Area. The background, methods and results of the field study are set forth in Section 6 ("Pre-construction Surveys") of the Ecology Report (Exhibit G). A map depicting vegetative communities and Cardno-delineated wetlands and streams is attached as **Figure 11**. Cardno identified 30 waterbodies (streams, ponds and ditches) in the Project Area. Thirteen (13) wetlands totaling approximately 4.71 acres were identified in the Project Area. The majority of the wetlands were of relatively low quality. There will be minor impacts to wetlands and ditches as a result of the Project. Section 7 of **Exhibit G** discusses impacts in greater detail.

[4906-4-08(B)(1)(c)]

Cardno conducted an extensive literature review of plant and animal life located within one-fourth mile of the Project Area boundary. The review included not only aquatic and terrestrial plant and animal species designated as threatened or endangered, but also those deemed to have commercial or recreational value. The literature review is found in Section 4.4 ("Biological/Conservation") of the Ecology Report (Exhibit G). Plant life is addressed in Section 4.4.1 ("Vegetative Community"), animal life is addressed in



Section 4.4.2 (“Wildlife Resources”), and threatened or endangered species are addressed in Section 4.4.3 (“Rare, Threatened & Endangered Species”).

Cardno determined that the species present in the Project Area are those primarily associated with agricultural fields, pasture grasslands, isolated wood lots, and wetlands. It noted that a majority of the federal- or Ohio-listed species potentially present in the area would be expected to inhabit the wetlands and associated streams. Cardno concluded, however, that it is unlikely that these habitats are well-developed due to constant disturbance from cultivation and habitat fragmentation. Cardno determined that the Project Area and one-quarter mile buffer are not known to provide significant habitat for sensitive bird species, and that there are no records of bald eagle nests or known bat hibernacula in the area. It also advised that no commercially valuable species were expected to be present in the Project Area.

[4906-4-08(B)(1)(d)]

Cardno’s field surveys of the Project Area and one-quarter mile buffer confirmed the conclusions it drew from the literature survey. It observed no evidence of (1) bald eagle nests or activity; (2) nests of listed or sensitive raptor species; (3) bat activity; or (4) any federal- or Ohio-listed species. Although these field observations did not constitute formal presence/absence surveys for specific species, they do confirm that the Project Area and one-quarter mile buffer constitute generally poor wildlife habitat owing to the historically high degree of fragmentation and the constant disturbance of the vast majority of the land by agriculture and related operations.

[4906-4-08(B)(1)(e)]

Applicant did not undertake other studies addressing the ecological impact of the Project.

## 2. POTENTIAL IMPACT DURING CONSTRUCTION

### OPSB Application Requirement [4906-4-08(B)(2)]:

*“(2) Ecological impacts. The applicant shall provide information regarding potential impacts to ecological resources during construction.*

*(a) Provide an evaluation of the impact of construction on the resources surveyed in response to paragraph (B)(1) of this rule. Include the linear feet and acreage impacted, and the proposed crossing methodology of each stream and wetland that would be crossed by or within the footprint of any part of the facility or construction equipment. Specify the extent of vegetation clearing, and describe how such clearing work will be done so as to minimize removal of woody vegetation. Describe potential impacts to wildlife and their habitat.*

*(b) Describe the mitigation procedures to be utilized to minimize both the short-term and long-term impacts due to construction, including the following:*

*(i) Plans for post-construction site restoration and stabilization of disturbed soils, especially in riparian areas and near wetlands. Restoration plans should include details on the removal and disposal of materials used for temporary access roads and construction staging areas, including gravel.*

*(ii) A detailed frac out contingency plan for stream and wetland crossings that are expected to be completed via horizontal directional drilling.*

*(iii) Methods to demarcate surface waters and wetlands and to protect them from entry of construction equipment and material storage or disposal.*

*(iv) Procedures for inspection and repair of erosion control measures, especially after rainfall events.*

*(v) Methods to protect vegetation in proximity to any project facilities from damage, particularly mature trees, wetland vegetation, and woody vegetation in riparian areas.*

*(vi) Options for disposing of downed trees, brush, and other vegetation during initial clearing for the project, and clearing methods that minimize the movement of heavy equipment and other vehicles within the project area that would otherwise be required for removing all trees and other woody debris off site.*

*(vii) Avoidance measures for state or federally listed and protected species and their habitat in accordance with paragraph (D) of rule 4906-4-09 of the Administrative Code.”*

Response:

[4906-4-08(B)(2)(a)]

As part of its surveys and analysis, Cardno calculated the probable impact of the construction of the Project on the ecological resources that it inventoried in the Project Area. Those impacts are set forth in Section 7.2 of the Ecology Report (Exhibit G), with a summary detailed in Table 7-2. The impacts addressed in Appendix E of the Ecology Report include (1) the linear feet and acreage of each stream and wetland crossing; (2) the methodology used for each stream and wetland crossing; (3) the extent of vegetation clearing, including the steps to be taken to minimize the removal of woody vegetation; and (4) the impacts to wildlife and its habitat.

