Application for Certificate of Public Convenience and Necessity
Darien Solar Energy Center
Docket #9806-CE-100
Walworth & Rock County, WI
July 24, 2020

Darien Solar

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APPENDICES

TERMS/ACRONYMS	DEFINITIONS
AC	Alternating Current
AFR	Application Filing Requirements
APA	Asset Purchase Agreement
ASNRI	Area of Special Natural Resource Interest
ATC	American Transmission Company
AWG	American Wire Gauge
bgs	Below Ground Surface
BMP	Best Management Practice
CA	Certificates of Authority
CGP	Construction General Permit
CL	Lean Clay
CPCN	Certificate of Public Convenience and Necessity
CPR	Clean Power Research
CRP	Conservation Reserve Program
DATCP	Department of Agriculture, Trade and Consumer Protection
dBA	A-weighted decibels
DC	Direct Current
DEM	Digital Elevation Model
DNR	Department of Natural Resources
DOT	Department of Transportation
ECSWMP	Erosion Control and Stormwater Management Plan
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
ER	Endangered Resource
ERR	Endangered Resource Review
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FR	Federal Regulation (Code of Federal Regulations reference)
GIS	Geographic Information System
GSU	Generator Step-up Transformer
HDD	Horizontal Direction Drilling
HSG	Hydrologic Soil Group
Hz	Hertz
IBA	Important Bird Area
IPaC	Information for Planning and Consultation
ISO	International Standards Organization

JDA	Joint Development Agreement
kCMIL	Thousand Circular Mils (Wire Gauge Measurement)
KOP	Key Observation Point
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt-hour
LID	Low Impact Development
LLC	Limited Liability Corporation
MFL	Managed Forest Law
MHz	Megahertz
MISO	Midcontinent Independent System Operator
MW	Megawatts
NAIP	National Agriculture Imagery Program
NPDES	National Pollutant DiGErge Elimination System
NEXRAD	Next-Generation Radar
NHD	National Hydrography Dataset
[redacted]	[redacted]t
NNWR	Necedah National Wildlife Refuge
NRIS	Network Resource Interconnection Service
NWI	National Wetland Inventory Mapping
O&M	Operations and Maintenance
OTA TV	Over-The-Air Television
PSC	Public Service Commission
psf	Pounds per square foot
PV	Photovoltaic
REC	Renewable Energy Certificate
ROW	Right of Way
[redacted]	[redacted]
SCADA	Supervisory Control and Data Acquisition
SCS	Site Characterization Study
SER	Socio-Economic Review
SHPO	State Historic Preservation Office
SNA	State-Designated or Dedicated Natural Area
SP	Poorly-graded Sand
SPCC	Spill Prevention, Control, and Countermeasures
SPT	Standard Penetration Test
SSURGO	Soil Survey Geographic Database

SWPPP	Stormwater Pollution Prevention Plan
TMY	Typical Meteorological Year
US	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UWM CRM	University of Wisconsin-Milwaukee Cultural Resources Management
W	Watts
WDNR	Wisconsin Department of Natural Resources
WGNHS	Wisconsin Geological and Natural History Survey
WHS	Wisconsin Historical Society
WisDOT	Wisconsin Department of Transportation
WPDES	Wisconsin Pollutant Discharge Elimination System
WWI	Wisconsin Wetland Inventory Mapping

1. Project Description and Overview

1.1 General Project Location and Description of Project and Project Area

(The overall size of the project area will have an impact on the amount of data and analyses required in this AFR. It is recommended that the project area be optimized so that the project retains flexibility for siting panels while at the same time reducing the total area for which data will be required.)

1.1.1 *Provide the following information about the project:*

1.1.1.1 *Project location – counties and townships in the project area.*

The Project is located north of Interstate 43 in Rock and Walworth counties and is west of the city of Delavan, Wisconsin. The Project covers Sections 23-26, Township 2N (Bradford Township), Range 14E in Rock County and Sections 10-11, 14-15, 17-23, 29-30 and 33, T2N, R15E in Walworth County (**Appendix B, Figure 1.1.2**).

1.1.1.2 *Size of project area (in acres) and size of solar arrays (in acres)*

The Project will be built within a 7,699-acre project area, referred to in this application as the Project Boundary. Of the approximately 4,200 acres under contract by the Project, Darien Solar expects that approximately 40 acres will be purchased and will be utilized for collection routing, the Project substation, operations and maintenance building, and potentially battery storage facilities.

The approximately 4,200 acres under contract represents all of the land that would be required to accommodate the solar panels for the 250MW capacity plus 46 percent additional capacity for alternative panel siting, presenting a gross capacity total of 365 MW. Within the approximately 4,200 acres, approximately 2,045 acres would ultimately be developed and host 250 MW of solar generating facilities. This area would include the surface area of solar panels themselves, spacing between the racking system, fence line, and access roads. The panel siting layout shown in **Appendix B**, **Figures** such as **4.1.1** and **4.1.2** includes 46% additional capacity described as Alternative Arrays.

If all areas presented in the 365 MW layout are deemed acceptable by the Commission for use by the Project, the final permitted 250 MW layout could use up to the same acreage footprint as the presented 365 MW layout, for the following reasons:

1) The highest performance of the tracking system requires adequate spacing of aisles within each array to avoid shading from one row to the next. Ample availability of constructible surface area allows for better spacing and a higher capacity factor, which results in more energy production on a per megawatt basis.

2) There will be additional setbacks from fences, trees, roads, etc., that are required to comply with operational requirements of the Project. A higher level of acceptable and

approved property also affords the Project the ability to minimize impacts to wetlands or other areas of environmental concern.

3) As covered in more detail in Section 1.4 of this application, the Primary Array area, or where preliminary design engineering, environmental and regulatory considerations most efficiently host facilities, includes uniform power blocks wherever possible to reduce cost and impact. More acceptable and approved property increases the number of uniform arrays that could be constructed.

1.1.1.3 *Size (rated capacity), in both DC and alternating current (AC) MWs, of the proposed project. (If an actual panel model is not yet under contract, the applicant must provide information on at least two models that are being considered. Those panels must represent the maximum and minimum megawatt size under consideration for purchase for the project.*

The Project will have an installed capacity of up to 250 MWAC. Power is generated by the panels as direct current. This direct current is then converted to alternating current by inverters. Total power production by the panels may be up to 375 MWDC (direct current).

PV panels (modules) produced by several manufacturers are under consideration for the Project, including Canadian Solar, Hanwha Qcells, JA Solar, Jinko, Longi, Risen, SunPower, and Trina. The Project will analyze current market offerings to make a final selection on specific solar module, inverter and racking system equipment. An example configuration that is representative of what would be used consists of 600,000 to 850,000 high-efficiency solar PV panels with a capacity to generate approximately 350-600 watts (W) of DC power each. Together, these components are referred to as solar modules.

Examples of specific panel models in this range are the Jinko Eagle HC 72M-V on the low wattage end and the Longi LR4-72HBD on the higher wattage end. While these two models are typical examples of what may be installed, final engineering will utilize the best, most economical technology available, which may include higher wattage modules. It is also possible that a different manufacturer of a substantially similar product could be selected in final procurement. Examples of different modules and outputs can be found in **Appendix C.**

The marketplace for solar modules is constantly changing, including, currently, with the imposition of tariffs on certain imported modules. Although the description above is representative of a likely choice for equipment, panels could exceed 600 W DC power output each, potentially leading to more or fewer total panels or other selected manufacturers. If the final, selected panel is rated higher than 600 W DC, Darien Solar will notify PSC staff of this selection with updated estimates.

1.1.1.4 *Number of panel sites proposed for the project and the number of alternate panel sites that have been identified (See the discussion on page 1 regarding alternatives).*

The 365 MWac (Primary plus Alternate) array layout has been divided into twenty seven fence boundary areas for discussion purposes as shown in **Figures 4.1.1** and **4.1.2** (**Appendix B**). The Example Power Block Configuration in **Appendix D** illustrates how the site could be divided into approximately 101 power blocks utilizing 4.2 MW inverters for representative purposes. Of the 101 power blocks, 70 would comprise primary panel sites and 31 would comprise alternate panel sites.

1.1.1.5 *Identify any new or modified electric transmission lines or other electric transmission facilities that might be needed.*

Information regarding new or modified electric transmission lines or other electric transmission facilities are described in **Appendix AC**. The following facilities have been determined necessary by MISO and ATC for the interconnection of the Darien Project as part of the MISO DPP-2017-AUG study group. Some of these upgrades are shared between Darien and other project members of the same MISO study group.

- The Point of Interconnection will consist of network upgrades including a newly-constructed interconnection switchyard which will be constructed and owned by ATC. The interconnection switchyard is a related facility to the Darien Solar generating facility and is essential to allowing the electricity generated by Darien Solar to be transmitted on the ATC transmission system;
- A newly-constructed 138 kV gen-tie transmission line of approximately 75 feet in length connecting the Point of Interconnection to the Project Substation within the Project Boundary. The 75-foot long gen tie line route and 1.24 acre Interconnection Switchyard footprint are shown on **Figures 4.1.1** and **4.1.2** (**Appendix B**).
- Other upgrades governed under separate Multi Party Facility Construction Agreements (MPFCAs) include the Paris Substation expansion, Arcadian, Berryville, and Elkhorn short circuit upgrades, North Monroe Substation grounding upgrades, and replacement structures on the Elkhorn to Lake Geneva line. ALTW and REC system grounding upgrades on Delavan, LaPrairie and Bradford are assumed as well as affected system upgrades.

1.1.2 *Provide a general map showing the location of the project area, nearest communities, townships, and major roads. Include an inset map showing where the project is located in the state. Scale should be appropriate for showing communities within at least 10 miles of the project area boundary.*

See **Figure 1.1.2** for a map of the Project Boundary and surrounding area incorporating the requested information.

1.2 Ownership

Identify the corporate entity or entities that would own and/or operate the plant.

Darien Solar Energy Center LLC (Darien Solar), is a Delaware Limited Liability Company authorized to do business in Wisconsin. Darien Solar is a wholly-owned subsidiary of Invenergy LLC (Invenergy) and is currently the anticipated entity to own and operate the plant.

Invenergy develops, builds, owns and operates large-scale energy facilities across four core technologies: wind (96 projects; 14,914 MW), natural gas (11 projects; 5,641 MW), solar (30 projects; 3,351 MW), and battery storage (13 projects; 260 MW). Invenergy projects are mainly located in the United States, with other projects located in Japan, Poland, Scotland, El Salvador, and Uruguay. Invenergy has a proven development track record of 150 large-scale projects developed totaling more than 25,000 MW.

In Fond du Lac and Dodge Counties, Wisconsin, Invenergy developed the Forward Wind Energy Center (Forward), a 129 MW wind energy generation facility that began operation in 2008 and provided wind energy to Wisconsin Public Service, Wisconsin Power & Light and Madison Gas &Electric. Public Service Commission Docket No. 9300-CE-100. Invenergy constructed and operated Forward for 10 years while providing energy and renewable energy certificates (RECs) to its customers. Invenergy sold Forward to the customers [see Commission Docket No. 05-BS-226] who will continue to operate the Project through its remaining service life.

In Iowa County, Wisconsin, Invenergy developed the Badger Hollow Solar Farm, a 300 MW solar energy generating facility that is currently under construction. See Public Service Commission Docket Nos. 9697-CE-100 and 9697-CE-101. A first phase of 150 MW is owned by Wisconsin Public Service and Madison Gas & Electric. A second phase of 150 MW is owned by We Energies and Madison Gas & Electric. Invenergy is managing the construction of the facility and will operate the facility on behalf of its customers.

1.3 Project Need/Purpose

Independent Power Producers (IPP) (merchant plants) skip to Subsection 1.3.6.

Subsections 1.3.1 thru 1.3.5 apply to utilities only. These subsections focus on compliance with Wis. Stat. § 196.374, the Renewable Portfolio Standard (RPS).

1.3.1 ***Utilities Only*** *– The utility's renewable baseline percentage and baseline requirement for 2001 2003 and the amount of renewables needed in the future.*

1.3.2 ***Utilities Only*** *– Amount of renewable energy currently owned and operated by the utility as defined by the RPS requirements for additional renewable energy.*

1.3.2.1 *Total existing renewable generation capacity.*

1.3.2.2 *Total energy produced by renewable assets in previous calendar year separated by generation type (Hydro, biomass, methane, wind etc.).*

1.3.2.3 *Amount of renewable energy acquired through purchase power agreements (separated by type, hydro, biomass, wind, solar, etc.).*

1.3.2.4 *Amount of RPS credits purchased.*

1.3.3 ***Utilities Only*** *– Expected annual energy output for the project.*

1.3.4 ***Utilities Only*** *– Other need not covered in Section 1.3.1*

1.3.4.1 *Monthly demand and energy forecast for peak and off peak periods over the next 20-25 years.*

1.3.4.2 *Describe how the availability of purchase power was analyzed.*

1.3.4.3 *Identify plant retirements forecast over the next 20-25 years.*

1.3.4.4 *Describe how the existing and expected applications for generation from IPPs have been factored into your forecast.*

1.3.4.5 *Describe how the proposed project meets the requirements the Energy Priorities Law, Wis. Stats. §§ 1.12 and 196.025(1).*

1.3.4.6 *Briefly describe utility's compliance under Wis. Stat. § 196.374 for energy efficiency.*

1.3.5 ***Utilities Only*** *– EGEAS Modeling*

1.3.5.1 *Describe the 25-year optimal generation expansion plan for all of the entities that are part of the generation plan.*

1.3.5.2 *The EGEAS modeling should include a 30-year extension period.*

1.3.5.3 *The solar resource should be modeled as non-dispatchable, using an hourly solar profile.*

1.3.5.4 *EGEAS modeling should be filed on disc as described in the PSC ERF Policy/Procedure Filing guide. (http://apps.psc.wi.gov/vs2015/ERF/documents/ERF%20Filing%20Procedure.pdf)*

[SECTIONS OMITTED, ONLY APPLY TO UTILITIES]

1.3.6 ***IPPs Only*** *– Energy Agreements*

1.3.6.1 *Identify all Wisconsin utilities under contract for delivery of energy from the proposed project.*

At this time, no Wisconsin utilities are under contract for delivery of energy from this proposed Project. Darien Solar agrees to construct the Project facilities to the stricter of the National Electric Safety Code (NESC) [1] or National Electric Code (NEC)[2], in the event that there is overlap between the codes. The NEC applies to non-supply facilities owned by non-utility entities, and the NESC applies to supply facilities owned by utilities. While there is little overlap between the NEC and NESC, in case of conflict or overlap between code requirements, Darien Solar will construct,

[1] Institute of Electrical and Electronics Engineers. 2017 National Electrical Safety Code (NESC).
[2] National Fire Protection Association. 2020 Edition. NFPA 70 – National Electrical Code (NEC).

maintain, and operate all applicable Project facilities to comply with the more restrictive code requirement.

1.3.6.2 *For each utility under contract or with which an agreement in principle for delivery of energy is in place provide the following, by utility:*

1.3.6.2.1 *Rated capacity under contract.*

Not applicable at this time.

1.3.6.2.2 *Annual energy to be delivered under contract or expected to be delivered.*

Darien Solar, provided it receives a CPCN from the Commission, would directly or indirectly through its affiliates, construct and operate the Project by selling the power using long term power purchase agreements. Alternatively, Darien Solar would sell or assign the Project, or a portion thereof, to a public utility or other qualified entity at any time before, during or after the Project is constructed. Any future buyer or assignee will be required to meet all permit conditions and any power purchase agreement obligations associated with the Project or portion thereof. As part of any such sale or assignment, Darien Solar or an affiliate may function as the EPC contractor to construct the Project and function as the operations and maintenance services provider to operate and maintain the Project.

1.4 Alternatives

Invenergy is a private, independent developer with decades of experience identifying and vetting sites for renewable energy projects. The sections below describe the process by which Invenergy identified the Project site, starting with consideration of other possible sites across Wisconsin.

Under the PSC guidelines for renewable energy development and after discussion with PSC staff, Darien Solar in this Application presents a layout of 365MWac, which is 46% greater than the desired project size of 250MW. By offering the Commission the ability to select locations of solar panels within the greater Project Boundary that will comprise an approved project, Darien Solar is placing before the Commission a variety of feasible alternative locations, limited only by the requirement that Darien Solar be able to optimize the electrical and structural arrangement as certain areas are removed for consideration.

The Darien Solar Project Boundary encompasses approximately 7,699 acres. This is a larger footprint than Darien Solar needs to complete the Project. These boundaries can encompass a full-scale solar facility and alternatives which offer a variety of different characteristics and allow the Commission to consider multiple configurations for the Project with unique benefits and choices. The impacts

described in this document are based on a 365MWac layout, which is 46% in excess of the capacity of the proposed Project. The 365MWac layout is shown in **Figure 4.1.1** and **4.1.2** (**Appendix B**).

The proposed sites for placement of solar generating equipment were evaluated for their topography, land rights, compliance with a uniform array construction, minimal impacts to adjacent residents, minimal impacts to environmentally sensitive areas and proximity to the Project's electrical infrastructure.

1.4.1 ***Utilities (CPCN)*** – ***Supply Alternatives***. *Describe the supply alternatives to this proposal that were considered (including a "no-build" option) and present the justification for the choice of the proposed option(s).*

1.4.1.1 *Describe any alternate renewable fuel options considered and why those options were not selected.*

1.4.1.1.1 *Wind*
1.4.1.1.2 *Biomass*
1.4.1.1.3 *Hydro*
1.4.1.1.4 *Landfill Gas*
1.4.1.1.5 *Fuel Cell*

1.4.1.2 *Describe Purchase Power Agreements (PPAs) considered or explain why a PPA was not considered for this project.*

1.4.1.3 *No-Build Option.*

[SECTIONS OMITTED, ONLY APPLY TO UTILITIES]

1.4.2 *Utilities (CPCN OR CA) and IPPs (CPCN) – Project Area Selection*

1.4.2.1 *Alternative Project Areas. Describe the project area screening and selection process used to select the proposed project area. Provide the following:*

1.4.2.1.1 *List individual factors or site characteristics used in project area selection.*

Invenergy began considering development of utility-scale solar energy projects in Wisconsin in late 2016 due to the ongoing decline in the cost of solar energy that would provide Wisconsin utilities an opportunity to source clean energy and capacity within the state at an affordable price. The Project Boundary was selected after analyzing the entire state of Wisconsin for potential utility scale solar farm sites. In evaluating sites, Invenergy considered the solar resource, proximity to transmission infrastructure, topography, ground cover and community acceptance. Favorable results for all of these categories are found in the Darien Solar Project Boundary.