A small portion of the Project Area is occupied by trees, which can be divided into two categories: (1) narrow (30-to-60 feet wide), linear strips of trees (referred to as “windrows”) running between cultivated areas that likely served historically as property boundaries; and (2) larger, more substantial blocks of trees and associated habitat (referred to as “woodlots”), with the largest of these likely maintained for hunting as many featured tree stands and utility vehicle trails. The vast majority of the trees in the Project Area, especially the woodlots, will not be disturbed by the construction of the Project.

The construction of the Project is expected to have almost negligible impacts on wildlife and their habitat. The vast majority of the Project will be constructed on agricultural fields, which already provide minimal habitat for plant and animal life. The relatively small areas of trees to be removed do not provide significant habitat for wildlife. Permanent disturbance of all streams and wetlands will be avoided, with HDD used to place any Collection Lines under the two (2) high quality (HHEI Class III) waterbodies in the Project Area. The disturbance of other waterbodies will be limited to agricultural ditches that have historically been highly impacted by cultivation and, while providing some habitat, do not support rich animal communities and are unlikely to support aquatic communities.

[4906-4-08(B)(2)(b)]

In addition to generally avoiding ecological impacts, Applicant will use a variety of measures to mitigate impacts. Prior to construction, sensitive resources such as stream and wetlands, will be demarcated with flagging or signage. The site orientation provided to construction personnel will include information about these resources, their importance to the area ecology, and steps to minimize impacts. HDD will be used to cross jurisdictional waterbodies, as described in **Exhibit G**. Appendix F of **Exhibit G** is a “frac out” contingency plan that sets forth procedures to avoid, minimize, and remediate potential environmental impacts resulting from an inadvertent return of drilling fluids during HDD operations. Timber and other vegetative debris may be chipped for use as erosion control mulch or disposed of in accordance with local regulations and landowner preferences. The SWPPP will incorporate appropriate erosion and sediment control measures to ensure that waterbodies close to construction activities are not adversely impacted. As necessary, environmental monitors will be used to ensure appropriate implementation and faithful observance of all of these protective and minimization measures. Additionally, Applicant will restore all disturbed waterbodies from construction to pre-construction conditions within one growing season.

Final construction designs will be submitted to the Board for review prior to construction. Those designs will include detailed procedures for each of the elements listed above, and will address: (1) soil management; (2) a detailed frac-out contingency plan for the HDD; (3) surface water and wetland demarcation; (4) SWPPP inspection procedures; (5) vegetation protection; and (6) vegetation disposal. Construction is not expected to interfere with any major species or its habitat.

The requirement under paragraph (D) of rule 4906-4-09 does not apply to the Project because it does not include any wind turbines.

### **3. POTENTIAL IMPACT DURING OPERATION**

OPSB Application Requirement [4906-4-08(B)(3)]:

*“(3) Operational ecological impacts. The applicant shall provide information regarding potential impacts to ecological resources during operation and maintenance of the facility.*

*(a) Provide an evaluation of the impact of operation and maintenance on the undeveloped areas shown in response to paragraph (B)(1) of this rule.*

*(b) Describe the procedures to be utilized to avoid, minimize, and mitigate both the short- and long-term impacts of operation and maintenance. Describe methods for protecting streams, wetlands, and vegetation, particularly mature trees, wetland vegetation, and woody vegetation in riparian areas. Include a description of any expected use of herbicides for maintenance.*

*(c) Describe any plans for post-construction monitoring of wildlife impacts.”*

Response:

[4906-4-08(B)(3)(a)]

The Project's operation will not have any significant adverse impacts to ecological resources, including on the undeveloped areas previously identified or streams, wetlands, and vegetation. There will be some minor permanent impacts to a wetland and ditches as a result of the Project, and these impacts are listed in Appendix E of **Exhibit G**. The Project will be a highly passive operation; equipment will have few moving parts, all of which will be fully enclosed. The Project will consume essentially no water (only for occasional cleaning of panels) and its only fuel will be sunlight. It will generate no stationary source air pollution, no wastewater and little solid waste.

Only a few operational personnel will be needed for the Project, and they will be present at any given location in the Project only occasionally. Personnel will perform essentially the following basic tasks: (1) inspection, maintenance, repair and replacement of equipment; (2) occasional cleaning of soiling and removal of snow, from solar panels; (3) regular mowing and associated maintenance of vegetative ground cover; (4) periodic security checks; (5) emergency response; and (6) community relations. On most days, at any particular location at the Project, no operating personnel will be present.

[4906-4-08(B)(3)(b)]

The Project's operation will be highly passive; it will not entail activities that may adversely affect the environment, including streams, wetlands and vegetation. After construction, the Project will have essentially no impact on mature trees, wetland vegetation or woody vegetation in riparian areas. Operating personnel may use commercially-available herbicides for the control of noxious weeds and as needed for the proper maintenance of the vegetative cover. Over the life of the Project, however, this likely will be far less than used for farming. Because the solar panels will be constructed only in cleared, dry, upland areas, the occasional use of herbicides will not adversely affect mature trees, streams, wetland vegetation, and riparian areas.

The final design of the Project also will include pollinator-friendly, native plantings in selected locations along the perimeter. These features not only will enhance the Project's visual appeal but will enrich local wildlife habitat and benefit local farming. Native fruit and flowering plants can provide a much-needed food source for wild, native butterflies, bees, and insects that pollinate flowering forbs and some commercial crops. As with the vegetative cover, pollinator habitat also will reduce erosion, reduce fertilizer, herbicide and pesticide use, discourage invasive species and improve water quality. Pollinator features will be included in the landscape plan, which will be part of the final design of the Project.

[4906-4-08(B)(3)(c)]

Applicant has no plans for the post-construction monitoring of impacts to wildlife because no adverse impacts are expected. The Project will have no moving parts that are not fully enclosed (and these will be limited to the Substation, the Inverters and, if tracking is employed, small electric motors). It will have no environmental discharges potentially affecting wildlife. Operational vehicle use will not appreciably increase the amount of traffic in the general vicinity of the Project Area.

## **C. LAND USE AND COMMUNITY DEVELOPMENT**

### **1. LAND USE IN PROJECT AREA AND POTENTIAL IMPACTS**

OPSB Application Requirement [4906-4-08(C)(1)]:

*“(1) Existing land use. The applicant shall provide information regarding land use in the region and potential impacts of the facility through the following maps and related information.*

*(a) Provide a map of at least 1:24,000 scale showing the following within one-mile of the project area boundary:*

*(i) The proposed facility.*

*(ii) Land use, depicted as areas on the map. Land use, for the purposes of paragraph (C) of this rule, refers to the current economic use of each parcel. Categories should include residential, commercial, industrial, institutional, recreational, agricultural, and vacant, or as classified by the local land use authority.*

*(iii) Structures, depicted as points on the map. Identified structures should include residences, commercial centers or buildings, industrial buildings and installations, schools, hospitals, churches, civic buildings, and other occupied places.*

*(iv) Incorporated areas and population centers.*

*(b) Provide, for the types of structures identified on the map in paragraph (C)(1)(a) of this rule, a table showing the following:*

*(i) For all structures and property lines within one thousand five hundred feet of the generation equipment or wind turbine, the distance between both the structure or property line and the equipment or nearest wind turbine.*

*(ii) For all structures and property lines within two hundred fifty feet of a collection line, access road, or other associated facility, the distance between both the structure or property line and the associated facility.*

*(iii) For each structure and property in the table, whether the property is being leased by the applicant for the proposed facility.*

*(c) Provide an evaluation of the impact of the proposed facility on the above land uses identified on the map in paragraph (C)(1)(a) of this rule. Include, for each land use type, the construction impact area and the permanent impact area in acres, in total and for each project component (e.g., turbines, collection lines, access roads), and the explanation of how such estimate was calculated.*

*(d) Identify structures that will be removed or relocated.”*

Response:

[4906-4-08(C)(1)(a) & (b)]

The map and tables required by the above are attached as **Figure 12** and **Figures 13, through 16**, respectively.

[4906-4-08(C)(1)(c)]

The impacts, in acres, of the Project on each land use category identified in the above map, including the construction impact area and the permanent impact area, in total, and separately for each project component (solar fields, collection lines outside of fencing, the Substation, and roads) are provided in the table attached as **Figure 17**.<sup>4</sup>

[4906-4-08(C)(1)(d)]

It is anticipated that only one residence and associated farm structures will be relocated to accommodate the Project. The Project Area includes a limited number of non-residential, farm-related structures or partial structures that are old and in relatively poor condition. In consultation with the participating land owners, one or more of these structures may be removed facilitate the Project and put the land to more productive use.

## **2. MAP REQUIRED FOR WIND FARMS**

OPSB Application Requirement [4906-4-08(C)(2)]:

*“(2) Wind farm maps. For wind farms only, the applicant shall provide a map(s) of at least 1:24,000 scale showing the proposed facility, habitable residences, and parcel boundaries of all parcels within a half-mile of the project area. Indicate on the map, for each parcel, the parcel number and whether the parcel is being leased by the applicant for the proposed facility, as of no more than thirty days prior to the submission of the application.*

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<sup>4</sup> Note that the total acreage impacted by the solar fields represents the entire acreage within the perimeter fences of the solar fields, but that considerably less than 50% of the land within the solar fields actually will be occupied by equipment.