1.4.2.1.2 *Explain in detail how brownfields were considered in the selection of sites to develop.*

The potential use of existing Brownfield sites within the region was evaluated. A comprehensive list of Brownfield sites was accessed from the US EPA website covering southern Wisconsin, particularly Rock, Walworth, Racine and Kenosha counties. Darien Solar identified twelve12 Brownfield sites within Rock county ranging in size from 0.4-acres to 19.44-acres, 20 sites within Walworth county ranging in size from 0.1-acres to 23.64-acres, 55 sites in Racine county ranging in size from 0.04 to 10.7 acres and 27 sites in Kenosha county ranging in size from 0.21 to 106 acres. The sites assessed in these counties were an average of 5.9 acres; and further searching at the state level showed the largest Brownfield property as 369 acres in Oneida, Wisconsin. None of the sites reviewed were large enough to host a 250MW project nor were any deemed suitable for solar development using the tiered evaluation approach outlined in Section 1.4.2.2.

Given the land requirements of the proposed Project, it was concluded that no Brownfield site across Rock, Walworth, Racine or Kenosha counties would be suitable.

1.4.2.1.3 *Explain how individual factors and project area characteristics were weighted for your analysis and why specific weights were chosen.*

From the individual factors noted in Section 1.4.2.1.1 (solar resource, proximity to transmission infrastructure, topography, ground cover, and community acceptance), all are critical to the successful development of a utility scale Solar Energy Center. Darien Solar equally weighted all factors in selecting the final project location.

1.4.2.1.4 *Provide a list of all project areas reviewed with weighted scores for each siting factor or characteristic used in the analysis.*

As noted in the previous section, Darien Solar views the described siting factors equally. A more detailed description of our approach to the site selection process is described in Section 1.4.2.2 below.

1.4.2.2 *Provide a narrative describing why the proposed project area was chosen.*

Tier One Evaluation – State Level

Darien Solar reviewed several solar resource datasets to identify areas within the state with adequate solar resource necessary to make the Project economically feasible. Unlike wind energy sites, where the resource is very site specific, the solar resource can be characterized on a more expanded or regional level. Based on data collected, southern Wisconsin was identified as one of the strongest resources in the

state due to its latitude and favorable weather patterns. As a result of the findings, Darien Solar moved ahead to evaluate the region for further evaluation.

Tier Two Evaluation – Regional Level

The purpose of a second tier evaluation was to determine if specific criteria could be met within the region that would result in the identification of a viable Project Boundary. The key criteria were sufficient land available for this size project, market access, engineering and design considerations, environmental compatibility, and community support and acceptance. Specifically, Darien Solar evaluated the following:

- Availability of land and compatibility with existing land uses including consideration of ground cover;
- Slopes;
- Project engineering and design parameters;
- Location of existing substations and transmission lines suitable for interconnection;
- Community and landowner support and acceptance of the Project; and
- Preliminary review of environmentally sensitive areas, such as parks, wetlands, waterbodies, and habitats.

The results of the evaluation identified an area of land within Rock and Walworth Counties that met the criteria needed for further development of the Project. The following conclusions were made about the area identified during the Tier Two evaluation:

- Significant tracts of cleared land are available within the region.
- Specific areas of the region are suitably flat to allow for economical construction of solar energy generation equipment
- The Project Boundary is located near an existing electric transmission line thought to be suitable for interconnection. Darien Solar filed an interconnection request and the MISO study process has made a determination of necessary network upgrades for the project.
- Initial and ongoing community and landowner outreach indicated community support and acceptance of the Project in the proposed area. Specifically, local landowners recognized solar's economic value compared to their traditional farm operations and entered into voluntary solar easements.
- Darien Solar performed preliminary environmental reviews to determine sensitive environmental resources in the Project Boundary to avoid or minimize any potential adverse environmental impacts. The preliminary reviews showed adverse impacts to the environment are avoidable and/or unlikely.

Tier Three Evaluation – Project Area Level

Once the Project Boundary was identified from the second-tier study, Darien Solar continued to collect data, refine placement of the solar arrays based on engineering and design parameters, and conduct community and landowner meetings to solicit public input.

In addition, to satisfy the Commission's requirement that the Project propose alternative sites, the impacts described in this document are based on a 365MWac layout, which is 46% in excess of the capacity of the proposed Project. Darien Solar is seeking approval to place project facilities of a 250 MW project on any of the participating project land as shown in **Figure 4.1.1** (**Appendix B**) to provide flexibility and efficiency in the placement of project facilities.

Within the Project Boundary, specific criteria for the tier three evaluation included the following:

- Land Use and Zoning, Including Applicable Setback Requirements
- Site Topography and slopes
- Geology
- Soils
- Existing Vegetative Communities
- Threatened and Endangered Species
- Archaeological and Historical Resources
- Surface Water Resources
- Wetlands
- Floodplains
- Projected Noise Levels
- Aviation
- Recreation and Publicly Owned Lands
- Community Services
- Transportation Infrastructure
- Efficiency of construction and conformity to uniform arrays
- Public Outreach and feedback from Project neighbors

Darien Solar believes that the most efficient construction can be attained by constructing the Project in uniform power blocks. An ideal configuration from a constructability standpoint for 4.2 MW inverters would be rectangles with an inverter in the center and the surrounding acres being used for PV modules on the tracking system that feed electricity to that inverter. If the inverter ultimately chosen for the Project differs from 4.2 MW, the "power block" area would be correspondingly impacted. Darien Solar requests that the Commission recognize the merits of constructing in uniform power block arrays, and if certain portions of the designated primary areas are determined to be unsuitable, Darien Solar will look to reconfigure the remaining, approved areas to retain complete and uniform power blocks, rather than designing areas for partial and/or non-uniform power blocks.

To the extent any given area is decided to be non-optimal by the Commission, Darien Solar asks the Commission to consider the practical effects on project design, constructability of such a decision, and to the extent possible retain power blocks. If a specific portion of the primary area is rejected for consideration for construction and

a power block cannot be shifted, the result would be suboptimal from a construction standpoint as that particular power block would have unique wiring and racking considerations that create additional engineering, logistical and construction complications. Darien Solar seeks to utilize uniform solar arrays with practices and equipment of industry leading quality and the closer the Project can adhere to this standard, the more efficient design, construction, and operation will be and, thus, the more economical the Project will be for the customer.

Darien Solar respectfully requests that the Commission review all of the indicated solar array areas and approve all locations deemed suitable for use by Darien Solar including Alternate array areas. Darien Solar will make final equipment and design decisions in a cost-efficient manner.

1.5 Utilities (CPCN OR CA) and IPPs (CPCN) – Site Selection

1.5.1 *List the individual factors or characteristics used to select the proposed and alternate panel sites.*

Within the Project Boundary, the proposed sites for placement of solar generating equipment were evaluated with constraints relating to topography, land rights, FEMA floodplains, modeled flood areas, adherence to a "power block" design, wetlands and other protected areas, existing underground pipelines, cultural resources, existing transmission and distribution lines, shading impacts from existing vegetation, minimal impacts to adjacent residents, and proximity to the Project's proposed electrical infrastructure.

1.5.2 *Provide information on how site characteristics and the type/s of panels chosen factored into the selection of the final panel sites.*

Using high efficiency modules enables the Project to minimize the footprint within the Project Boundary required to reach the desired capacity. To minimize environmental impact, The Project utilizes primarily relatively flat, open terrain, in order to minimize grading, and clearing of wooded areas. The panel sites throughout the project were selected to avoid surface impacts to areas designated as wetlands. In addition, where possible, the layout included symmetrical 4.2MW power blocks and parcels in proximity to each other to maximize the electrical efficiency, simplify the design, construction, and operation, and to minimize the cost of underground collection lines.

1.5.3 *Setback distances*

1.5.3.1 *Provide the minimum setbacks for both boundary fences and solar panels from:*

- *residences*
- *property lines*

- *other buildings (e.g., animal barns, storage sheds)*
- *roads*
- *any other features.*

Table 1.5.3.1 provides an inclusive list of setbacks used for the Project layout.

Table 1.5.3.1– Darien Solar Setback Matrix	
Type	**Distance to Solar Panels (feet)**
Walworth County: A-1 Prime Agricultural Land District, A-2 Agricultural Land District, C-2 Upland Resource Conservation District, B-4 Highway Business District, M-3 Mineral Extraction District and P-1 Recreational Park Districts Setbacks Rock County: A-1 Exclusive Agricultural District and NROS - Natural Resource Open Space District Setbacks ** No specific setbacks have been defined from Project fence lines. All fence lines will be outside of road rights-of-way and will not encroach on any adjacent parcels.	
Yards/Property Line (participating and non-part.)	Not less than 50 feet from all property lines in Walworth County. Not less than 15 feet from side yards without sewer access in Rock County (8 feet with sewer access). Not less than 25 feet from rear yards in Rock County.
Shoreland	Not less than 75 feet from the ordinary high-water mark of any navigable waterway
Street including all Federal, State and County Trunk highways	65 feet from the right-of-way of all Federal, State and County Trunk highways
All other road ROW	Not less than 40 feet
Pipeline	Not less than 50 feet (based on assumed 50 ft operating ROW with additional 25 ft on either side during construction)
Transmission	Not less than 50 feet (based on assumed 100 ft ROW)
Wetlands	Target of 50 feet where feasible
Non-participating residences	Not less than 100 feet
Participating residences	Not less than 100 feet
Other buildings	Not less than 20 feet

During final design and engineering, if right of way distances are determined to be greater than the assumptions listed in **Table 1.5.3.1** for pipelines and transmission lines, Darien Solar will ensure both panels and fences are set outside of these rights of way.

1.5.3.2 *Identify any sites where non-participating "good neighbor" agreements are needed or have been executed.*

As of the time of the application, one good neighbor agreement has been executed. Darien Solar has made additional offers of good neighbor agreements to landowners of residential property immediately adjacent to proposed arrays and will continue to offer further agreements and to negotiate such agreements in good faith.

1.5.3.3 *Status of easement agreements:*

1.5.3.3.1 *Identify all project sites with easement agreements that have been signed.*

1.5.3.3.2 *Identify all sites where easement agreements have not been signed and provide a short description of the status of negotiations.*

All solar easements required to construct a 250MW solar facility have been acquired. The easement type and status are listed in **Table 1.5.3.3**.

Table 1.5.3.3 Landowner Easement Type and Status

Number	Landowner Name	Type	Status	Fence ID
1	Dean Kincaid Enterprises LLP	Solar Easement	Signed	10 & 13
2	Dean Kincaid, Inc.	Solar Easement	Signed	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 & 25
3	Gordon J. Petkoff and Anita M. Petkoff	Solar Easement	Signed	12
4	Thomas and Christine Scott	Solar Easement	Signed	15
5	Marjorie Lipinsky Joint Revocable Trust and Ryan Walstra	Solar Easement	Signed	9
6	Robert C. Hansen and Gail A. Hansen Trust	Solar Easement	Signed	11

Table 1.5.3.3 Landowner Easement Type and Status				
Number	**Landowner Name**	**Type**	**Status**	**Fence ID**
7	Gerald E. and Kathleen M. Vance	Solar Easement	Signed	10
8	BVV Holdings, LLC	Solar Easement	Signed	7
9	Elsie M. Brockwell	Solar Easement	Signed	6
10	Dale H. Volberding	Collection Easement	Signed	Between 14 & 17/18
11	Dean D. Truckenbrod	Solar Easement	Signed	15
12	Truckenbrod Family Joint Venture	Solar Easement	Signed	15
13	Randall G. and Cynthia L. Wuttke	Collection Easement	Signed	Between 3, 5, & 8
14	R&R Ventures Limited Partnership	Solar Easement	Signed	2, 3, 5, & 8
15	McClellan Farms, Inc.	Solar Easement	Signed	1, 2, & 3
16	H&L Farms, Inc.	Exclusivity Agreement	Signed	26
17	Steven A. and Jodi M. Scott	Collection Easement	In Negotiation	Between 10 & 11
18	Michael J. Smiley	Collection Easement	Signed	Between 10 & 11
19	Dean Kincaid Enterprises LLP	Purchase option	In Negotiation	1
20	Gary and Ruth Steadman	Good Neighbor Agreement	Signed	Between 17, 18 & 19

1.6 Utilities Only – Cost

1.6.1 Provide capital cost of the completed facility organized by Plant Account Codes (PAC) found in the PSC's Uniform System of Accounts for Private Electric Utilities – 1/1/90. Provide a breakdown within each PAC and a subtotal. *Include, at least, the following PACs:*

1.6.1.1 *PAC 340 –Land and Land Rights.*

1.6.1.2 *PAC 341 – Structures and improvements (operation and maintenance (O&M) buildings, access roads).*

1.6.1.3 *PAC 344 – Generators (foundations, engineering, procurement, construction management, erection).*

1.6.1.4 *PAC 345 – Accessory Electrical Equipment (substation, meteorological towers, collector circuit system, SCADA.*

1.6.2 *Provide the complete terms and conditions of all lease arrangements.*

1.6.2.1 *Site lease*

1.6.2.2 *Neighbor or non-participant agreements*

1.6.2.3 *Provide a statement demonstrating how conditions of Wis. Stat. § 196.52(9)(a)3(b) have been met (this pertains to leased generation contracts).*

1.6.2.4 *Affiliated interest approvals required. Include those applied for or received.*

1.6.3 *Discuss and provide the comparative costs of the alternatives identified and evaluated in Section 1.4.*

1.6.4 *Describe the effect of the proposed project on wholesale market competition. Include a description of how, at the time of this filing, the proposed facility would be treated as an intermittent resource in the Midcontinent Independent System Operator, Inc. (MISO) market.*

1.6.5 *Provide an estimate of the expected life span for the power plant.*

1.6.6 *Describe how the facility would be decommissioned at the end of its life span.*

1.6.6.1 *Provide an estimate of the cost of and source of funding for decommissioning.*

[SECTIONS OMITTED, ONLY APPLY TO UTILITIES]

1.7 IPPs Only – MISO and Project Life Span

1.7.1 *MISO Market. Describe how, at the time of this filing, the proposed facility would be treated as an intermittent resource in the MISO market.*

Intermittent resources in the Midcontinent Independent System Operator (MISO) such as wind and solar may qualify to provide both energy and capacity to the MISO market so long as they are registered with MISO and deliverable to load via Network Resource Interconnection Service (NRIS) or Firm Transmission Service. Darien Solar has applied to MISO for NRIS for the full 250MWac of proposed capacity of the Project. Per MISO's Business Planning Manual 11, Section 4.2.3.4.1, solar photovoltaic (Solar PV) projects in MISO have their capacity value determined based on the three year historical average output of the resource for hours ending 15, 16, and 17 EST for the most recent summer months (June, July, and August). Solar PV resources that are new, upgraded or returning from extended outages submit all operating data for the prior summer with a minimum of 30 consecutive days, in order

to have their capacity registered with MISO. A resource with less than 30 days of metered values would receive the class average of 50% for its Initial Planning Year.

1.7.2 *Provide an estimate of the expected life span for the power plant.*

The expected life span for this solar power facility is 35 to 50 years. The base operating case for the Project is 35 years, but actual life span could be longer. The Solar Lease and Easement Agreements provide for a total operating period of 50 years.

1.7.3 *Describe how the facility would be decommissioned at the end of its life span.*

At the end of commercial operation, Darien Solar will be responsible for removing all of the solar arrays and associated facilities to a depth of four feet below grade. Darien Solar reserves the right to extend Commercial Operations by applying for an extension of any required permits. Should Darien Solar decide to continue operation, a decision would be made as to whether to continue with the existing equipment or to upgrade the facility with newer technologies.

Decommissioning of the Project at the end of its anticipated 35 - 50 year useful life would include removing the solar arrays, inverters, transformers, above-ground portions of the electrical collection system, fencing, lighting, substation, access roads and the O&M facility from the Project Boundary. Standard decommissioning practices will be utilized, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements and equipment, followed by restoration of the site.

Though Darien Solar is not aware of any photovoltaic solar energy generating systems greater than 100MW that have been decommissioned, the construction methods and materials have been used in other projects for decades, and as an industry, decommissioning methods are common.

Darien Solar expects to implement the following decommissioning plan:

Timeline

Decommissioning is estimated to take approximately 12 months to complete.

Removal and Disposal of Project Components

- Modules will be inspected for physical damage, tested for functionality, and removed from racking. Functioning modules will be packed and stored for reuse. Non-functioning modules will be sent to the manufacturer or a third party for recycling or other appropriate disposal method.
- Racking, poles, and fencing will be dismantled/removed and will be sent to a metal recycling facility. Holes will be backfilled.

- Project facilities will be removed to a depth of three feet as part of decommissioning.
- Aboveground wire will be sent to a facility for proper disposal and/or recycling. Belowground wire will be cut back to a depth of four feet and abandoned in place.
- Aboveground conduit will be disassembled onsite and sent to a recycling facility.
- Junction boxes, combiner boxes, and external disconnect boxes will be sent to an electronics recycler.
- Inverters will be sent to the manufacturer or an electronics recycler as applicable and functioning parts will be reused.
- Material from concrete pads will be removed and sent to a concrete recycler.
- Computers, monitors, hard drives, and other components will be sent to an electronics recycler and functioning parts will be reused.
- Unless otherwise requested by the landowner, permanent access roads constructed for the Project will be removed.
- After all equipment is removed, the Project Boundary will be restored to a condition reasonably similar to its pre-construction state.