*Include on the map the setbacks for wind turbine structures in relation to property lines, habitable residential structures, electric transmission lines, gas distribution lines, hazardous liquid(s) pipelines, and state and federal highways, consistent with no less than the following minimum requirements:*

*(a) The distance from a wind turbine base to the property line of the wind farm property shall be at least one and one-tenth times the total height of the turbine structure as measured from its tower's base (excluding the subsurface foundation) to the tip of a blade at its highest point.*

*(b) The wind turbine shall be at least one thousand, one hundred, twenty-five feet in horizontal distance from the tip of the turbine's nearest blade at ninety degrees to the property line of the nearest adjacent property at the time of the certification application.*

*(c) The distance from a wind turbine base to any electric transmission line, gas pipeline, hazardous liquid pipeline, or state or federal highway shall be at least one and one-tenth times the total height of the turbine structure as measured from its tower's base (excluding the subsurface foundation) to the tip of a blade at its highest point.*

*(d) Minimum setbacks from property lines and residences may be waived pursuant to procedures set forth in paragraph (C)(3) of this rule."*

Response:

[4906-4-08(C)(2)]

This requirement is not applicable to the Project because it does not include wind turbines.

### **3. SETBACK WAIVERS**

OPSB Application Requirement [4906-4-08(C)(3)]:

*"(3) Setback waivers. The setback shall apply in all cases except those in which all owner(s) of property adjacent to the wind farm property waive application of the setback to that property. The waiver(s) must meet the following requirements:*

*(a) Content of Waiver. The waiver shall:*

*(i) Be in writing;*

*(ii) Provide a brief description of the facility;*

*(iii) Notify the applicable property owner(s) of the statutory minimum setback requirements*

*(iv) Describe the adjacent property subject to the waiver through a legal description;*

*(v) Describe how the adjacent property is subject to the statutory minimum setback requirements; and*

*(vi) Advise all subsequent purchasers of the adjacent property subject to the waiver that the waiver of the minimum setback shall run with the land.*

*(b) Required Signature. The waiver shall be signed by the applicant and the applicable property owner(s), indicating consent to construction activities without compliance with the minimum setback requirements.*

*(c) Recordation of Waiver. The waiver shall be recorded in the county recorder's office where the property that is subject of the waiver is located.*

Response:

[4906-4-08(C)(3)]

This requirement is not applicable to the Project because it does not require any setback waivers.

#### **4. LAND USE PLANS**

OPSB Application Requirement [4906-4-08(C)(4)]:

*“(4) Land use plans. The applicant shall provide information regarding land use plans.*

*(a) Describe formally adopted plans for future use of the project area and surrounding lands for anything other than the proposed facility.*

*(b) Describe the applicant's plans for concurrent or secondary uses of the site.*

*(c) Describe the impact of the proposed facility on regional development, including housing, commercial and industrial development, schools, transportation system development, and other public services and facilities.*

*(d) Assess the compatibility of the proposed facility and the anticipated resultant regional development with current regional plans.*

*(e) Provide current population counts or estimates, current population density, and ten-year population projections for counties and populated places within five miles of the project area.”*

Response:

[4906-4-08(C)(4)(a)]

Applicant conferred with local officials and examined the Preble County Comprehensive Economic Development Strategy and Land Use Plan with regard to the Project and its relationship to the County’s land use priorities. In 2011, Preble County adopted this land use plan emphasizing support for the agricultural economy, preservation of agricultural land, creation of new employment opportunities. The Project advances these goals because it allows farms to diversify income, preserves land for future generations, increases township and county tax revenues, and creates temporary and permanent jobs in the County.

[4906-4-08(C)(4)(b)]

Applicant has no plans for concurrent or secondary use of the Project Area.

[4906-4-08(C)(4)(c) & (d)]

As the Socioeconomic Report (Exhibit D) indicates, the Project is not expected to have any significant adverse effect on regional development, including housing, commercial and industrial development, schools, transportation system development, or other public services and facilities. The Project will, however, positively contribute to employment, as well as providing the secondary and induced effects of increased wages. Similarly, the Project will contribute significant new sums annually to the tax base for the County. As described above, Preble County adopted a land use plan focused on increasing employment opportunities, emphasizing the agricultural economy, and preservation of agricultural land. The Project helps meet these goals by creating temporary and permanent employment opportunities and by preserving farm land for

future generations. Preble County is also part of the Dayton Development Coalition, which encourages innovation and diverse economic growth throughout the Dayton region.