To facilitate a return to agricultural use following decommissioning, the land would be tilled to break the new vegetative growth, which will have enhanced the topsoil condition as further discussed in section 5.13.

1.7.3.1 *Provide an estimate of the cost of and source of funding for decommissioning.*

At the 15th anniversary of the commencement of operations, Darien Solar will post a form of financial security, such as a surety bond, letter of credit, escrow account, reserve fund, parent guarantee or other suitable financial mechanism, if any net cost of decommissioning exists.

Upon receipt of a CPCN and evaluation of all permit conditions, and completion of final site design and engineering, Darien Solar will prepare a site-specific decommissioning cost estimate. In advance of this, Darien Solar has conducted further research of third-party projects and expects the total cost of decommissioning of Darien Solar at the end of its useful life would be in the range of $0 to $7.5 million net of salvage value. The figure is based on the evaluation of salvage value prices of the relevant equipment and facilities.

Darien Solar believes that establishing a decommissioning funding source coinciding with the commencement of commercial operation is unnecessary. Establishing a fund on the project's 15th anniversary of the commencement of operations is a more reasonable approach.

1.8 Utilities and IPPs – Required Permits and Approvals

1.8.1 *Approvals and Permits. For each of the regulatory agencies listed below provide the following information:*

- *regulatory agency,*
- *the approvals/permits required,*
- *application filing date,*
- *the status of each application,*
- *agency contact name and telephone number.*

1.8.1.1 *Federal*

1.8.1.1.1 *Federal Aviation Administration (FAA)*
1.8.1.1.2 *U.S. Army Corps of Engineers*
1.8.1.1.3 *U.S. Fish and Wildlife Service*
1.8.1.1.4 *Other federal agencies not listed above*

1.8.1.2 *State*

1.8.1.2.1 *WisDOT*
1.8.1.2.2 *DNR*
1.8.1.2.3 *Other state agencies not listed above*

1.8.1.3 *Local Permits – including county, town, city, and village*

Table 1.8.1 addresses the requirements of Section 1.8.1 of the Application Filing Requirements, including all subsections, i.e., 1.8.1.1 through 1.8.1.3. The permits listed below are required as a general matter for new development based on the Applicant's review of applicable law. Permits to be applied for will be determined based on Applicant's final site plan preparation following issuance of a Final Decision on the Application.

Table 1.8.1 – Regulatory Permits and Approvals

Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
Certificate of Public Convenience and Necessity (CPCN)	*PSCW* *Gas and Energy Division* *Andy Ehlert, PE – Engineering Supervisor* *Andy.ehlert@wisconsin.gov*	*New electric generating facility over 100MW*	*7/24/20*	*Application Filed*
Engineering Plan	*WDNR* *Office of Energy*	*CPCN*	*3/30/20*	*Response Received 4/6/20.*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
	Geri Radermacher – Wetland Regulatory/Zoning Specialist *262-574-2153* *Geri.Radermacher@wisconsin.gov*			
Wisconsin Pollutant Discharge Elimination System (WPDES) Construction Site Permit	*WDNR* *Water Quality Bureau* *Adrian Stocks* *Natural Resources Manager* *608-266-2666* *Adrian.Stocks@wisconsin.gov*	*Required due to Project size.*	*Anticipated Q3 2021*	*Draft ECSWMP in Appendix L*
Private Well Notification Number	*WDNR* *Bureau of Drinking and Groundwater* *Deborah Lyons-Roehl* *Operations Program Associate* *608-267-9350* *Deborah.LyonsRoehl@wisconsin.gov*	*Required if a new well is constructed for the O&M building.*	*Only required if it is deemed necessary to drill a new well for the O&M facilities.*	*To be completed if deemed necessary for the O&M building.*
Utility Permit	*WisDOT –SE Region (Walworth County)* *Bureau of Highway Maintenance* *Chue Hang* *Permit Engineer* *262-548-5671* *chue.hang@dot.wi.gov* *dotdtsdseutilitypermits@dot.wi.gov*	*Utility crossing permits to construct or maintain a utility facility in Walworth County (SE Region)*	*Anticipated Q1 2022*	*To be completed*
Utility Permit	*WisDOT –SW Region (Rock County)*	*Utility crossing permits to construct or maintain a utility*	*Anticipated Q1 2022*	*To be completed*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
	Bureau of Highway Maintenance *Mark Goggin* *Permit Coordinator* *608-789-5955* *mark.goggin@dot.wi.gov* *dotdtsdswutilitypermits@dot.wi.gov*	*facility in Rock County (SW Region)*		
Driveway Permit	*WisDOT-SE Region (Walworth County)* *Kevin Koehnke* *Bureau of Highway Maintenance* *262-521-5344* *dotdtsdsepermits@dot.wi.gov*	*For new driveway entrances on state roads in Walworth County (SE Region)*	*Anticipated Q1 2022*	*To be completed*
Driveway Permit	*WisDOT-SW Region (Rock County)* *Scot Hinkle* *Bureau of Highway Maintenance* *608-246-5334* *scot.hinkle@dot.wi.gov*	*For new driveway entrances on state roads in Rock County (SW Region)*	*Anticipated Q1 2022*	*To be completed*
Oversize-Overweight Permit	*WisDOT* *Bureau of Highway Maintenance* *P.O. Box 7980* *Madison, WI 53707-7980* *608-266-7320* *Oversize-permits.dmv@dot.wi.gov*	*For transportation of oversize-overweight loads, such as the substation.*	*Anticipated Q2 2022*	*To be completed*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
Erosion Control and Storm Water Management Permit Application (ECSWMP)	*Rock County Department of Land Conservation* *Thomas Sweeny* *County Conservationist* *608-754-6617 (ext 3)* *thomas.sweeney@co.rock.wi.us*	*Land disturbance activities.*	*Anticipated Q2 2022*	*To be completed*
Construction Site Erosion and Sediment Control General Permit	*Walworth County Land Use & Resource Management Department* *Michael P. Cotter* *Director/Deputy Corporation Counsel* *262-741-7915* *mcotter@co.walworth.wi.us*	*Land disturbance activities.*	*Anticipated Q2 2021*	*To be completed*
Building Site Permit	*Rock County Planning, Economic & Community Development Agency* *Colin Byrnes* *Planning Director* *608-757-5587* *byrnes@co.rock.wi.us*	*New construction*	*Anticipated Q1 2022*	*To be completed*
Utility Permit	*Rock County Highway Department* *Duane Jorgenson* *Public Works Director* *608-757-5450* *Duane.Jorgenson@co.rock.wi.us*	*Construct & Operate Utilities within Highway Right-of-Way*	*Anticipated Q1 2022*	*To be completed*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
Utility Permit	*Walworth County Public Works Department* *Richard A. Hough* *Director Public Works* *262-741-3114* *rhough@co.walworth.wi.us*	*Construct & Operate Utilities within Highway Right-of-Way*	*Anticipated Q1 2022*	*To be completed*
Driveway Access Permit	*Rock County Highway Department* *Duane Jorgenson* *Public Works Director* *608-757-5450* *Duane.Jorgenson@co.rock.wi.us*	*For new driveway entrances on county and township roads.*	*Anticipated Q1 2022*	*To be completed*
Driveway Permit	*Walworth County Public Works Department* *Richard A. Hough* *Director Public Works* *262-741-3114* *rhough@co.walworth.wi.us*	*For new driveway entrances on county and township roads.*	*Anticipated Q1 2022*	*To be completed*
Oversize Overweight Permit	*Walworth County Public Works Department* *Richard A. Hough* *Director Public Works* *262-741-3114* *rhough@co.walworth.wi.us*	*Using County roadways for oversize/overweight vehicles*	*Anticipated Q2 2022*	*To be completed*

All wetland or waterway impacts will be directly avoided through siting or construction methods (i.e., directional boring of collection line). USACE Section 404 and DNR Section 401 permits related to wetland impacts will not be required based on project siting and construction methods (i.e., direction boring of collection lines).

No endangered species impacts are anticipated that would necessitate permits from the US Fish and Wildlife Service (USFWS) or WDNR. Agency feedback received during the April 14 and May 12, 2020 meetings to discuss environmental resources and project plans indicated the Project design and construction/operational plans reasonably avoided impacts to species resources.

Because the Project is not proposed to be developed on or near an airport, the Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (78 FR 63276) does not apply. Similarly, because no proposed structures will exceed listed height thresholds, Notice of Construction is not required under 14 FR Part 77, nor are WisDOT high structures permits required. Section 5.14.3 provides further discussion regarding FAA and WisDOT permits.

The DATCP Agricultural Impact Statement is not required, since Darien Solar is not a public utility.

1.8.2 *Correspondence with Permitting Agencies. Provide copies of correspondence to and from state and federal agencies that relate to permit approval, compliance approval, or project planning and siting. Provide copies of any correspondence to or from local governments. This should continue after submittal of the application.*

Copies of official correspondence to and from state and federal agencies that relate to permit approval, compliance approval, or Project planning and siting are listed below and included in **Appendix A**, with the exception of the DNR ER Review which is included as confidential information in **Appendix K**. A log of meetings with agencies, local governments, and other interested parties is also included in **Appendix S**. **Table 1.8.2** summarizes the correspondence with permitting agencies.

Table 1.8.2 Correspondence with Permitting Agencies

Correspondence	Regulatory Agency	Trigger / Notes	Filing Date	Meeting Date	Status
Endangered Resources Review	DNR	CPCN	ERR 8/10/2018 Updated 1/2/2019, 03/04/2020, and 5/26/20	10/07/2019, 05/12/2020	Completed (Confidential **Appendix K**)
Engineering Plan	DNR	CPCN	3/30/20	1/15/20	Response Received

					4/6/20 (**Appendix A**)
Federal Threatened and Endangered Species Consultation	USFWS	CPCN	IPaC 7/23/2018 Updated 3/09/2020 and 5/22/20	04/14/2020, 05/12/2020	Completed (**Appendix A**)
Noise Receptors and Visual Simulation Location Review	PSC	CPCN	Provided 4/16/2020	Approved 4/21/2020	Completed via email. **(Appendix A)**

2. Technical Description – Project Area, Arrays, Panels, and Ancillary Facilities

2.1 Estimated Solar Resource and Projected Energy Production

Provide a complete energy production assessment for the project. This report should include, at a minimum:

2.1.1 *Solar resource data used in analysis.*

The solar resource data used to estimate energy output was determined using an internal resource assessment (**Appendix Y**). Darien Solar evaluated several public and private datasets, including satellite modeled datasets such as the NREL Solar Prospector dataset, Solar Anywhere Clean Power Research (CPR), and data from 3Tier, as well as publicly available measurements from nearby weather stations. To further assess the solar resource at the site Darien Solar commissioned a Solar Monitoring System (SMS) in Q4 2019, which will help to further refine energy estimates once sufficient data is received. This data can be provided upon the Commission's request when it is available.

2.1.2 *Gross and net capacity factor (explain the method used to calculate the capacity factors and provide the data used).*

Darien Solar will have an estimated gross capacity factor of between 24 and 39 percent and an estimated net capacity factor of between 20 to 30 percent. These values were found utilizing the PVSyst modeling software (the industry standard) and conservative loss assumptions based on many years of solar farm operation experience. The PVSyst output report is attached as Confidential **Appendix Y**. These loss assumptions match those observed throughout the industry.

2.1.3 *Estimated energy production of project.*

2.1.3.1 *Estimated production losses.*

Gross to net calculations take into account, among other factors, energy losses in the electrical collection system, mechanical availability, array losses, and system losses. Industry-wide, energy losses typically range from fifteen to twenty percent (15 to 20 percent) of maximum output for utility-scale solar.

2.1.3.2 *Estimated net energy production.*

Darien Solar estimates an average annual output of between approximately 400,000 and 600,000 Mwh. Annual energy production output will depend on final design, site specific features, and annual variability in the solar resource. The energy production modeling report is attached as Confidential **Appendix Y.**

2.2 Solar Panel Type and Characteristics

2.2.1 *Identify the manufacturer and model of solar panel to be used. (If no Panel Purchase Agreement has been signed, applicants should identify the panel or panels being considered. It is acceptable to identify a range by providing information on the largest and smallest panel being considered, however, consult with Commission staff prior to preparing the application).*

PV panels produced by a number of manufacturers are under consideration for the Project, including Canadian Solar, Hanwha Qcells, JA Solar, Jinko, Longi, Risen, SunPower, and Trina. All modules under consideration are mono- or poly-crystalline models. The panel selected may use bifacial technology, which, unlike a monofacial module, contains a clear backsheet instead of an opaque backsheet, allowing the solar cell to absorb light entering from the back along with light entering from the front side of the cell.

Bifacial modules have been shown to increase production by as much as 30% at a point in time. This results in a higher annual energy yield and thus improved project economics. There should be no material change in project footprint requirements between projects utilizing bifacial panels and monofacial panels.

Darien Solar will consider the costs and performance of each technology option as well as environmental and safety standards when making its final selection. This process has been included in the proposed project timeline and the final selection should not alter the project scope, time frame, or budget.

Modules under consideration range from 350 to 600 W DC per module. Examples of specific panel models in this range are the Jinko Eagle HC 72M-V on the low wattage end and the Longi LR4-72HBD on the higher wattage end. While these two models are typical examples of what may be installed, final engineering will utilize current technology available, which may include higher wattage modules, to optimize project economics. It is also possible that a different manufacturer of a substantially similar

product could be selected in final procurement. Examples of a wide range of modules and outputs can be found in **Appendix C.**

Solar modules are much more of a commodity than wind turbines or other forms of power generating equipment. In addition, new product variants (e.g. higher efficiency or higher wattage per module options) are being introduced to the market at a rapid pace. As such, it is important to maintain as much flexibility in the individual supplier and technology choice as possible until just before procurement to maintain economic viability.

2.2.2 *Panel delivery date – Indicate whether or not this date is firm.*

The current construction schedule calls for panel delivery to begin in the first half of 2023. This date is not firm.

2.2.3 *Total number of panels required for project.*

Based on the module wattages under consideration the final count could range from 600,000 to 850,000 high efficiency solar PV panels.

2.2.4 *Technical characteristics of panels.*

2.2.4.1 *Panel physical dimensions.*

Dimensions for current panel options under consideration are approximately 1052 mm x 2131 mm (41.4 in. x 83.9 in., or 3.5 ft. x 7.0 ft) for a typical mono- or poly-crystalline module as shown on the data sheets in **Appendix C**. Total PV module surface area for the primary array areas is expected to be approximately 475 acres, pending final engineering design. If solar panels are purchased from a company other than the ones previously mentioned, the panel dimensions should be close to the size range provided. As technology changes the form factor may also vary in height or width, but no material changes to the site plan would be expected.\

2.2.4.2 *Panel material/type.*

Each panel is made from crystalline silicon, anti-reflective glass, aluminum frames, copper electrical wires with plastic sheathing, and weather-resistant “quick connect” wire connectors.

2.2.4.3 *Highest and lowest points during daily rotation.*

At 60 degrees (tilted to the highest position), the highest point of the modules will be no more than 15 feet above ground and the lowest point of the modules will be at least 18 inches from the ground. Final determination of PV module heights will be made by Darien Solar during final detailed project design and will be based on factors

such as PV system installation cost, capital cost, construction preference, tracker mounting configuration, and site constraints.

2.2.4.4 *Any surface treatment of panels.*

During the manufacturing process, all solar panel manufacturers listed in the preceding sections treat the surface of each panel with an anti-reflective coating to minimize glare and increase efficiency. Ongoing maintenance of the solar modules is not expected to include periodic washings due to the typical precipitation levels in the area.

2.2.4.5 *Panel power curve (provide actual data – solar resource and rated output needed to create the curve).*

Appendix C (following the module data sheets) contains power curves for a variety of modules under consideration. Darien Solar will provide the power curve of the final module after selection.

2.2.4.6 *Panel tolerances for extreme weather events. Include any operational actions for extreme weather events.*

Darien Solar has reviewed the closest weather station's climate history (AgACIS WETS Station Beloit, WI), as verified by the Solar America Board for Codes and Standards. Darien Solar intends to purchase equipment designed to ensure the highest level of operability and reliability across the range of anticipated environmental conditions for the lifetime of the project.

Final tracking system components and pile sizes and depths will be designed to meet local building codes for extreme design wind and snow loads. Potential tracking technologies will be assessed in the context of other Project attributes, such as resource forecast and expected operating profile. A standard safety feature included in most modern solar tracking systems includes a setting or mode known as “stowing”. During extreme weather events, the trackers can enter this setting and rotate the panel modules to reduce the degree of load experienced on the PV modules and racking structures from high directional winds.

Likewise, the trackers can be rotated to avoid snow loading if warranted. For example, if the modules are normally stowed flat in the evenings, a snowstorm is predicted, and wind conditions are conducive (that is to say, calm), the trackers could tilt the solar modules to a maximum angle to reduce snow accumulation. Darien Solar intends to purchase trackers that have the ability to rotate as described. The final selection will assume consider operating scenarios where equipment can operate in the design temperature and environmental conditions

Any PV modules selected will meet international standards for hail ratings and operating temperature ranges (**Appendix C**).

2.2.5 *Technical characteristics of inverters.*

Inverter data sheets are provided in **Appendix C**.

2.2.6 *Technical characteristics of any tracking systems, panel supports, and racking.*

2.2.6.1 *Type of material used for supports and racking.*

Typically, the panel mounting system consists of a steel bracket on top of the steel pile bolted to the racking superstructure.

2.2.6.2 *Tracking system used.*

The solar modules will be mounted to a horizontal single-axis tracking system. In this type of system, the panel arrays are arranged in north-south oriented rows. An electric drive motor rotates the horizontally mounted solar modules from east to west to follow the sun (on a single axis) throughout the day. The tracker rows will follow the sun from approximately 60 degrees east to 60 degrees west through the course of the day. When the sun is directly overhead, the PV modules will be at a zero-degree angle (level to the ground).

Horizontal single-axis tracking systems are typically comprised of aluminum or galvanized or stainless steel.

Multiple tracking system technologies are currently being evaluated from Tier 1 manufacturers such as: Array Technologies, Nextracker, and FTC; a similar system from a different vendor may also be selected. Models from Nextracker contain electric motors on each individual tracker row throughout the Project; Array Technologies uses a linked row system with one motor per multiple racks.

2.2.6.3 *Dimensions and number of sections required.*

The Project is designed in 4.2 MW-AC power blocks, which are typically comprised of approximately 140 tracker rows, with the final number dependent on the final electrical design.

Based on the information provided in the Technical Data Sheets for the mounting systems under consideration, the tracker widths range from 6.4 feet to 12.8 feet but may fall outside this range during final engineering design. The number of sections required are dependent upon the manufacturer and type of panels installed, and the location that they are being constructed. The tracking systems under consideration have different specifications and maximum capacities of solar panels that can be

installed. Estimates of the number of sections that will be required can be provided after a manufacturer(s) has been selected.

Additionally, a typical solar tracker may range from 100 to 350 feet long.

2.2.6.4 *Typical distances between rows, access roads, and fences.*

Distances between array rows may range from 15 to 30 feet wide. A usual minimum distance from array edges to internal access roads is 4 feet. Distance from tracker array edges to fences is typically a minimum of 8 feet.

While the information above pertains to a typical solar array, the final distances will depend on the tracker and array technology utilized following final engineering design specifications.

2.2.7 *Scale drawings of a typical panel row including inverter pad and transformer box.*

Appendix C includes data sheets with dimensions for a range of modules and inverters that would be used on the Project. It should be noted that the exact dimensions and ratings of the equipment that will be available at the time of procurement could be different, but similar to the information contained in **Appendix C**.

Typical module dimensions are 3 to 4 feet wide by 6 to 7 feet tall. Typical inverter enclosures are 15 to 20 feet long by 6 to 7 feet wide by 7 to 8 feet tall. Typical pad mounted transformers that will be located on the inverter skids are approximately 10 feet wide and long, and approximately 8 to 10 feet tall. An example can be seen on the TMEIC and SMA Inverter skid datasheets in **Appendix C,** which also includes typical profile views of the trackers and inverter skid equipment. **Appendix D** includes an exhibit depicting a typical array configuration.

2.2.8 *Provide information on any perimeter fencing that would be used around the solar PV arrays. Describe any requirements on the fencing around the PV sites.*

The perimeter fence around the solar arrays will be up to 8-feet-high to minimize wildlife intrusion into the facility and comply with applicable electrical codes. No barbed wire will be used on the perimeter fence, and "deer fence" will be used, unless required otherwise by applicable codes, standards, rules, or regulations. Fencing around the Project substation and O&M building will likely be a chain link design with barbed wire to satisfy applicable security requirements for those Project components.

The NESC[1] applies only to the high-voltage portions of solar projects. This includes the collector substation, which is addressed in NESC Part 1 and overhead

transmission lines which is addressed in NESC Part 2. The NESC does not address PV Solar arrays.

Generally, the NEC addresses the requirements for PV solar arrays in Section 691 for projects greater than 5 MW. Fencing requirements are in Section 110.31.

2.3 Other Project Facilities

2.3.1 *Site Construction Area. Describe the site construction area. Include location and dimensions for:*

2.3.1.1 *Solar arrays.*

A typical solar array area construction layout is provided in **Appendix D**.

2.3.1.2 *Lay-down areas.*

The general construction laydown area is shown on **Figures 4.1.1** and **4.1.2** (**Appendix B**). Racking materials, modules, cables and other materials would initially be stockpiled, and distributed in the field as construction sequencing progressed. This area would also host temporary construction offices and parking for personal and construction vehicles and equipment. An example of a laydown area configuration is included in **Appendix D**, page one.

One approximately 8-acre temporary laydown yard south of the Project substation is currently proposed and will be located outside of the proposed fenced area. Any additional temporary laydown yards that may be used during construction would be located in areas within the array fence boundaries shown in **Figures 4.1.1** and **4.1.2** (**Appendix B**).

2.3.1.3 *Parking area.*

Construction parking will be contained within the construction laydown area described above.

2.3.1.4 *Provide a scale drawing showing the general construction setup for the solar array sites.*

A scale drawing of an example array block construction site layout is provided in **Appendix D**.

2.3.2 *Collector Circuits.*

2.3.2.1 *Total number of miles of collector circuits required – separated by circuit type (overhead vs. underground).*

Approximately 48 miles of underground collection will be required for the Project's Primary Arrays. Depending on the final design, approximately 10 collector circuits are expected to be needed to connect 250 MW of solar arrays to the Project Collector Substation. There are no overhead collector circuits planned for the Project.

2.3.2.2 *Specify the collector circuit voltage to be used.*

The collection system will operate at a nominal voltage of 34.5 kV.

2.3.2.3 *Transformer type, location, and physical size of transformer pad at each site.*

Pad mounted transformers that will be located on the inverter skids will be 3-phase, up to 4600 kVA, 34.5 kV high side, and be air cooled. The transformers are approximately 10 feet wide and long, and 8-10 feet tall. Examples of similar pad-mounted transformers on inverter skids are included in the SMA and TMEIC inverter skid datasheets in **Appendix C**.

2.3.2.4 *Underground collector circuits.*

2.3.2.4.1 *Conductor to be used.*

The 34.5 kV medium voltage underground collector circuits from the substation low side bus will be daisy chained to up to approximately 7 inverter stations (depending on final inverter size) per circuit. Properly sized surge arrestors will be placed at the end of each medium voltage circuit. Conductor sizes up to 1500 KCMIL will be used.

2.3.2.4.2 *Describe installation type and how lines would be laid (open-cut trench, vibratory plow, directional bore, etc.). Provide scale drawing of underground circuit.*

Collector circuits will be installed using an open-cut trench, directionally bored, or plowed depending on conditions. Construction details for these installation methods and a scale drawing of the underground circuit for a typical array are provided in **Appendix D**.

2.3.2.4.3 *Depth and width of trench, and minimum depth of soil cover over circuits (if applicable).*

The medium voltage cables will typically be direct buried in native soil arranged in a triangular configuration with 36" – 60" of cover in a 12" – 18" wide trench pending final engineering. Parallel trenches will be separated to maintain cable ampacity.

Underground AC collector circuit burial depths must comply with the NEC 300.50 or, in certain instances, Part 3 of the NESC if applicable to the Authority Having Jurisdiction (AHJ). The NEC states that cables shall be installed in accordance with 300.50(A)(1), (A)(2), or (A)(3), and the installation shall meet the depth requirements of table 300.50.

2.3.2.5 *Overhead collector circuits.*

2.3.2.5.1 *Size of pole to be used.*

2.3.2.5.2 *Engineering drawing of structure to be used.*

Not applicable.

2.3.3 *Site Foundations. Describe the type of foundation or foundations to be used for each part of the project. If more than one type of foundation may be needed describe each and identify under what circumstances each foundation type would be used. Include the following:*

2.3.3.1 *Describe how the panel and inverter foundations would be installed (e.g. direct imbed, excavation for pouring of concrete footings, etc.).*

Per the preliminary geotechnical report (**Appendix T**), Darien Solar expects to use steel, driven piles, with a minimum embedment depth of 5 feet for both panel foundations and inverter foundations pending final engineering. Piles will vary in size and embedment depth and may or may not be galvanized. If pile refusal is encountered due to shallow bedrock or other subsurface obstructions, alternate foundation installation techniques or designs such as pre-drilled, cast-in-place or helical piles may be needed. Alternate foundation types for inverters, such as concrete footings, may be considered during final design.

2.3.3.2 *Dimensions, surface area and depth required for each foundation.*

The preliminary report recommends typical driven pile foundations be W6x8.5 to W8x28 steel sections with 14 to 16-foot embedment depths. Construction details for driven, cast-in-place, and helical piles as well as pile refusal plans are provided in **Appendix D**. Darien solar will conduct additional geotechnical testing as part of final site design and engineering.

2.3.3.3 *Amount of soil excavated for each foundation type.*

No soil excavation is required for the planned driven piles, nor would it be required if helical piles are used. If a pile location requires cast in place, then the hole will be augered with a negligible amount of material removed.

For shallow concrete inverter pad foundations, a typical excavation method could displace approximately 16 cubic yards of soil pending final engineering.

2.3.3.4 *Describe how excavated soils would be handled including disposal of excess soil.*

Darien Solar will approach grading with the objective to achieve a balanced site, meaning a target of zero net cut and fill (cut materials are used for fill where required, with no need to import or export off site). However, in the scenario where excess soils are generated on site, they will be thin-spread in a nearby location. Spreading subsoil on cropland/pasture will require topsoil BMPs.

2.3.3.5 *Materials to be used for the foundation. Include:*

2.3.3.5.1 *Approximate quantity and type of concrete required for typical foundation.*

No concrete is needed for driven or helical piles. Generally, less than half of a cubic yard of concrete or flowable fill is needed for cast-in-place foundations. For shallow concrete inverter pad foundations, a typical excavation method could displace approximately 16 cubic yards of soil pending final engineering.

2.3.3.5.2 *Materials required for reinforcement.*

Sacrificial steel or galvanization may be needed to reinforce design against corrosion.

2.3.3.5.3 *Description of the panel mounting system.*

Typically, the panel mounting system consists of a steel bracket on top of the steel pile bolted to the racking superstructure. A torque tube is then fixed to pile foundations via steel brackets or other mechanisms, the modules are then fixed to the torque tube via steel mounting brackets or another similar mechanism.

2.3.3.6 *Provide technical drawings of each foundation type to be used showing foundation dimensions.*

Typical drawings of the foundation types under consideration are included in **Appendix D**. Exact dimensions, surface area, depth implications, and final quantity will be determined upon final engineering after permitting and prior to construction. Up to 140,000 foundations are being considered for the solar array.

2.3.3.7 *Describe how foundation or support installation would address the risk of frost heave on facilities.*

A preliminary geotechnical investigation performed by Terracon **(Appendix T**) included fourteen (14) borings within the Project Boundary.

Per the preliminary geotechnical report, the soils on this site are frost susceptible, as with most or all sites in Wisconsin. The typical frost depth for southern Wisconsin for foundation design considerations is 48 inches (4 feet). Terracon recommends an ultimate adfreeze (frost heave) of 750 psf acting along the pile perimeter to a depth of 4 ft bgs. Helical pile design may be considered as a more economical approach to mitigating the effects of frost heave compared to deep driven or grouted pile foundations, to be determined during the design process.

A final geotechnical study, including pile load testing, will be completed prior to construction which will be used to determine final engineering pile requirements. The final engineering design will be approved by a structural engineer to ensure compliance with all applicable regulations, the safety and durability of the Project, and with frost heave risk considered and mitigated.

2.3.4 *Access Roads*

2.3.4.1 *Provide the total number and total miles required for access roads. Provide the amounts for both temporary access (used during construction only) and permanent access (for long-term facility operation and maintenance) roads. State if any temporary access roads would be converted into permanent access roads.*

Suitable access roads, typically gravel 12 feet wide with 4-foot shoulders, will be constructed within the Project Boundary and are shown in **Appendix B**. Approximately 14 miles of permanent access roads are anticipated for the proposed Primary Arrays of the Project based on current design estimates. Access roads are predominantly within the array fence boundaries. All access roads are subject to final design engineering, input from landowners, and input from local road authorities. As such, the exact number and width of temporary, permanent, or temporarily widened access roads will not be known until the time of construction, when final determinations can be made.

Roads will be located primarily to provide access to power conversion equipment at the center of power blocks and around the Project perimeter to provide access to the solar equipment and accommodate ongoing maintenance of the Project components. Roads will not be constructed within every aisle. Roads will also provide access to the array perimeter for emergency vehicles under emergency circumstances. As the final array configuration will be determined following PSC approval, the access road design and locations depicted in **Appendix B** are preliminary. Darien Solar will incorporate the input from landowners and local road authorities when feasible in the final design considerations.

Temporary roads may be constructed for strategic laydown areas throughout the project as needed. If used, any temporary roads will avoid all impacts to delineated

wetlands, waterways, sensitive species habitat and cultural resources. No temporary roads will be converted into permanent access roads. Temporary widening of roads to approximately 24 feet may be required in certain areas to accommodate construction traffic and deliveries. This temporary widening would be within the construction disturbance limits for the permanent access roads as described in Section 5.3.3.3.

2.3.4.2 *Describe materials to be used and methods for construction of temporary and permanent access roads, including road bed depth.*

Permanent and temporary (if any are required pending final engineering) access roads are constructed with a subgrade base and an aggregate course on top of the subgrade. The subgrade work completed to support the roads will vary depending on soil types, weather conditions, etc., but generally range from simple compaction of the native soils starting at a depth of 6-12 inches below grade to cement stabilization or other treatments to the subgrade soils to create a suitable base. Subgrade treatment can be as deep as 2-3 ft below grade in some scenarios. The aggregate depth of the road will also vary but is typically 6-12 inches in depth and may be in excess of 18 inches in specific scenarios. Shoulders are compacted and seeded, and not expected to require subgrade treatment or aggregate.

2.3.4.3 *Specify the required width of temporary and permanent access roads. Fully describe any differences between final road size and that required during construction.*

Suitable permanent access roads are typically 12 feet wide with 4 foot shoulders. During Project construction, permanent access roads may be temporarily widened to approximately 24 feet in necessary scenarios. Temporary road improvements will consist of temporarily widening a permanent access road to support additional traffic or off-loading activities, increased turn radius areas to support turning or larger equipment, and placement of temporary aggregate roads in places that may not have a permanent road if conditions require further stabilization to support construction activities.

2.3.4.4 *Describe any site access control (e.g. fences or gates).*

The perimeter fence around the solar arrays will be up to 8-feet-high to minimize wildlife intrusion into the facility and comply with applicable electrical codes. No barbed wire will be used on the perimeter fence, and “deer fence” will be used. Fencing around the Project substation and O&M building will likely be a chain link design with barbed wire to satisfy applicable security requirements for those Project components. Access to the Project is only for Project personnel and approved contractors and gates will be installed at access road entrances at public roads. Landowners will not have access to or use of access roads within the secured array areas.

2.3.5 *General Construction Areas*

2.3.5.1 *Identify size and location of laydown areas outside of those found at the array sites and any other areas used for material storage.*

An approximately 8-acre general construction laydown area is described in Section 2.3.1.2 and shown on **Figures 4.1.1** and **4.1.2** (**Appendix B**). Racking materials, modules, cables and other materials would initially be stockpiled, and distributed in the field as construction sequencing progressed. An example of a laydown area configuration is included in **Appendix D**. Additional laydown and staging areas may be located inside the array sites. No additional laydown areas or materials storage outside of the array sites are planned for the Project.

2.3.5.2 *Identify size and location of construction parking areas.*

Construction parking will be contained within the general construction laydown areas described above.

2.3.5.3 *Describe the expected use of these areas after project completion.*

Areas that are used for laydown yards and/or parking during project construction that are not incorporated in the final project layout will be returned to agricultural use and seeded by landowners in accordance with their crop management program. After construction is complete, the gravel surface placed within the temporary laydown yards/parking areas would be removed and the soil would be de-compacted.

Areas that are used for laydown yards and/or parking during project construction that are incorporated in the final project layout will be seeded consistent with the final designated ground cover for that area. Seed mixes will be materially similar to the conceptual array mix described in the Vegetation Management Strategy (VMS).

2.3.5.4 *Provide a list of all hazardous chemicals to be used on site during construction and operation (including liquid fuel).*

The primary hazardous chemicals that will be present on site are fuel for vehicles and construction equipment, oil in the transformers at the substation and inverter pads, and heating fuel for the O&M building. Smaller quantities of additional chemicals will also be used on site, including paints, lubricants, and cleaning products. Darien Solar's ECSWMP lists these and other potentially hazardous substances in **Appendix L**.

Potentially hazardous materials in fire suppression agents used for the battery system are listed below. The fire suppression agents proposed by Darien Solar are common to many industrial, military, and healthcare applications.

- Potassium Nitrate (used in fertilizers)
- DCDA - Dicyandiamide or Cyanoguanidine (used as curing agent for resins)
- Organic Resin

- Heptafluoropropane

The following are hazardous materials found in common Lithium Ion batteries. Final materials will be dependent on final battery selection, but the list below is representative of similar batteries Darien solar will use.

- Graphite (used in pencils)
- Lithium Iron Phosphate
- Acetylene (used for welding and cutting)
- Fluoride polymers (used in high purity plastics applications such as wiring insulation and piping)
- Lithium Hexafluorophosphate
- Various organic solvents

2.3.5.5 *Discuss spill containment and cleanup measures including the Spill Prevention, Control, and Countermeasures (SPCC) and Risk Management planning for the chemicals proposed.*

A Spill Prevention, Control, and Countermeasures (SPCC) Plan complying with all EPA requirements will be developed for both construction and operation of the facility. Spill kits will be available on site, and training, inspection protocols, and response procedures will be established in the SPCC Plan. The SPCC plan will be developed and implemented after initial construction mobilization to the site, but prior to storage of materials at the site that would require it. All approved contractors will be responsible for their own SPCC plans that will be tailored to the specific work items being conducted, such as secondary containment measures for fuel tanks and the substation transformer. Details pertaining to these specific work items will be contained in each contractor's plan. Each plan will be continually updated through the course project construction and adjusted accordingly.