[4906-4-08(C)(4)(e)]

Estimates of current population, population density, and ten-year population projections for counties and populated places within five (5) miles of the Project Area are provided the “Socioeconomic Trends in Preble County” section of the Socioeconomic Report. In particular, population figures the County are provided in Table 2 of the Socioeconomic Report (Exhibit D). Similar data for each of the populated areas within five (5) miles of the Project Area are set forth in the “Socioeconomic Trends in Preble County” discussion.

#### **D. CULTURAL AND ARCHAEOLOGICAL RESOURCES**

The Project will have a very low visual profile on the land. The highest points within the solar fields will be the “high end” of the solar panels, whether fixed or, twice daily, tracking. In each case, the highest point of the solar panels and the inverters will be less than 15 feet above ground level. All other portions of the Project will either be located at the Substation or be installed below grade.

The highest part of the Project above ground level will be equipment within the Substation. The highest structure within the Substation will be a single, narrow lightning mast, with an anticipated maximum height of 70 feet. Other components within the Substation are likely to have maximum heights of 30 feet. Despite these features, the Substation and gen-tie line will not add materially to the anthropogenic profile of the area because it will be constructed adjacent to the existing 69 kV transmission line. This existing transmission line is near or higher than 30 feet in height.

Applicant retained EDR to evaluate the visual impact that the Project would have on registered landmarks, formally-adopted reaction amenities, as well as the community at large. EDR has extensive experience in performing evaluations of this type, including a number that have been submitted to the Board on behalf of other clients. EDR performed both a cultural resources records review, which is entitled “Cultural Resource Records Review” dated November 2018 (“Cultural Resources Report”), a copy of which

is attached as **Exhibit H**, as well as a viewshed analysis, which is entitled “Visual Resource Assessment” dated November 2018 (“Visual Resources Report”), a copy of which is attached as **Exhibit I**.

As part of these studies, EDR conducted a viewshed analysis of the Project based on a bare earth digital surface model (“DSM”). The DSM conservatively assumed a viewer height of six (6) feet and a maximum height for the Project of 15 feet throughout the Project Area. It incorporated both topographical data for the area as well as buildings and vegetation derived from the Ohio Statewide Imagery Program’s 2007 “light detection and ranging” (also known as “LIDAR”) data for Preble County.

The results of this methodology conservatively demonstrate that the Project generally will not be visible at locations that are two (2) miles or more away from the Project Area. The analysis also illustrates why the Project will not be visible from the vast majority of areas even within two (2) miles of the Project Area. Rather, due to the extremely low profile of the solar panels and the significant amount of vegetation in the area, the number of locations from which the equipment may be visible is relatively few; the vast majority of these locations are very close to the equipment.

## **1. RECREATION AREAS AND LANDMARKS IN PROJECT AREA**

OPSB Application Requirement [4906-4-08(D)(1)]:

*“(1) Landmark mapping. The applicant shall indicate, on a map of at least 1:24,000 scale, any formally adopted land and water recreation areas, recreational trails, scenic rivers, scenic routes or byways, and registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within ten miles of the project area. Landmarks to be considered for purposes of paragraph (D) of this rule are those districts, sites, buildings, structures, and objects that are recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the state historic preservation office, or the Ohio department of natural resources.”*

Response:

[4906-4-08(D)(1)]

Applicant has provided the required information, though the Project will not be visible or audible beyond a two-mile perimeter. As discussed above, locations outside of this two-mile area will not have visibility of the equipment. Also, the Project will cause only very modest operational noise, and certainly no additional noise above background at any location two (2) miles or more from the Project Area. For this reason, EDR concluded that auditory impacts from the Project were not a significant type of impact with respect to historical resources. Applicant has provided the cultural resources map required above in **Figure 18**.

## **2. IMPACTS ON REGISTERED LANDMARKS**

OPSB Application Requirement [4906-4-08(D)(2)]:

*“(2) Impacts of landmarks. The applicant shall provide an evaluation of the impact of the proposed facility on the preservation and continued meaningfulness of these landmarks and describe plans to avoid or mitigate any adverse impact.”*

Response:

[4906-4-08(D)(2)]

EDR evaluated the impact of the Project on the preservation and continued meaningfulness of the registered landmarks within the vicinity of the Project Area in Section 2.3 of the Cultural Resources Report (see Exhibit H). Because all of the landmarks are distant from the Project Area, EDR concluded that there would be no direct effects from the construction or operation of the Project on any of the landmarks. EDR recommended that, for those few areas of significant ground disturbance, such as the Substation, the Applicant conduct a limited Phase 1 archeological survey to avoid any direct effects to below-grade resources. EDR’s viewshed analysis demonstrates that the Project also will not be visible from any of the area landmarks. Accordingly, the Cultural Resources Report concludes that the Project is not anticipated to result—even indirectly—in significant adverse effects on historic-architectural resources in the vicinity.