2.3.6 *Construction Site Lighting.*

2.3.6.1 *Describe the site lighting plan during project construction.*

The Project does not plan on having any permanent lighting on site during construction. During potential extensions of working hours, temporary lighting may be used in the construction and laydown areas. If work extends into the evening, Darien Solar intends to utilize portable light plants if temporary lighting is necessary during project construction. Lights will be turned to focus on work activities, so as not to shine on neighboring property or on-coming traffic. The O&M area will include down-shielded lighting for security purposes and also to ensure that the nearby residence will not experience disturbance from constant, 24-hour lighting. The only lights that would remain on outside of construction periods would be office lights for administrative tasks, vehicle lights for transport, or possible security lights for the laydown yards.

2.3.6.2 *Provide copies of any local ordinances relating to lighting that could apply.*

Walworth County Ordinance Sec. 74-96 could apply and is included in **Appendix I**.

2.4 Substation

If the project includes the construction of a substation or modifications to an existing substation, provide the following information:

2.4.1 *A complete electrical description of required substation facilities including a list of transformers, busses, and any interconnection facilities required.*

The preliminary project collection substation design includes one or more transformers, which may not be identical, ranging in size from 55/73/91MVA to 105/140/175MVA that will transform voltage from the 34.5kV collection system to the 138kV interconnection system. Final design and engineering will dictate the number and size of the final transformer combination. A drawing of a typical, larger transformer is included in **Appendix C**. Each transformer will have its own 138kV circuit breaker tied to a common 138kV bus before exiting the substation with an overhead 138kV transmission line. There will be two independent 34.5kV collection system buses with individual 34.5kV feeder breakers for each collection feeder. All breakers will be supplemented with disconnect switches according to industry practices. A control enclosure will be installed on-site that will house the protection, communication, and SCADA equipment necessary to safely operate the collection substation. The facility will be fenced-in and protected according to the NESC.

A discussion of interconnection facilities is covered in Section 2.5.5 and **Appendix AC**.

2.4.2 *Indicate the size (in acres) of the land purchase required for the new substation or substation expansion.*

Darien Solar plans to enter into an option to purchase up to 40 acres for the combined use of the O&M Building, Project substation, and potential BESS. The number of acres expected to be used for the new substation is approximately 2.8 acres as depicted in **Figures 4.1.4** and **4.1.5 (Appendix B)**. The ultimate location of the substation could be adjusted based on final engineering, layout considerations, and design inputs.

2.4.3 *Indicate the actual size of the substation or substation addition in square feet, the dimensions of the proposed substation facilities, and the orientation of the substation within the purchase parcel.*

The preliminary substation design assumes the footprint will be approximately 300 x 400 feet, or 120,000 square feet. The proposed layout on the parcel is depicted on

Figure 4.1.4. The substation likely will be located in the central portion of the Project Area.

2.4.4 *Identify current land ownership and whether applicant has control of property or whether or not an option to buy has been signed.*

The land is currently privately owned and subject to a solar lease, and Darien Solar plans to enter into an option to purchase up to 40 acres of the property.

2.4.5 *Describe substation construction procedures (in sequence as they would occur) including erosion control practices (see Section 3.1).*

The construction sequence for the substation will likely involve, in the following order: driveway and access road installation, site grading work, foundation and fence installation, grounding and conduits, rock surfacing, above grade physical construction of bus work and installation of major electrical equipment, wiring and completion of all terminations, testing, commissioning, energization, then site area reclamation and finishing. A site-specific construction specification and schedule will be developed but is not yet available. All contractors will be required to follow the Storm Water Pollution Prevention Plan as well as adhere to any site specific environmental requirements, including erosion and dust control. The Erosion Control Plan is included in **Appendix L.**

2.4.6 *Describe any security requirements for the substation site and provide information on how these would be met.*

A control enclosure will be installed on-site that will house the protection, communication, and SCADA equipment necessary to safely operate the collection substation. The facility will be fenced-in and protected according to the NESC. Access to the control enclosure is typically operated via key control or badge reader systems.

2.5 Transmission and Distribution Interconnection

If the project includes the construction of an electric generator tie line, that is not the subject of a separate application before the Commission, provide the following information:

2.5.1 *Describe any transmission or distribution grid interconnection requirement.*

The following facilities have been determined necessary by MISO and ATC for the interconnection of the Darien Project as part of the MISO DPP-2017-AUG study group. Some of these upgrades are shared between Darien and other projects in the same MISO study group.

- The Point of Interconnection will consist of network upgrades including a new interconnection switchyard and substation which will be constructed and owned by ATC on the RCEC Bradford to West Darien 138kV transmission line. The

interconnection switchyard and substation are related facilities to the Darien Solar generating facility and are essential to permitting the electricity generated by Darien Solar to be transmitted on the ATC transmission system;

- A newly-constructed 138 kV transmission line (less than one mile) connecting an Interconnection Switchyard at the Point of Interconnection to the Project Substation within the Project Boundary;
- Other upgrades governed under separate Multi Party Facility Construction Agreements (MPFCAs) include the Paris Substation expansion, Arcadian, Berryville, and Elkhorn short circuit upgrades, North Monroe Substation grounding upgrades, and replacement structures on the Elkhorn to Lake Geneva line. ALTW and REC system grounding upgrades on Delavan, LaPrairie and Bradford are assumed as well as affected system upgrades

2.5.2 *Provide details on the types of structures and lines that would be constructed as part of any necessary electric transmission generator tie line.*

A 138 kV Gen-Tie line will be located between the Darien Solar project substation and the interconnection substation to span approximately 75 feet. The gen-tie line will consist of a single monopole steel structure on a concrete pier foundation. Final engineering for the project substation, interconnection substation and gen-tie have not been completed. However, the structure height is anticipated to be approximately 65 to 85 feet above ground. Gen-tie facilities will be designed and built in compliance with the NESC.

Darien Solar will own, construct, and maintain the proposed gen-tie line. If Darien solar is sold to one or more public utilities, as outlined in Section 1.2 of the CPCN application, those entities would then own the gen-tie line.

2.5.3 *Describe the right-of-way needed for the tie line and the status of any easements or other land agreements with property owners.*

Transmission line engineering has not been completed but the right of way width is anticipated to fit within 100ft. The right of way would fall on the property Darien Solar intends to purchase, and currently leases, for the Project collection substation. Therefore, no additional easements would be needed for the transmission line.

2.5.4 *Describe all communications and agreements, official or otherwise, with the transmission or distribution owner.*

Darien has requested interconnection to MISO as part of MISO DPP-2017-AUG study group. With that process there has been discussion with the Transmission Owner ATC and MISO as regular course of business for an Interconnection Request. These communications include those organized by MISO to facilitate the Interconnection Process. Darien has participated in Kick-Off calls for the each of the Definitive Planning Phases (DPP) (1 and 2) and kick-off of the Facilities Study for

the Interconnection Facilities, (Phase 1). In addition, there have been calls and emails with MISO and the Transmission Owner in which results of ongoing studies have been discussed.

The kick-off call for DPP1 for this group was held on 4/13/2018, DPP2 on 1/14/2019, DPP3 on 4/15/2019 and Phase 1 Interconnection Facilities on 2/21/2019.

Darien, MISO and ATC have had several calls to negotiate the Generator Interconnection Agreement (GIA) and related Multi Party Facility Construction Agreements (MPFCA) for shared upgrades. Darien Solar has had a telephone conference and exchanged emails with ATC representatives to discuss the proposed Darien Solar facilities that are proposed to be constructed near and amongst existing ATC facilities.

2.5.5 *For transmission interconnections, indicate where the project is in the MISO Queue and provide copies of the latest draft or final MISO report for the project interconnect. During the PSC review process applicant must continue to supply the latest reports from MISO.*

The Project consists of interconnection position J850 requesting the Interconnection of 250 MW of solar generation to a new interconnection switchyard and substation, which will be constructed by ATC. The interconnection switchyard and substation are considered an essential part of the Project to permit the electricity generated by Darien Solar to be transmitted on the ATC transmission system. The queue position is in MISO DPP-2017-AUG-East (ATC) study cluster.

Projects in MISO DPP-2017-AUG-East (ATC) study cluster have concluded their GIA and MPFCA negotiations. Darien has fully executed a Generator Interconnection Agreement (GIA) and related Multi Party Facility Construction Agreements (MPFCA) for shared upgrades. A public copy of the executed GIA is included in **Appendix AC**.

2.6 Operations and Maintenance (O&M) Building

2.6.1 *Describe the purpose and use of the proposed O&M building.*

The O&M area would accommodate a permanent O&M building, parking area, and other associated facilities such as drinking water well, aboveground water storage tanks, septic system, security gate, lighting, and signage. The permanent O&M building would house administrative and maintenance equipment and personnel.

The Project's O&M building is expected to require 4,000-5,000 square feet to be able to offer the following:

- 2700 sq. ft. warehouse space
- three offices including one shared workspace for up to 7 technicians,

- a control center/library,
- a bathroom with shower, and
- a breakroom/kitchen.

2.6.2 *Number of full-time employees that would be working at the facility.*

The Project expects the facility will employ 4 permanent employees and have additional office space for traveling workers.

2.6.3 *Provide the size (in acres) of the land purchase required for the facility.*

Darien Solar expects that the 40-acre land purchase described in section 2.4.2 will be adequate for site access, substation, O&M, BESS, parking and storage areas.

2.6.4 *Building and Building Footprint.*

2.6.4.1 *Provide a drawing or diagram of the O&M building with dimensions including square feet.*

A diagram of the preliminary O&M building is shown in **Figure 4.1.4/4.1.5** (**Appendix B**).

2.6.4.2 *Indicate the actual size of the building in square feet.*

The O&M building is expected to require 4,000-5,000 square feet.

2.6.4.3 *Describe the type of building to be constructed (metal, frame, etc.).*

A diagram of a typical O&M building is shown in in **Figure 4.1.4/4.1.5** (**Appendix B**). As Darien Solar gets closer to construction and final engineering, the design of the O&M building will continue to be refined. The major material components would consist of metal, brick, wood, concrete, or other forms of structural materials. The final design and construction of this building would be consistent with applicable Wisconsin State Building Code and County Building Standards and may include materials not identified in this list.

2.6.5 *Lighting and Security Plan for O&M Property*

2.6.5.1 *Describe how the building property would be lit and how the lighting plan minimizes disturbance to nearby residences.*

The O&M area will include down-shielded lighting for security purposes. These lights will be turned on either by a local switch, as needed, or by motion sensors that will be triggered by movement. This will ensure that the nearby residence will not experience disturbance from constant, 24-hour lighting.

2.6.5.2 *Describe any security plans for the property (fences etc.).*

A perimeter fence that is 6 to 7-feet-high with an additional foot of barbed wire above will enclose the O&M area. The rest of the Project will be enclosed by fencing as described in section 2.3.4.4.

2.6.6 *Describe any other facilities needed, including:*

2.6.6.1 *Parking lots.*

The O&M building would have an adjacent parking area of approximately ten parking spots to anticipate a maximum load of four permanent employees' vehicles and six visitors' vehicles.

2.6.6.2 *Sheds or storage buildings.*

The approximate 2,700 square feet of warehouse space house inside the O&M building is the only permanent storage building expected.

2.6.6.3 *Supplies of water.*

Darien Solar will work with the applicable local regulatory authorities to either drill a new water well or connect with the municipal water service to supply the facility's needs.

2.6.6.4 *Sewer requirements.*

Project will work with applicable local regulatory authorities to install a new septic system.

2.6.6.5 *Construction of any stormwater management facilities.*

A stormwater management plan will be developed in accordance with Wisconsin statutes and guidelines as part of the final site design. The stormwater plan will incorporate the entire site layout, including final panel site design with appropriate best management practices. The stormwater plan is described in greater detail below.

2.7 Battery Storage

If the proposed project would include a large-scale Battery Energy Storage System (BESS) or plans to include one in the future, provide the following information.

2.7.1 *Describe the location of the proposed BESS, including a map that shows its placement within the other project facilities.*

The BESS will either be located throughout the field to utilize the same inverters as the solar arrays (called "DC-coupled") or centralized on the same parcel as the O&M

building and project substation (called “AC-coupled”). In the first scenario, the BESS will likely be housed in standard ISO shipping containers. One or more containers will be installed at each solar inverter skid. Utilizing smaller, additional transforming equipment, the BESS containers will connect to the solar inverters and utilize the same collection system as the solar plant to connect to the project substation. In the centralized scenario, one or more steel buildings, totaling up to approximately 350’ long and 200’ wide would house the batteries. Likely in between the battery building and the project substation would be a graveled area up to approximately 300’ long and 100’ wide for the battery system’s inverters and pad mounted transformers. The inverters would be connected to the pad-mount transformers, which would then connect to the project substation. Structures would be mounted on concrete slab or pier foundations. **Figure 4.1.4/4.1.5** (**Appendix B**) depicts an AC-coupled BESS on the same parcel with the O&M building and substation.

2.7.2 *Explain what criteria was used to decide whether to use a BESS, and provide information on how its inclusion would affect the electrical design of the project and MISO interconnection process.*

The decision process to include battery storage will incorporate an analysis of the following criteria: the capital and operating costs of the systems, regulatory and permitting considerations, the wholesale electricity market conditions, prices for energy, capacity, ancillary services and MISO tariff provisions for the utilization of battery energy storage systems (BESS).

The impact to the MISO grid from the integration of a BESS at Darien Solar will be positive, as the storage system can act as an "electrical suspension" system for the grid, to smooth out abrupt ups and downs in solar production that can occur on partly cloudy days. Depending upon project design, the system can furnish other grid services such as frequency response, voltage support, and output scheduling to potentially shift some afternoon production to later in the day, if needed, to correspond with peak demands.

Dependent upon interest from potential offtakers, Darien Solar can pursue the interconnection of a BESS via the recently established MISO surplus interconnection process. To request Surplus Interconnection Service, an interconnection customer can submit an Interconnection Request (Appendix 1 to Attachment X) to MISO accompanied by a study deposit in the amount of $60,000. The request can be submitted at any time if it meets all the requirements described in Attachment X to MISO Tariff. If MISO determines that service outlined in the Surplus Interconnection Request would not result in material adverse impact on the Transmission System and/or Affected Systems, as compared to the impacts that are created by the Existing Generating Facility without the inclusion of the proposed Surplus Interconnection Service, the requested Surplus Interconnection Service will be granted.

2.7.3 *Provide information on how the BESS would be installed, any changes to project impacts through its inclusion, and ongoing operations and maintenance actions it would require.*

If a battery storage system is added to the Project, the batteries will be housed in one or more enclosures or in steel containers. Enclosures and containers will be populated with battery racks that are bolted to the floor and strung together electrically. Racks are typically loaded by forklifts. The enclosures or containers will be installed on concrete foundations in the manner described above.

In an AC-coupled or DC-coupled system, the power delivered at the point of transmission interconnection resulting from generation and battery storage, would not increase beyond 250 MW, as the batteries will serve to compliment the solar facility by smoothing, shifting, or firming the solar generation.

In either an AC-coupled or DC-coupled system, there would be a minimal increase in impervious surface added by the project, which would be addressed in the SWPPP. The visual impact would increase in both scenarios, but in a landscape currently dominated by the existing transmission lines, the BESS's enclosures and external electrical yard would not be entirely out of character. The visual impact in the DC-coupled scenario would also slightly increase by the addition of one or more steel shipping containers adjacent to inverters throughout the site. These are relatively low height and this would be a very minor change relative to the base case of the proposed solar facility installation as the inverter locations are generally several hundred feet into the interior of the solar arrays and will be minimally visible to people viewing them from public roads or neighboring properties.

Finally, the BESS components will contribute relatively minor additional noise, but Darien Solar believes that overall noise levels from the Project will remain relatively low. As documented in the Darien Solar pre-construction noise report (**Appendix P** to the Application), noise emissions from the Project are predicted to be less than 40 dBA at night and less than 45 dBA during the day. Potential mitigation measures included in Appendix P involve the construction of a noise wall at the BESS location. A final determination on noise mitigation actions will be made once Darien Solar has completed final design engineering and has selected final project equipment. Based on final design engineering and final project equipment selection, an updated model of noise emissions from the Project will be created and used to determine if noise mitigation measures need to be included in the Project as designed. If mitigation measures are deemed necessary, Darien Solar would consider and implement as needed a variety of feasible and achievable approaches such as: constructing a noise wall, adjusting the location of the substation and BESS further from receptors, specifying lower noise equipment or enclosing equipment. Darien Solar will update the noise analysis as part of final design to ensure that noise levels at all non-

participating, noise-sensitive receptors continue to be predicted to be less than 50dBA daytime and 45dBA nighttime.

The storage enclosures or containers will have a fire protection system that will contain and extinguish fires. The typical fire suppression agents are FM200, Stat-X, or F-500. As part of regular maintenance, Darien Solar will monitor and refill/replace the suppression agent and other parts of the fire suppression system. With this fire suppression system, the fire risk for the project will not appreciably change due to the addition of the battery energy storage system.

Operations and maintenance for the battery site will be performed in coordination with the solar facility. The largest maintenance items for the battery system will be the annual capacity test, regular inverter maintenance (if the battery system has its own inverters), and data monitoring from a remote project operations control center. Through remote monitoring, Darien Solar will ensure the battery stays within optimal operating bands to ensure both safety and long-term performance. Critical information such as battery temperature, battery state of charge, and any system warnings are monitored on a 24/7 basis. Any anomaly is identified immediately and is able to be addressed by action from a remote control center or by dispatching local solar and storage technicians to site. In addition to real time monitoring and support, analysts can analyze trends in operating data to predict anomalies or failures before they arise.

3. Construction Sequence and Workforce

3.1 Construction Sequence

3.1.1 *Provide the construction schedule for the proposed project. Include a timeline showing construction activities from beginning of construction to in-service. Identify all critical path items.*

Appendix H includes a preliminary project schedule for the construction process including an approximate timeline of construction items. Darien Solar considers all items as critical path items. If the project is authorized, construction would commence in Spring 2022 after frost leaves the ground. If this is delayed, Darien Solar still expects to commence construction within twenty-four months of a CPCN Order. Onsite construction activities are expected to continue for 18 – 24 months and conclude with a commercial operations date on or before 12/31/2023.

3.1.2 *Provide a description of the staging and construction sequence required for building a typical solar array. Include the delivery of materials.*

Below is a typical staging and construction sequence:

1. Mobilize equipment and personnel to site

2. Installation of sensitive resource/impact avoidance signage/flagging, survey staking, and stormwater protection/wildlife exclusion measures (e.g., silt fence)
3. Construct laydown yard(s) and office trailers.
4. Access road construction and grading of the array areas, including delivery of aggregate for roads
5. Racking pile deliveries behind the grading crews as they progress through site
6. Delivery and installation of inverters
7. Delivery of medium voltage cable
8. Installation of medium voltage cable underground
9. Installation of the racking piles
10. Delivery of the racking system components
11. Installation of the racking system
12. Delivery of the solar panels
13. Installation of the solar panels
14. Installation of miscellaneous equipment such as DC collection
15. Commissioning the plant
16. Commercial operation

Fencing surrounding array areas may be installed at any point between items 3 and 14.

3.1.3 *Provide an estimate of time required to complete construction at a typical solar array.*

The solar array blocks will be constructed on a rolling basis with simultaneous activities occurring in multiple blocks. If a single power block was constructed independently, in its entirety, it would require an estimated construction duration of 12-16 weeks.

3.1.4 *Provide a description of the staging and construction sequence for any other facilities to be constructed.*

The Project will include interconnection, transmission line, and substation facilities. Those facilities will be constructed at any point between the staging items listed above at section 3.1.2, items 3 and 13. Minimal large deliveries will be required for the Generator Step-up Transformer (GSU), the control enclosure, and transmission structures.

General site improvements will be made such as access improvements and preparation of the staging/laydown areas. The temporary staging/laydown areas will be approximately 50 acres in total and located at various locations within the Project boundary. The staging/laydown areas will be used for storage of construction

materials and shipped equipment containers, receiving construction deliveries, and temporary parking for Project related vehicles.

3.2 Workforce

3.2.1 *Provide information on the workforce size and skills required for project construction and operation.*

The Project's construction workforce will consist of craftworkers, laborers, and electricians, along with onsite management personnel. The Project's contractor may use a traveling workforce for items that are self-performed. During peak construction periods, approximately 400 workers are anticipated. However, this is for an ideal construction schedule and peak manpower may vary based on the final schedule.

During the project's operational period, Darien Solar will likely be staffed with four full time, certified maintenance technicians for the life of the project. These technicians have a wide variety of skill sets such as: electrical proficiency, software knowledge, general maintenance skills, safety, and solar specific problem-solving abilities.

3.2.2 *Estimate how much of the expected workforce would come from local sources.*

The estimated local, meaning Walworth and Rock Counties, labor workforce for the Project during construction is an estimated 26 and 4 jobs respectively. An estimated 265 jobs are forecasted to be sourced within the State of Wisconsin during construction. During the Project's operational life four full-time employees are anticipated to reside locally in host or adjacent Counties.

3.3 Construction Equipment and Delivery Vehicles

Provide a description of the types of construction equipment needed to build the project and the types of delivery vehicles that would be used to deliver panels and equipment to array sites. For large equipment and vehicles include:

3.3.1 *Types of construction equipment and delivery vehicles.*

Darien Solar estimates that there will be between 25 and 35 trucks used daily for equipment delivery during construction. Light duty trucks will also be used on a daily basis for transportation of construction workers to and from the site. Most panels and other site equipment and materials will be delivered by standard, legal load weight semitrucks. Typical construction equipment such as scrapers, bulldozers, dump trucks, watering trucks, motor graders, vibratory compactors, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- Skid steer loader;
- Vibratory pile driver;
- Medium duty crane;
- All-terrain forklift;

- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

3.3.2 *Gross vehicle weight (loaded and unloaded) for all vehicles using local roads.*

Other than delivery vehicles for the main step-up transformers in the Project substation and trucks delivering grading machines to the site such as bulldozers and excavators, Darien Solar believes all of the vehicles using local roads will be legal loads in terms of size and weight. If there becomes a need for a larger vehicle, Darien Solar's construction contractor will work with state and local authorities to obtain the applicable oversize-overweight permits to provide more vehicle details closer to delivery dates. The anticipated delivery vehicle for the main step-up transformer at the Project collection substation is estimated to have a gross vehicle weight of approximately 309,500 pounds.

3.3.3 *For vehicles used for delivery (diagrams or drawings of vehicles are acceptable). Include:*

As mentioned above, the solar equipment delivery vehicles will primarily use standard size and weight semitrucks and trailers. The delivery vehicle for the main substation transformers can vary and drawings will be provided during the overweight/oversize permit approval process.

The information provided in Sections 3.3.3.1, 3.3.3.2, 3.3.3.3, and 3.3.3.4 below is for a typical transformer delivery vehicle. Final delivery vehicle information will be provided to the correct authorities once finalized closer to delivery dates. In the event the delivery vehicle for the main substation transformer varies greatly from the information provided, Darien solar will coordinate with local affected parties to relay updated information regarding the vehicle and plan for transport off the highway.

3.3.3.1 *Overall vehicle length.*

The expected maximum length of the vehicle is 75 feet.

3.3.3.2 *Turning radius.*

The typical front turn radius of the delivery vehicle is 52 feet.

3.3.3.3 *Minimum ground clearance.*

Minimum ground clearance is 6-inches, though if no overhead obstructions are present the deck can be raised and lowered to accommodate bumps and dips in the road surface.

3.3.3.4 *Maximum slope tolerance.*

The maximum allowable slope is 7%.

3.3.4 *Roads and Infrastructure. Estimate the potential impacts of construction and delivery vehicles on the local roads. Provide the following:*

3.3.4.1 *Describe methods to be used to handle heavy or large loads on local roads.*

Solar projects do not require the large volume of concrete trucks, large mobile cranes, or extreme oversized vehicles that are common on wind projects.
Typical construction and delivery vehicles such as dump trucks (e.g. for aggregate delivery), and flat bed and enclosed tractor-trailer for equipment and material deliveries will constitute the majority of Project traffic. The Project will also use light-duty pickup trucks or cars for personnel access to the project site. A small number of oversized/overweight deliveries will be required for main substation transformers. As such, the potential impact of construction and delivery on the local roads is minimal and is being addressed with the local government entities as part of a JDA. Overweight and oversize loads will be permitted with the relevant local authorities.

3.3.4.2 *Probable routes for delivery of heavy and oversized equipment and materials.*

The main haul route for construction materials into the Project Boundary will likely be on US Interstate 43, US Highway 14, State Highway 89, and State Highway 11 (see **Appendix B Figure 8.5.1**). County and Township roads within the Project Boundary will be used to deliver equipment and materials to the Laydown Area and directly to construction sites. The heavy equipment for the substation would likely be delivered directly to the substation via North Road and Creek Road. Applicable State/County oversize/overweight permits will be obtained for the final route prior to delivery.

Final road use and haul routes will be determined after consultation with Local Governments.

3.3.4.3 *Potential for road damage and any compensation for such damage.*

Darien Solar has had preliminary conversations with the Walworth County Administrator, Rock County's Administrator's senior Staff, Walworth and Rock Counties' land development Staff, the Darien Town Board Chair and Staff, and the Bradford Town Chair to discuss local agreements and will negotiate in good faith with the local government entities to reach appropriate arrangements regarding road use. Darien Solar will have an obligation to repair any road damaged caused by Project construction. Darien Solar believes one of the fundamental components of

such an agreement will be an objective standard of repair for public infrastructure, as well as adherence to local zoning and siting regulations in effect at the time of filing this application.

3.3.4.4 *Probable locations where local roads would need to be modified, expanded, or reinforced in order to accommodate delivery of equipment.*

Darien Solar is not currently aware of any locations where road improvements will be necessary to accommodate construction.

3.3.4.5 *Include an estimate of whether or not trees near or in road right-of-way (ROW) might need to be removed.*

It is not expected that trees in the road ROW would need to be removed to accommodate Project deliveries or construction.

3.3.4.6 *Provide an estimate of likely locations where local electric distribution lines would need to be disconnected in order to allow passage of equipment and materials.*

No disruption of existing distribution lines is anticipated to allow for passage of Project equipment or materials.

3.3.4.6.1 *Describe how residents would be notified before local power would be cut.*

Not applicable.

3.3.4.6.2 *Estimate the typical duration of a power outage resulting from equipment or materials delivery.*

Not applicable.

3.3.5 *Construction Traffic. Describe any anticipated traffic congestion and how congestion would be managed, minimized or mitigated. Include:*

3.3.5.1 *List of roads most likely to be affected by construction and materials delivery.*

See **Figure 8.5.1** (**Appendix B**) for preliminary Project haul routes which depicts the roads most likely to be affected by construction and materials delivery. A majority of the local roads in the Project Boundary will be used. Every town or county road that is planned for a solar array access road entrance will be affected by construction. In addition to the County and State Highways noted under Section 3.3.4.2, local roads including Clowe's Road, County Highway C, North Road, South

Odling Road, East Creek Road and Old 89 Road will also likely be used for the Project.

Traffic congestion will be minimal, and any traffic congestion will be managed, minimized, or mitigated. To the extent site conditions allow, delivery trucks will be off loaded near the point of use to minimize double handling or adding to the amount of trucking. Prior to any deliveries, a traffic control plan will be developed and reviewed with the Town, County, or WISDOT officials as appropriate. Signage will be installed to guide trucks to the appropriate roads after reviewing with local officials. Trucks will not be allowed to stage or block public roads. If trucks cannot exit the road in a timely fashion, they will be directed to a designated staging area. Major component deliveries will be required to stagger delivery times and dates, so the site teams are not overwhelmed with a surge of trucks at one time.

3.3.5.2 *Duration of typical traffic disturbance and the time of day disturbances are most likely to occur.*

Construction delivery traffic will mostly occur daily during daylight hours. Deliveries will begin in the early morning and continue to mid-late afternoon. Smaller vehicles for personnel arriving onsite may occur prior to or after daylight hours. Trucks will be directed off major roads, onto secondary roads or the construction site to minimize the potential for traffic congestion. Traffic delays should be limited to the time it takes for delivery trucks to turn on or off public roads. The delivery and construction timing may be adjusted as needed to maintain the Project's construction schedule.

4. Project Maps, Aerial Photography, Photo Simulations, and GIS Shapefiles

The required maps are included in **Appendix B**.

4.1 Project Area Maps

4.1.1 *General Project Area Map. (The extent of this map should show the entire project area and reach at least 1 mile beyond the project area boundary. Approximate scale 1:4800.)*

Figure 4.1.1 is provided in **Appendix B**.

4.1.2 *Detailed Project Area Map. (The scale for this map should be larger than that of the general project map so that the added detail is clearly visible. This usually necessitates a series of maps.)*

Figure 4.1.2 is provided in **Appendix B**.

4.1.3 *Topographic Maps*

Provide topographic maps at 1:24,000 or larger scale showing: project boundary, all solar array sites (proposed and alternate), substation facilities, collector circuits, access roads, and O&M building.

Figure 4.1.3 is provided in **Appendix B**.

4.1.4 *Substation*

4.1.4.1 *Provide a map showing the following features:*

- *The location, dimensions (in feet and acres), and layout of any new substation or proposed additions to an existing substation.*
- *Recent aerial photos of the substation site.*
- *The location of all power lines entering and leaving the substation, including any turning structures. Show details in a separate diagram of any turning structures that might impact adjacent land owners (size, type of structure, guying, etc.).*
- *For new substations, show the location of the access road and the location of any new stormwater management features (i.e. pond, swale, etc.). For expansion of existing substations, show details on changes to access roads that may be required (width, length, location, etc.), as well as any other ground disturbing construction activities.*
- *Show parcel data including the name of landowners for the substation site or substation addition. Include adjacent landowners.*
- *Show topographic contours of the property.*

4.1.4.2 *Provide an engineering diagram/s of the substation and substation equipment including any turning structures and interconnection facilities.*

Figure 4.1.4/4.1.5 is provided in **Appendix B** and includes the information identified in 4.1.4.1 and 4.1.4.2.

4.1.5 *O&M Building*

4.1.5.1 *Provide a map showing the O&M building, parking area, roads, and any other facilities. Include, as a background, a recent aerial photograph of the property.*

4.1.5.2 *Provide an engineering drawing of the O&M building.*

Figure 4.1.4/4.1.5 is provided in **Appendix B** and includes the information identified in 4.1.5.1. and 4.1.5.2.

4.1.6 *Natural Resources and Land Use/Ownership Maps*

4.1.6.1 *Wetland and waterway maps.*

Figure 4.1.6.1 (**Appendix B**) depicts an overview of field-delineated wetlands and waterways in the Project Boundary.

4.1.6.2 *Land ownership maps, minimum scale 1:10,000 (map extent to one mile from the project boundary).*

Figure 4.1.6.2 is included in **Appendix B**.

4.1.6.3 *Public lands.*

Figure 4.1.6.3 is included in **Appendix B.**

4.1.6.4 *Land cover.*

Figure 4.1.6.4 is included in **Appendix B**.

4.1.6.5 *Flood Insurance Rate maps (FIRMs) (within the project boundary). Provide flood insurance maps if the site is within one-half mile of a floodplain.*

Figure 4.1.6.5 is included in **Appendix B**.

4.1.6.6 *Soil survey maps (within the project boundary)*

Figure 4.1.6.6 is included in **Appendix B**.

4.1.6.7 *Bedrock maps (within the project boundary). Map showing depth to bedrock for the entire project area.*

Figure 4.1.6.7A, Depth to Bedrock and **Figure 4.6.6.7B**, Bedrock Geologic Map are included in **Appendix B.**

4.1.7 *Community Maps*

4.1.7.1 *Zoning maps. Provide a map or maps of the project area showing existing zoning (e.g. agriculture, recreation, forest, residential, commercial etc.). Map should show existing zoning out to 0.5 miles beyond the boundaries of the project area.*

Figure 4.1.7.1 is included in **Appendix B**.

4.1.7.2 *Sensitive sites. Additional map (if necessary) showing proximity to schools, day care centers, hospitals, and nursing homes up to 0.5 miles from the substation site.*

Figure 4.1.2 is included in **Appendix B** and includes sensitive sites identified in section 4.1.7.2.

4.1.7.3 *Airports.*

Figure 4.1.7.3 is included in **Appendix B.**

4.1.8 *Communication Infrastructure*

4.1.8.1 *Identify radio, television, microwave towers, and any NEXRAD or Doppler weather radar installations on a map and show the results of the line of site analysis. Include communications and NEXRAD/Doppler installations within a 50-mile radius of the project area.*

Figure 4.1.8.1 is included in **Appendix B** and depicts the information requested in section 4.1.8.1. Communications studies conducted for the Project Boundary are included in **Appendix O** and contain the relevant maps within the studies.

4.2 GIS shapefiles – Provide GIS shapefiles and attributes as listed below. GIS attribute table information should be clearly labeled to identify fields and feature names.

A list of provided GIS shapefiles is included in **Appendix V** as listed below. All digital files are provided on a disk to the PSC.

4.2.1 *Project area boundary.*
4.2.2 *Proposed solar array sites identified by number.*
4.2.3 *Alternate solar array sites identified by number.*
4.2.4 *Access roads (permanent and temporary) for proposed solar array sites (include road width).*
4.2.5 *Access roads (permanent and temporary) for alternate solar array sites (include road width).*
4.2.6 *Underground collector circuits (include number of conductors and voltage, and the installation method).*
4.2.7 *Overhead collector circuits (include voltage).*
4.2.8 *Generator tie line (include voltage and likely structure locations).*
4.2.9 *Electric distribution lines.*

4.2.9.1 *All electric distribution lines within the entire project area (include voltage of each line and phases present (A, B, and/or C).*

Voltage and phase of existing distribution is currently unknown. Distribution line locations have been provided based on aerial photos and are depicted in **Figure 4.1.2** (**Appendix B**).

Typical distribution lines in Wisconsin range from 4 to 35kV and can be either one or three-phase lines. Because the Applicant is an IPP, not the local distribution owner, specific phase and voltage information is not readily available.

4.2.9.2 *All electric distribution lines within one mile of the project boundary area (include voltage of each line and phases present (A, B, and/or C).*

Voltage and phase of existing distribution is currently unknown. Distribution line locations have been provided based on aerial photos and are depicted in **Figure 4.1.2** (**Appendix B**).

Typical distribution lines in Wisconsin range from 4 to 35kV and can be either one or three-phase lines. Because the Applicant is an IPP, not the local distribution owner, specific phase and voltage information is not readily available.