### 3. IMPACTS ON FORMALLY-ADOPTED RECREATION AREAS

OPSB Application Requirement [4906-4-08(D)(3)]:

*“(3) Recreation and scenic areas. The applicant shall describe the identified recreation areas within ten miles of the project area in terms of their proximity to population centers, uniqueness, topography, vegetation, hydrology, and wildlife. Provide an evaluation of the impact of the proposed facility on identified recreational and scenic areas within ten miles of the project area and describe plans to mitigate any adverse impact.”*

Response:

[4906-4-08(D)(3)]

In Section 2 of its Visual Resources Report (see Exhibit I), EDR evaluated the impact that the Project would have on formally-adopted recreation areas and includes a comprehensive inventory of all formally-adopted recreation areas within five (5) miles of the perimeter of the Project Area. The Visual Resources Report concludes that, within that 5-mile area, there are no National River Inventory-designed rivers, National Scenic Trails, or National Wildlife Refuges. Woodland Trails, a State Wildlife Management Area, is located approximately one-quarter mile south of the Project Area at its closest point. Additionally, a number of lakes and streams informally used for recreation are located within the 5-mile area, but the Project will not impact these resources. When topography and existing vegetation are taken into account, the viewshed analysis conducted by EDR concludes that only 6.1% of the viewshed area between two (2) to five (5) miles from the Project may be able to see the Project. The low profile of the Project's infrastructure, maintaining the vast majority of existing woodlots, and the topography of the region ensures that visibility within the Project's viewshed area is limited to within zero (0) to two (2) miles. Because of this, Applicant has requested a waiver from the requirement to identify and describe recreation and scenic areas within ten miles of the Project Area.

### 4. VISUAL IMPACTS

OPSB Application Requirement [4906-4-08(D)(4)]:

*“(4) Visual impact of facility. The applicant shall evaluate the visual impact of the proposed facility within at least a ten-mile radius from the project area.”*



*The evaluation shall be conducted or reviewed by a licensed landscape architect or other professional with experience in developing a visual impact assessment. The applicant shall:*

*(a) Describe the visibility of the project, including a viewshed analysis and area of visual effect, shown on a corresponding map of the study area. The viewshed analysis shall not incorporate deciduous vegetation, agricultural crops, or other seasonal land cover as viewing obstacles. If the viewshed analysis includes atmospheric conditions, it shall incorporate the atmospheric conditions under which the facility would be most visible.*

*(b) Describe the existing landscape and evaluate its scenic quality. This description shall include documentation of a review of existing plans, policies, and regulations of the communities within the study area, and list all references to identified visual resources or other indications of the visual preferences of the community.*

*(c) Describe the alterations to the landscape caused by the facility, including a description and illustration of the scale, form, and materials of all facility structures, and evaluate the impact of those alterations to the scenic quality of the landscape.*

*(d) Evaluate the visual impacts to the resources identified in paragraph (D) of this rule, and any such resources within ten miles of the project area that are valued specifically for their scenic quality.*

*(e) Provide photographic simulations or artist's pictorial sketches of the proposed facility from public vantage points that cover the range of landscapes, viewer groups, and types of scenic resources found within the study area. The applicant should explain its selection of vantage points, including any coordination with local residents, public officials and historic preservation groups in selecting these vantage points.*

*(f) Describe measures that will be taken to minimize any adverse visual impacts created by the facility, including, but not limited to, project area location, lighting, turbine layout, visual screening, and facility coloration. In no event shall these measures conflict with relevant safety requirements."*

Response:

The Visual Resources Report comprehensively addresses the full range of visibility-related considerations set forth above. This includes an evaluation of the existing landscape and its scenic quality, the maximum extent of changes in the landscape that will result from construction of the Project throughout the entire Project Area, photographic simulations of the Project from a variety of vantage points representing

different viewer groups and types of scenic resources, and measures that Applicant will take to minimize adverse impacts. See **Exhibit I**.

[4906-4-08(D)(4)(a)-(c)]

The land use within the 5-mile area surrounding the perimeter of the Project Area is characterized by a mix of open agricultural fields, sparse rural residential properties, forested windrows and woodlots, and utility corridors. The Project Area itself is primarily located on private agricultural land. Most of these farms are in active use, but some of them are fallow. In general, the existing landscape in and immediately around the Project Area is typical of rural Ohio, in which there is ample vegetation, the predominant land use is agriculture, and there is relatively low population density.

The Project will only moderately alter this landscape and will not materially affect its scenic quality. The Project will have a very low profile and present a consistent visual image throughout the Project Area. Except for the Substation, which will have very limited visibility, the Project's equipment will be either buried or less than 15 feet in height. Each of the solar fields will contain essentially the same components, which will consistently follow the existing level of the various farm fields. With no discernable movement of the equipment (none if fixed tracking is used), it is fair to characterize the solar panels as passively "harvesting" energy from the sun, rather than corn or soybeans.