4.2.10 *Transmission lines within the project area identified by voltage.*

4.2.11 *New substation – provide shapefiles showing:*

- 4.2.11.1 *Perimeter of entire parcel acquired or to be acquired,*
- 4.2.11.2 *Perimeter of substation,*
- 4.2.11.3 *Access road,*
- 4.2.11.4 *Other facilities such as a retention pond or storm water management,*
- 4.2.11.5 *All collector circuits entering the substation,*
- 4.2.11.6 *Transmission interconnect.*

4.2.12 *Expansion of an existing substation:*

- 4.2.12.1 *Perimeter of expanded area,*
- 4.2.12.2 *Boundary showing any new land acquisition,*
- 4.2.12.3 *Location of all new power lines and reconfigured lines,*
- 4.2.12.4 *Location of all collector circuits entering the substation,*
- 4.2.12.5 *Location of any modified interconnection.*

4.2.13 *O&M Building:*

- 4.2.13.1 *Perimeter of property acquired,*
- 4.2.13.2 *Perimeter of building,*
- 4.2.13.3 *Location and perimeter of other buildings,*
- 4.2.13.4 *Location and perimeter of parking lot,*
- 4.2.13.5 *Location of access road.*

4.2.14 *Wetlands and waterways in the project area:*

- 4.2.14.1 *Wisconsin Wetland Inventory (WWI) wetlands,*

4.2.14.2 *NRCS hydric soils,*
4.2.14.3 *Delineated wetlands (See Section 8),*
4.2.14.4 *DNR mapped waterways,*
4.2.14.5 *Field identified waterways (See Section 8).*

4.2.15 *Land owners/buildings:*

4.2.15.1 *Residences on all participating parcels,*
4.2.15.2 *Non-participating residences inside the project boundary,*
4.2.15.3 *Land ownership and parcels within the project area,*
4.2.15.4 *Land ownership and parcels within one mile of the project area boundary,*
4.2.15.5 *Confined animal operations – provide shapefiles showing:*

- *The locations of any confined farm animals within the project area,*
- *All confined animal operations within one mile of the project area boundary,*
- *For each confined animal shapefile provide attribute data that identifies the type of animal, the number of confined animals, and the name of the land owner.*

4.2.16 *All public lands within the project boundary and public lands within two miles of the project boundary.*

4.2.17 *All public airport runways within 10 miles of the project boundary. Show runway orientation and length.*

4.2.18 *All private airports and landing strips inside and within two miles of the proposed project boundary. Show runway orientation and length.*

4.2.19 *Land cover/Vegetative communities. (Do not use obsolete DNR Land Cover data.) See section 5.3.*

4.2.20 *Provide a GIS shapefile showing the locations of properties enrolled in the Conservation Reserve Program.*

At this time, Darien Solar has requested CRP shapefiles from the local conservation office and a request has been made to the regional office to distribute the files. Once the CRP shapefiles are received, Darien Solar will provide them to the PSC staff.

4.2.21 *FEMA flood plains within the project area.*

4.2.22 *Aerial Photos (no older than three years) of project area and surrounding landscape (10-mile radius of the project area).*

In response to 4.2.22, aerial photos of the Project Boundary and surrounding landscape are provided for a 2-mile radius from the Project Boundary. This reduced radius was approved by PSC staff.

A list of provided GIS shapefiles is included in **Appendix V**. All digital files are provided on a disk to the PSC.

4.3 Topography – Raster files of topographic features within the project area and surrounding landscape (10-mile radius of the project area).

Raster files of topographic features within the Project Boundary and 2-mile radius from the Project Boundary are provided with the other requested shapefiles in **Appendix V.** This reduced radius was approved by PSC staff.

4.4 Photo Simulations

Photo simulations are required. Simulations should seek to provide an accurate representation of what the project area would most likely look like after the project is completed. In order to be certain that any photo simulations provided in an application will be useful, please consult with PSC staff before preparing and submitting photos.

Photo simulations for six locations around the Project Boundary are included in **Appendix E**. Commission staff consultations were conducted electronically and photo simulation locations approved Tuesday, April 21, 2020.

Photo locations were selected to represent areas frequented by the public, and include the edges of the nearby villages, well-traveled highways, and a city park within the Project boundary, and were reviewed with PSC staff. The specific vantage point for each photo was selected for good visibility of the proposed Project.

Photos were taken at each location using a digital camera set to an effective focal length of approximately 50mm to best reflect the experience of a person standing at the photo location. A model of the existing topography and proposed infrastructure was then used to generate renderings simulating the view after construction of the Project. A map of the photo locations, and both the raw images (existing conditions) and rendering of the proposed condition are included in **Appendix E**. High-resolution raster image files have been provided to the PSC on a disk.

5. Natural and Community Resources, Description and Potential Impacts

5.1 Site Geology

5.1.1 *Describe the geology of the project area.*

The Wisconsin Geological and Natural History Survey (WGNHS) Bedrock Geology Map of Walworth County[3] and Wisconsin maps[4] the bedrock of the entire Project Boundary as the Sinnipee Group of Ordovician Dolomite (**Figure 4.1.6.7 B, Appendix B**). Based on a WGNHS Depth to Bedrock Map of Walworth County[3] Wisconsin[5], the depth to bedrock at the Project can generally be expected to range from 0-250 feet below ground surface (bgs) (**Figure 4.1.6.7 A, Appendix B**). Furthermore, according to the WGNHS Karst and Shallow Carbonate Bedrock in Wisconsin map[6], shallow carbonate bedrock, as categorized between the ranges of 0-50 bgs and greater than 50 feet bgs, covers nearly all of the Project Boundary; this suggests the potential presence of karst features. No fault lines are mapped with the Project Boundary, and southeastern Wisconsin is generally considered an area without notable risk of seismic activity[7].

According to the Natural Resources Conservation Service[8], the major soil units in the Project Boundary are Plano silt loam (gravelly substratum, 4,065acres), Drummer silt loam (gravelly substratum, 355 acres), Dodge silt loam (302 acres), and McHenry silt loam (265 acres).

5.1.2 *Geotechnical report on soil conditions.*

5.1.2.1 *Provide a summary of conclusions from any geotechnical report or evaluation of soils in the project area including:*

- *Results of soil borings including a review of soil bearing capacity and soil settlement potential.*
- *Identify any soil conditions related to site geology that might create circumstances requiring special methods or management during construction.*

A preliminary geotechnical engineering report was performed by Terracon, dated October 25, 2019 (**Appendix T**). Fourteen (14) borings were performed within the Project Boundary. Thirteen borings were advanced via hollow stem augers to up to 20 feet within the proposed PV array and one boring was advanced to 50 feet. Per the preliminary geotechnical report, ultimate end bearing capacity across the boring locations was approximately 500 lbs, and total foundation settlements are not anticipated to exceed 1 inch. Two of the shallower borings reached refusal due to possible bedrock and/or boulder at depths of 8.5 feet and 10.5 feet below ground surface. Traces of shale

[3] Gotkowtiz, M. B. and P. R. Schoephoester. 2006. Bedrock Geology, Geneva Lake Area, Walworth County, Wisconsin. WGNHS Open-File Report 2006-02.
[4] WGNHS. 2005. Bedrock Geology of Wisconsin. Accessed on: April 10, 2020.
[5] Trotta, L. C. and R. D. Cotter. 1973. Depth to Bedrock in Wisconsin. Accessed on: April 10, 2020.
[6] Bradbury, K. R. 2009. Karst and Shallow Carbonate Bedrock in Wisconsin.
[7] Mudrey, Jr., M. G., B. A. Brown, and J. K. Greenberg. 1982. Bedrock Geologic Map of Wisconsin. Accessed on: April 10, 2020.
[8] National Resources Conservation Service. Web Soil Survey. Accessed 2020.

fragments are also noted in several borings at or beneath 6 feet bgs. Subsurface conditions encountered generally consist of 0 to 24 inches of clayey topsoil over stiff to hard, lean, sandy, and silty clay with variable but generally trace amounts of sand and gravel. Groundwater was encountered in 7 of 14 borings at depths of 8.5, 13, 13.5 (x2), 17, 18.5, and 20 ft bgs.

5.1.2.2 *Depth to bedrock*

- *Identify any sites where panel supports or foundation construction must be modified because of the presence of bedrock.*
- *Describe construction methods and foundation issues associated with situations where bedrock formations are near the surface.*
- *Discuss the likelihood or potential that construction on bedrock formations may negatively impact private wells within two miles of solar array sites.*

As a result, Darien Solar expects to experience bedrock, boulders, gravel, or other refusal conditions requiring additional construction methods and techniques, such as but not limited to pre-drilling. Further geotechnical exploration will be conducted prior to final engineering design and site construction, to further inform soil characteristics across the Project Boundary. Private wells should not be impacted by foundation construction.

5.2 Topography

5.2.1 *Describe the general topography of the project area.*

The existing topography within the Project Boundary can be described as rolling hills, though the developed and agriculture areas have a relatively flat grade. Surface elevations range from 840 to 990 feet above mean sea level (**Figure 4.1.3, Appendix B**). The lowest elevations are along the few streams and drainages present, particularly Turtle Creek through the western part of the Project Boundary. Slopes within the Project footprint are generally within the 0 to 6% range with very minor areas with 6 to 12% slopes. The Project will be designed to use the existing topography to the maximum extent practicable to minimize grading.

5.2.2 *Describe expected changes to site topography due to grading activities.*

Grading changes to the existing topography that would affect land use, water inflow/outflow directions from the site, and flow rates impacting erosion on or off the site, will be minimized in the engineering process. Cut/fill and associated blending of the site will be required in areas, pending final engineering design, but at a high-level view will not change the nature of the topography on the site. Note that all cut/fill or earth movement quantities provided in this application are subject to final design engineering. WDNR governs erosion control on the site via the WPDES permitting.

Topsoil preservation, as required by WDNR is not included in any estimated or approximated quantities provided in this application.

5.3 Land Cover

5.3.1 *Vegetative communities in the project area - List and identify the dominant plants in the following community categories. Analysis should use recent data, not greater than two years old. Land cover can be based on recent aerial photography or on-site evaluation.*

5.3.1.1 *Agricultural*

- *Row/Traditional crops*
- *Specialty crops/Other*

The Project Boundary is heavily dominated by row crop agriculture, primarily composed of corn (*Zea mays*) and soybeans (*Glycine max*). Scattered alfalfa (*Medicago sativa*) hay fields are also located within the Project Boundary. See **Table 5.3.2** for acreages of the agricultural land cover categories. No organic farms were identified within the Project Boundary.

5.3.1.2 *Non-Agricultural upland*

- *Prairie/Grasslands/Pasture/Fallow field*
- *Upland forests*

Minor areas of grassland, prairie, and pasture, were observed within the Project Boundary during site reconnaissance conducted from October 21, 2019 – October 25, 2019. The prairie/grassland/pasture/fallow field areas are also depicted on **Figure 4.1.6.4** (**Appendix B**)**.** Grassland and prairie areas generally consisted of small plots utilized for hay production and lawns associated with homes or businesses. No areas of high quality grassland, prairie or pasture were observed in the Project Boundary during 2019 site reconnaissance or during 2019 and 2020 field wetland delineation efforts. Fallow fields observed in the Project Boundary were generally dominated by volunteer vegetation including mare's tail (*Erigeron canadensis*) giant ragweed (*Ambrosia trifida*), common pigweed (*Amaranthus retroflexus*), witchgrass (*Panicum capillare*), and barnyard grass (*Echinochloa crus-galli*). Fallow fields that were observed were likely a result of a wetter than normal growing season and are normally in crop production. Grassy swales within and separating fields were dominated by smooth brome (*Bromus inermis*), orchard grass (*Dactylis glomerata*), and reed canary grass (*Phalaris arundinacea*) (**Table 5.3.2**).

Upland woodlands are typically composed of a combination of sugar maple (*Acer saccharum*), American basswood (*Tilia americana*), box elder (*Acer negundo*), quaking aspen (*Populus tremuloides*), and red oak (*Quercus rubra*). The woodland

communities are defined by the Natural Communities of Wisconsin[9] as Southern Mesic Forests, Southern Dry-Mesic Forests, or Southern Dry Forests (**Table 5.3.2**).

5.3.1.3 *Wetlands (by Eggers and Reed classification type)*

Based on a desktop review dated March 25, 2020, that consisted of a review of historic aerial imagery, water resource shapefiles, LiDAR data, and other publicly available resources, wetlands within the Project Boundary were desktop delineated and included seasonally flooded basins, fresh (wet) meadow, shallow marsh, shrub-carr, and floodplain forest wetlands[10].

Seasonally flooded basins are wetlands that have alternating periods of saturation and inundation. In an agricultural setting, depressional areas with stunted crops, a lack of vegetation, or a predominance of wet, weedy vegetation are indications of a seasonally flooded basin. Fresh (wet) meadow wetlands typically remain wetter for longer periods of time than seasonally flooded basins and are dominated by sedges or other graminoids such as reed canary grass. Shallow marsh wetlands possess standing water throughout the majority of the growing season, but rarely exceeds a depth of 1 meter. It is common for wetlands within this classification to be dominated by cattail (*Typha spp*.), river bulrush (*Schoenoplectus fluviatilis*), and dark-green bulrush (*Scirpus atrovirens*). Shrub-carr wetlands are regularly inundated and dominated by a shrub layer. Common plants found within this wetland type include red osier dogwood (*Cornus alba*), speckled alder (*Alnus incana*), and sandbar willow (*Salix interior*). Floodplain forest wetlands are typically located in riparian areas and dominated by cottonwood (*Populus deltoides*), black willow (*Salix nigra*), box elder (*Acer negundo*), silver maple (*Acer saccharinum*), and green ash (*Fraxinus pennsylvanica*). The wooded wetland communities are typical of the Floodplain Forest as defined by the Natural Communities of Wisconsin[6].

A field wetland delineation conducted on October 21 – 25, 2019 and April 20– 21, 2020, documented 48 wetlands that primarily consisted of seasonally flooded basins and wet meadow wetlands. The field investigation only covered areas within the Project Boundary that have potential to be impacted due to development ("Delineation Area") and therefore did not cover the entirety of the Project Boundary. Within the Delineation Area herbaceous wetlands were typically disturbed and contained non-native plant species. Additionally, no bog or fen features were observed. Full results of the field wetland delineation can be found in the Wetland Delineation Report in **Appendix U.** Full details of the desktop and field delineation efforts are described in Section 8.2.

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[9] Epstein, E.E. Natural communities, aquatic features, and selected habitats of Wisconsin. Chapter 7 in The ecological landscapes of Wisconsin: An assessment of ecological resources and a guide to planning sustainable management. Wisconsin Department of Natural Resources, PUB-SS-1131H 2017, Madison.

[10] Eggers, S. D. and D. M. Reed. 1997. Wetland Plants and Plant Communities of Minnesota and Wisconsin, second edition. U. S. Army Corps of Engineers, St. Paul, MN, USA.

5.3.2 *Acres of land cover categories in project area - Estimate the number of acres within each land cover category listed below. Provide this information in table format and explain what method was used to calculate the areas reported.*

5.3.2.1 *Agricultural*

- *Row/Traditional crops*
- *Specialty crops/Other*

5.3.2.2 *Non-Agricultural upland*

- *Prairie/Grasslands/Pasture/Fallow field*
- *Upland forests*

5.3.2.3 *Wetlands by Eggers and Reed classification type.*

5.3.2.4 *Developed land*

- *Residential*
- *Commercial/Industrial*

Land cover within the Project Boundary was originally mapped and described using data and descriptions from the Wiscland 2.0 Land Cover Data (WLCD)[11], which combines ground-level mapping, satellite imagery, and USDA data in a product produced jointly by the WDNR, UW-Madison and the State Cartographer's Office. The updated view of Wisconsin's land cover was accomplished by using data from the U.S. Government's Landsat series of satellites followed up with a coordinated field collection effort combining WDNR staff assistance and a WDNR summer field collection crew that visited field locations in 2015 to collect and verify land cover type information. WLCD data was ground-truthed during a site visit by a biologist in October 2019 and April 2020 in order to conduct a high-level evaluation of the accuracy of the land cover types. The WLCD was also compared to 2019 NAIP photography to further evaluate current land cover conditions within the Project Boundary. Based on these reviews we found the WLCD is slightly different than existing conditions on the ground. Using the WLCD shapefile, Westwood digitized land cover using GIS software to make a more accurate representation of land cover within the Project Boundary and have used those numbers in **Table 5.3.2** below. It is worth noting that wetland land cover and wetland impact quantities identified in this section are based on the above land cover digitization effort. Detailed wetland types and quantities and impact amounts based on field and desktop wetland delineation efforts are provided in Section 8.3, **Appendix U** and depicted in **Figures 4.1.6.1, 8.3.1** and **8.3.2** (**Appendix B**).

[11] Wisconsin Department of Natural Resource, Univ. of Wisconsin-Madison. 2016. Land Cover Data (Wiscland 2.0).

Seven land cover types were recognized and mapped within the Project Boundary based on the land cover digitizing effort described above. Agriculture, wetland, forest, grassland, urban/developed, barren land, and open water comprise the land cover types within the Project Boundary (**Table 5.3.2**).

Table 5.3.2 – Estimated Land Cover Types Within Project Boundary*

Land Cover Type **	Area (Acres)	Percent of Total
Row/traditional crops	5,810	75.47
Prairie/grasslands/pasture/fallow field	302	3.92
Upland forest	549	7.13
Seasonally flooded basin	193	2.50
Floodplain forest	154	2.00
Wet meadow	128	1.67
Shallow open water	15	0.19
Shallow marsh	15	0.19
Shrub-carr	8	0.11
Hardwood swamp	2	0.03
Watercourse	4	0.05
Commercial/industrial	305	3.96
Residential	214	2.78
Total	**7,699**	**100**

*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.

**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.

5.3.3 *Land Cover Impacts – In table format, estimate the number of acres, in each land cover type identified in Section 5.3.2, that would be affected by project construction and or facilities. Provide the amounts of both temporary and permanent impacts for the following categories.*

5.3.3.1 *Solar panel rows and pads*

Table 5.3.3.1 – Array Area Land Cover Impacts*						
Land Cover Type **	**Fence I.D.**	**Power Block I.D.**	**Primary Array Areas**		**Alternate Array Areas**	
			Area (Acres)	**Percent of Total Project Boundary**	**Area (Acres)**	**Percent of Total Project Boundary**
Row/traditional crops	All Fence I.D.	All Power Block I.D.	1,978	25.69	1,001	13.00
Prairie/grassland /pasture/fallow field	1, 3, 4, 9, 10, 13, 18, 19	AA, DD, JJ, VVV, WWW, XXX, YYY	7	0.09	<1	<0.01
Upland forest	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 19, 25, 26	L, M, N, O, BB, CC, DD, EE, FF, GG, HH, JJ, VVV, BBBB, FFFF, HHHH	16	0.21	10	0.13
Seasonally flooded basin	3	R, V, W	1	0.01	1	0.01
Floodplain forest	N/A	N/A	0	0	0	0
Wet meadow	3	N/A	4	0.05	0	0
Shallow open water	N/A	N/A	0	0	0	0
Shallow marsh	N/A	N/A	0	0	0	0
Shrub-carr	N/A	N/A	0	0	0	0
Hardwood swamp	N/A	N/A	0	0	0	0
Waterway	N/A	N/A	0	0	0	0
Commercial/industrial	1, 2, 4, 17	E, BB, DD, WW, BBBB, FFFF	<1	<0.01	5	0.06
Residential	8, 11, 13, 16, 19	N/A	<1	<0.01	<1	<0.01
		Total	**2,006**	**26.05**	**1,017**	**13.20**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.						
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.						