The Project also will have a low reflectivity. Solar panels are designed to maximize energy production by capturing as much light as possible, which means that they inherently have low levels of glare from reflection of sunlight. Solar panels "use high-transmission, low-iron glass, which absorbs more light, producing smaller amounts of glare and reflectance than normal glass" (SunPower, 2010). With regard to glare from solar panels, The Massachusetts Department of Energy Resources has reported the following:

"Solar panels are designed to absorb solar energy and convert it to electricity. Most are designed with anti-reflective glass front surfaces to capture and retain as much of the solar spectrum as possible. Solar module glass has less reflectivity than water or window glass. Typical panels are designed to reflect only about 2 percent of

incoming sunlight. Reflected light from solar panels will have a significantly lower intensity than flare from direct sunlight” (MDER, 2015).

The Project’s operation also will include only very limited lighting, which will not adversely affect existing nighttime conditions. The solar panels will not generate electricity at night. Lighting will be used primarily for safety and security at gates and infrequent repair and replacement of equipment.

[4906-4-08(D)(4)(d)]

The DSM analysis indicates that there will be essentially no potential visibility of the Project from areas located more than two (2) miles or more away from the Project Area. Actual visibility is likely to be even more limited than the DSM modeling indicates because screening provided by buildings, yard trees, and windrows (i.e., areas not mapped as forest) within the study area provide more extensive and effective screening than assumed in the modeling. Visibility of the Project will be restricted largely to areas within two (2) miles of the Project. Visibility of the Project beyond that is expected to be insignificant as the equipment will blend into the existing landscape from any open view.

[4906-4-08(D)(4)(e)]

The Visual Resources Report includes visual simulations of representative views of the Project from various foreground and near mid-ground distances, as well as different viewer circumstances. Among the viewpoints selected are ones from a transportation corridor, an intermediate distance view of the Project as it interacts with a residential setting, and open, immediate foreground views of the Project in its agricultural setting. The overall visual effect from the Project could be considered adverse only when largely unscreened and viewed in the immediate foreground (i.e., where the Project occurs in an open field directly adjacent to a public road). However, none of these unscreened foreground views are available from scenic resources and, therefore, do not cause an undue adverse effect on aesthetic resources.

[4906-4-08(D)(4)(f)]

There may be instances in which the Project is regarded as causing an adverse visual effect for a unique viewer location in close proximity to the equipment, such as a home immediately adjacent to the Project and that is directly oriented toward a broad and unobstructed view of it. Situations such as these will be accounted for in the development of a landscape plan for the Project, which will be included as part of the final design. A number of cost-effective options are available to address specific issues in limited circumstances. First, in some cases, full screening with short trees, native hedges or low-growing vegetation outside a portion of the fence may be employed. Second, portions of the perimeter fence can be designed with different materials or colors to enhance its visual appeal. Finally, native pollinator habitat outside a portion of the fence can provide a partial screen that “softens” the visual differences between the Project and the rural character of the area. Given the level topography in the Project Area, attention to the perimeter fence of a particular solar field using these and similar techniques can significantly address most aesthetic concerns. Applicant will work closely with nearby residents and local officials to identify those locations that may be best suited for landscaping treatments.

The Project also will be designed to mitigate the effects of night-time lighting. As noted above, lighting for the Project will be minimal. These systems, however, will be designed to reduce any off-site impacts. Among the features that may be incorporated into the design are that lights be down-ward facing, equipped with side shields, or motion-activated.

## **E. AGRICULTURAL DISTRICTS AND AGRICULTURAL LAND**

### **1. AGRICULTURAL RESOURCES IN PROJECT AREA**

OPSB Application Requirement [4906-4-08(E)(1)]:

*“(1) Mapping of agricultural land. The applicant shall identify on a map of at least 1:24,000 scale the proposed facility, all agricultural land, and separately all agricultural district land existing at least sixty days prior to submission of the application located within the project area boundaries. Where available, distinguish between agricultural uses such as cultivated lands, permanent pasture land, managed woodlots, orchards, nurseries,*

*livestock and poultry confinement areas, and agriculturally related structures.”*

Response:

[4906-4-08(E)(1)]

The above-required map is attached as **Figure 19**. It identifies all agricultural land, and separately identifies all land enrolled in the Current Agricultural Use Value (“CAUV”) program. This program allows farmland devoted exclusively to commercial agriculture to be valued based on the agricultural use of the land rather than its "highest and best" potential use, resulting in a substantially lower tax bill for working farmers. The map categorizes agricultural land as one of the following agricultural uses, based on 2015 data from the National Agricultural Statistics Service uses 2015 Cropland Data Layer Program: (1) soybeans; (2) corn; (3), hay/alfalfa; (4) winter wheat; and (5) winter wheat and soybeans. In addition to CAUV and cropland cover, **Figure 19** also displays agricultural districts within the Project Area.

## **2. IMPACTS TO AGRICULTURAL RESOURCES**

OPSB Application Requirement [4906-4-08(E)(2)]:

*“(2) Agricultural information. The applicant shall provide, for all agricultural land, and separately for agricultural uses and agricultural districts identified under paragraph (E)(1) of this rule, the following:*

*(a) A quantification of the acreage impacted.*

*(b) An evaluation of the impact of the construction, operation, and maintenance of the proposed facility on the land and the following agricultural facilities and practices within the project area:*

*(i) Field operations such as plowing, planting, cultivating, spraying, harvesting.*

*(ii) Irrigation.*

*(iii) Field drainage systems.*

*(iv) Structures used for agricultural operations.*

*(v) The viability as agricultural district land of any land so identified.*

*(c) A description of mitigation procedures to be utilized by the applicant during construction, operation, and maintenance to reduce impacts to agricultural land, structures, and practices. The description shall illustrate how avoidance and mitigation procedures will achieve the following:*

*(i) Avoidance or minimization to the maximum extent practicable of any damage to field tile drainage systems and soils in agricultural areas.*

*(ii) Timely repair of damaged field tile systems to at least original conditions, at the applicant's expense.*

*(iii) Segregation of excavated topsoil, and decompaction and restoration of all topsoil to original conditions unless otherwise agreed to by the landowner."*

Response:

[4906-4-08(E)(2)(a)]

The table attached as **Figure 20** lists the acreage of disturbance, including temporary disturbance and permanent loss of cultivated lands/croplands, grassland pasture, and land enrolled in the CAUV program. Impacts are totaled for each agricultural use and broken out by Project component. The Project Area contains eight (8) parcels currently enrolled in an agricultural district totaling approximately 547 acres.

[4906-4-08(E)(2)(b)]

With respect to the impact of the Project, for any of the agricultural land within the fence that is used for operation of the Project, the associated agricultural use will be supplanted by the Project for approximately 40 years. For these areas, all field operations, irrigation and viability as agricultural district land will be precluded during that time. These activities and uses may be continued after that period of time, however, following decommissioning of the Project and restoration of the occupied area for agricultural purposes. As noted above, construction of the Project is not expected to result in the removal of or damage to any significant or valuable structure currently used for agricultural operations.

[4906-4-08(E)(2)(c)]

Prior to construction, Applicant will consult with the owner of agricultural land participating in the Project and other readily available public resources to ascertain, to the extent practicable, the type, size and location of all functioning drain tile where construction is planned. Applicant will use this information to map the expected locations of drain tile and physically mark the surface accordingly. To the extent the location of functioning drain tile is known, during construction Applicant either will avoid damage to it or, subject to any required permitting, repair any that is purposefully damaged. Subject to any required permitting, Applicant will use commercially reasonable efforts during construction to promptly repair any such drain tile that is damaged. Also, if Applicant becomes aware during operation of circumstances indicating that the Project has damaged functioning drain tile, then Applicant will promptly investigate the matter and, subject to any required permitting, use commercially reasonable efforts to promptly repair any such damage.

Relatively little topsoil will be disturbed or significantly compacted during construction. The primary activities that will necessitate some topsoil movement or compaction will be (1) the laying of the foundations for the Substation, inverters, and pyranometers; (2) the trenching of the channels for collection lines and (3) creation of beds for the roads. Topsoil removed during construction either will be returned before the end of construction or provided to the participating land owner. Any needed decompaction and restoration of topsoil during decommissioning will be addressed in the Decommissioning Plan.

In addition, the vast majority of the land surface within the fence lines, including almost all of the area below the arrays themselves, will be planted with a robust, low-growing seed mix, primarily native grasses and other low-maintenance varieties. The areas that may not be vegetated will be roads with an aggregate surface, the inverters, the pyranometers, the fencing and the specific locations where the pilings for the racking are installed. (Each piling would occupy much less than one square foot of land surface.) This vegetative cover will have a variety of benefits for the land, including absorbing precipitation, providing stable wildlife habitat, and improving water quality. The cover will

reduce erosion and run-off and it will be in place even in winter, when the fields hosting it normally may be unplanted, and therefore subject to erosion and nutrient loss. As a result, the area topsoil will remain largely intact for participating land owners who chose to return their fields to crop production following the Project's useful life. Finally, the vegetative cover will enhance the aesthetic qualities of the Project.

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Summary: Application Text electronically filed by Mr. Michael J. Settineri on behalf of Alamo Solar I, LLC