Due to the planned changing of the land cover surrounding the solar panels, most of the land cover within the fence boundaries is assumed to change and reflect the vegetation management strategy for the Project. Though the land cover can be converted back to its original purpose following the decommissioning of the Project, the impact will be considered permanent for the duration of the Project.

5.3.3.2 *Collector circuits. For collector circuits in wooded areas, disclose whether or not a ROW around the cables would be maintained in an open (no tree) condition.*

Land cover impact for collector circuits were calculated for those laying outside of the fence boundaries to avoid counting impact twice between this section and section 5.3.3.1. An impact buffer of 15 feet to each side of the collector center line was used to allow for the potential impact of the equipment used to place them. All impacts from the collection system are considered temporary, because after the circuits are placed, the land cover will be allowed to return to its existing condition (**Table 5.3.3.2**).

Table 5.3.3.2 – Collection System Land Cover Impacts*

Land Cover Type**	Fence I.D.	Power Block I.D.	Primary Collection Line		Alternative Collection Line	
			Area (Acres)	Percent of Total Project Boundary	Area (Acres)	Percent of Total Project Boundary
Row/traditional crops	All Fence I.D.	B, I, L, N, M, Y, AA, CC, DD, EE, GG, JJ, LL, NN, OO, PP, QQ, VV, WW, CCC, QQQ, RRR, SSS, TTT, UUU, VVV, YYY, ZZZ, BBBB, CCCC, FFFF, HHHH, IIII	14	0.19	11	0.15
Prairie/grasslands/pasture/fallow field	10, 11, 19, 24	NN, OO, VVV, CCCC	<1	<0.01	<1	<0.01
Upland forest	3, 4, 5, 8, 9, 10, 11, 19, 20, 21, 23, 24, 25, 26	M, Y, AA, CC, EE, GG, II, JJ, NN, OO, VVV, BBBB, CCCC, FFFF, HHHH, IIII	1	0.01	<1	<0.01
Seasonally flooded basin	N/A	N/A	0	0	0	0
Floodplain forest	19, 24	VVV, CCCC	0	0	1	0.01
Wet meadow	19, 25	VVV, CCCC	0	0	<1	<0.01
Shallow open water	N/A	N/A	0	0	0	0

Table 5.3.3.2 – Collection System Land Cover Impacts*						
Land Cover Type**	**Fence I.D.**	**Power Block I.D.**	**Primary Collection Line**		**Alternative Collection Line**	
			Area (Acres)	**Percent of Total Project Boundary**	**Area (Acres)**	**Percent of Total Project Boundary**
Shallow marsh	N/A	N/A	0	0	0	0
Shrub-carr	N/A	N/A	0	0	0	0
Hardwood swamp	N/A	N/A	0	0	0	0
Watercourse	N/A	N/A	0	0	0	0
Commercial/industrial	1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26	B, I, M, Y, AA, CC, DD, EE, GG, LL, NN, OO, PP, QQ, VV, WW, CCC, QQQ, RRR, SSS, TTT, UUU, YYY, ZZZ, BBBB, CCCC, FFFF, HHHH, IIII	1	0.01	<1	<0.01
Residential	3, 8, 11, 13	M, EE, OO, QQ	<1	<0.01	0	0
		Total	**16**	**0.21**	**13**	**0.17**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.						
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.						

5.3.3.3 *Access roads*

Land cover impact for access roads were calculated for those laying outside of the fence boundaries to avoid counting impact twice between this section and section 5.3.3.1. The permanent impacts to land cover due to the access roads is calculated based on the maximum proposed road width of 12 feet with 4 foot shoulders. The temporary impacts to land cover due to the access roads is calculated based on a 15' buffer on each side of the access road, for a total construction corridor of 50 feet (15 feet on each side of the 20-foot-wide road/shoulders).

Table 5.3.3.3 – Access Road Land Cover Temporary Impacts*						
Land Cover Type**	**Fence I.D.**	**Power Block I.D.**	**Primary Access Road**		**Alternative Access Road**	
			Area (Acres)	**Percent of Total Project Boundary**	**Area (Acres)**	**Percent of Total Project Boundary**
Row/traditional crops	All Fence I.D.	A, H, I, L, N, W, AA, CC, DD, GG, JJ, NN, PP, VV, WW, CCC, QQQ, RRR, SSS, TTT, YYY, ZZZ, BBBB, EEEE, FFFF, IIII, VVVV	3	0.03	2	0.02
Prairie/grasslands/ pasture/fallow field	6, 7, 10	DD, NN	<1	<0.01	<1	<0.01
Upland forest	3, 4, 8, 9, 20, 21, 26	M, P, AA, GG, II, JJ, BBBB, IIII	<1	<0.01	<1	<0.01
Seasonally flooded basin	N/A	N/A	0	0	0	0
Floodplain forest	N/A	N/A	0	0	0	0
Wet meadow	N/A	N/A	0	0	0	0
Shallow open water	N/A	N/A	0	0	0	0
Shallow marsh	N/A	N/A	0	0	0	0
Shrub-carr	N/A	N/A	0	0	0	0
Hardwood swamp	N/A	N/A	0	0	0	0
Watercourse	N/A	N/A	0	0	0	0
Commercial/industrial	1, 2, 4, 5, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26	H, I, AA, CC, GG, JJ, NN, VV, WW, CCC, RRR, SSS, TTT, YYY, ZZZ, BBBB, EEEE, FFFF, VVVV	<1	<0.01	<1	<0.01
Residential	N/A	N/A	0	0	0	0
		Total	**3**	**0.03**	**2**	**0.02**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.						
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.						

Table 5.3.3.3 – Access Road Land Cover Permanent Impacts*						
Land Cover Type**	**Fence I.D.**	**Power Block I.D.**	**Primary Access Road**		**Alternative Access Road**	
			Area (Acres)	**Percent of Total Project Boundary**	**Area (Acres)**	**Percent of Total Project Boundary**
Row/traditional crops	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26	J, K, N, P, Y, EE, GG, HH, KK, NN, OO, VV, CCC, EEE, LLL, AAAA, BBBB, DDDD, HHHH, IIII, JJJJ, LLLL, MMMM, NNNN, IIIII, JJJJJ	2	0.02	<1	0.01
Prairie/grassland /pasture/fallow field	6, 7, 10	HH, SS	<1	<0.01	0	0
Upland forest	4, 8, 20, 21	EE, KK, LLLL	<1	<0.01	0	0
Seasonally flooded basin	N/A		0	0	0	0
Floodplain forest	N/A		0	0	0	0
Wet meadow	N/A		0	0	0	0
Shallow open water	N/A		0	0	0	0
Shallow marsh	N/A		0	0	0	0
Shrub-carr	N/A		0	0	0	0
Hardwood swamp	N/A		0	0	0	0
Watercourse	N/A		0	0	0	0
Commercial/industrial	8, 14, 17, 18, 20, 21	KK, LLL, DDDD, LLLL	<1	<0.01	0	0
Residential	N/A		0	0	0	0
		Total	**2**	**0.02**	**1**	**0.01**

*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.

**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.

5.3.3.4 *Substation and BESS*

The land purchased for the combined use of the O&M Building, Project substation and BESS is approximately 40 acres. The preliminary substation design assumes the footprint will be approximately 300 x 400 feet. The BESS footprint is estimated at 4.4 acres; land cover impacts are summarized in **Tables 5.3.3.4** and **5.3.3.5.** Both substation and BESS land cover impacts are considered permanent. The proposed layout of the parcel is depicted in **Figure 4.1.4/4.1.5** in **Appendix B**.

Table 5.3.3.4 – Substation and BESS Landcover Impacts*

Land Cover Type **	Substation		BESS	
	Area (Acres)	Percent of Total	Area (Acres)	Percent of Total
Row/traditional crops	3	0.03	4	0.06
Prairie/grasslands/pasture/fallow field	0	0	0	0
Upland forest	0	0	0	0
Seasonally flooded basin	0	0	0	0
Floodplain forest	0	0	0	0
Wet meadow	0	0	0	0
Shallow open water	0	0	0	0
Shallow marsh	0	0	0	0
Shrub-carr	0	0	0	0
Hardwood swamp	0	0	0	0
Watercourse	0	0	0	0
Commercial/industrial	0	0	0	0
Residential	0	0	0	0
Total	**3**	**0.03**	**4**	**0.06**

*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.

**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.

5.3.3.5 *O&M Building*

The land purchased for the combined use of the O&M Building, Project substation and BESS is approximately 40 acres. The preliminary O&M Building design is expected to require 4,000 to 5,000 square feet. The land cover impacts in **Table 5.3.3.5** include the O&M building, associated parking and a gravel storage area and are considered permanent. The proposed layout of the parcel with the O&M Building is depicted in **Figure 4.1.4/4.1.5** in **Appendix B**.

Table 5.3.3.5 – O&M Building Landcover Impacts*		
Land Cover Type **	**Area (Acres)**	**Percent of Total**
Row/traditional crops	2	0.03
Prairie/grasslands/pasture/fallow field	0	0
Upland forest	0	0
Seasonally flooded basin	0	0
Floodplain forest	0	0
Wet meadow	0	0
Shallow open water	0	0
Shallow marsh	0	0
Shrub-carr	0	0
Hardwood swamp	0	0
Watercourse	0	0
Commercial/industrial	0	0
Residential	0	0
Total	**2**	**0.03**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.		
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.		

5.3.3.6 *Generator tie line*

Land cover impacts resulting from the 100-foot wide ROW for the 75-foot long gen-tie line are summarized in **Table 5.3.3.6**. The 75’ x 100' wide gen-tie corridor was used for calculating permanent impacts. Because the distance of the gen tie line is only 75 feet, no impacts associated with poles were included in this calculation.

Table 5.3.3.6 Gen-Tie Landcover Impacts		
Land Cover Type *	**Permanent Impacts**	
	Area (Acres)	**Percent of Total Project Boundary**
Row/traditional crops	<1	<0.01
Prairie/grasslands/pasture/fallow field	0	0
Upland forest	0	0
Seasonally flooded basin	0	0
Floodplain forest	0	0
Wet meadow	0	0
Shallow open water	0	0

Table 5.3.3.6 Gen-Tie Landcover Impacts		
Land Cover Type *	**Permanent Impacts**	
	Area (Acres)	**Percent of Total Project Boundary**
Shallow marsh	0	0
Shrub-carr	0	0
Hardwood swamp	0	0
Watercourse	0	0
Commercial/industrial	0	0
Residential	0	0
Total	**<1**	**<0.01**
*Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.		

Table 5.3.3.6a represents the permanent landcover impacts for the point of interconnect switchyard located next to the Project substation.

Table 5.3.3.6a – Point of Interconnect Land Cover Impacts*		
Land Cover Type **	**Area (Acres)**	**Percent of Total**
Row/traditional crops	1	0.02
Prairie/grasslands/pasture/fallow field	0	0
Upland forest	0	0
Seasonally flooded basin	0	0
Floodplain forest	0	0
Wet meadow	0	0
Shallow open water	0	0
Shallow marsh	0	0
Shrub-carr	0	0
Hardwood swamp	0	0
Watercourse	0	0
Commercial/industrial	0	0
Residential	0	0
Total	**1**	**0.02**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.		
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.		

Table 5.3.3.6b represents temporary land cover impacts associated with the general construction laydown yard located west of the O&M building.

Table 5.3.3.6b – Laydown Yard Temporary Land Cover Impacts*		
Land Cover Type **	**Area (Acres)**	**Percent of Total**
Row/traditional crops	8	0.10
Prairie/grasslands/pasture/fallow field	0	0
Upland forest	0	0
Seasonally flooded basin	0	0
Floodplain forest	0	0
Wet meadow	0	0
Shallow open water	0	0
Shallow marsh	0	0
Shrub-carr	0	0
Hardwood swamp	0	0
Watercourse	0	0
Commercial/industrial	0	0
Residential	0	0
Total	**8**	**0.10**
*See **Section 8.3, Appendix U** and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.		
**Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.		

5.4 Invasive Species

5.4.1 *Describe locations where invasive species, forest pests, or diseases have been observed in the project area (e.g., invasive plants, oak wilt, etc.).*

During a spring 2020 survey conducted by AES ecologists, 34 non-native or invasive species were observed (**Appendix W**). Invasive and non-native species were mainly concentrated around field edges and roadside ditches in small localized populations and in wetlands. Commonly encountered non-native and invasive species included smooth brome (*Bromus inermis*), dandelion (*Taraxacum officinale*), garlic mustard (*Alliaria petiolata*) Kentucky bluegrass (*Poa pratensis*), white campion (*Silene latifolia*), white mulberry (*Morus alba*), Canada thistle (*Cirsium arvense*), common burdock (*Arctium minus*), common buckthorn (*Rhamnus cathartica*), Tatarian honeysuckle (*Lonicera tatarica*), Siberian elm (*Ulmus pumila*), hybrid cattail (*Typha* X *glauca*), reed canary grass, common reed grass (*Phragmites australis*), and narrow-leaved cattail (*Typha angustifolia*). Emerald ash borer (*Agrilus planipennis*), gypsy moth (*Lymantria dispar dispar*), and oak wilt (*Ceratocystis fagacearum*), although not encountered in the Project Boundary, have the potential to occur in Rock and Walworth Counties.

5.4.2 *Describe mitigation actions during construction that would be used to prevent the introduction or spread of invasive species, forest pests, or diseases.*

In order to prevent the introduction or spread of invasive species, forest pests, or disease, topsoil and fill material from within the Project Boundary or a local source will be used. If excavation and other construction equipment is used in an area containing documented invasive species, then the equipment will be inspected and cleaned of debris and soil prior to removal of equipment from the area. ROWs and treelines will be a top priority for monitoring the potential of invading species.

5.4.3 *Describe planned ongoing invasive species management for the project during operations.*

The invasive species monitoring protocol would be implemented by a qualified contractor. Periodic visual inspections of the establishing and established vegetation will be made to detect new invasive plant species occurrences and expansion of pre-existing ones. The timing and frequency of these inspections will be adapted in response to needs identified during and immediately following construction. The outcome of these inspections will be contractor-developed control recommendations based on the species and circumstances observed. These control recommendations will be reviewed and implemented as appropriate by Darien Solar. For full details refer to the Vegetation Management Strategy in **Appendix W** for information in response to Sections 5.4.2 and 5.4.3. Additional information regarding Darien Solar's invasive species management for the Project during operations is provided below at Section 5.5.1.3.

5.5 Vegetation Management

5.5.1 *Provide a detailed revegetation and site restoration plan that discusses the following items:*

5.5.1.1 *Types of revegetation proposed for impacted areas. Include seed mixes if known.*

The Darien Vegetation Management Strategy's phased approach begins with site soil preparation and cover crop seeding (Phase 1), followed by the establishment of a native sedge & grass ground cover only (Phase 2). This strategy will reduce the risk that plantings will be overtaken by weedy plants, leading to lower maintenance efforts in the long term. Phase 1 and Phase 2 occur prior to solar facility construction. The third Phase; Zone Establishment, will occur after solar facilities are constructed. This phased approach results in plantings that contain a greater diversity of species while minimizing disturbance and maximizing weed control. The ecological communities proposed in the Zone Establishment section will be capable of adapting over time to environmental change with minimal impact to solar arrays. The proposed vegetation zones include the Grass Sedge Cover for Upland (GSU), Moist Soil (GSM), Pollinator Habitat for Upland (PHU), Moist Soil (PHM), Monarch Habitat (MH), View Screening (VS), and Familiar Crop Screening (FCS) zones. Where these zones will be applied and the typical seed mixes proposed for these zones are further

detailed in the Vegetation Management Strategy in **Appendix W**. For full details, refer to the Vegetation Management Strategy in **Appendix W** for information in response to Sections 5.5.1.1 through 5.5.1.3.

5.5.1.2 *Vegetation monitoring and management protocols for subsequent years after construction.*

The conceptual approach of the Vegetation Management Strategy will be applied across the entire Project by an ecological consulting firm/landscape professionals, Darien Solar staff, and construction contractors. The implementation of the Vegetation Management Strategy will result in a Vegetation Management Plan executed by a similar group of experienced professionals. The Vegetation Management Plan will be materially similar to the Vegetation Management Strategy but will take into account the conditions within the final limits of Project disturbance, seed mix availability, and timing of the construction sequence. The same vegetation management practices will be implemented during the construction, operation, and reclamation of the gen-tie line. Vegetation impacts, outside of the tree trimming/clearing in the gen-tie line's easement area, are expected to be minimal given the short distance of the proposed line. Darien Solar is also considering the use of grazing sheep at the proposed project as identified in **Appendix W**. For full details, refer to the Vegetation Management Strategy in **Appendix W** for information in response to Sections 5.5.1.1 through 5.5.1.3. The final Vegetation Management Plan will available and provided to the Commission prior to commencement of construction activities.

5.5.1.3 *Invasive species monitoring and management.*

One of the primary goals of the Vegetation Management Strategy, which will inform the Vegetation Management Plan is to maintain a high degree of weed control and invasive species management across the site. As further detailed in **Appendix W**, mowing and spot-herbicide application will be primary methods of invasive species management. The Vegetation Management Plan will take a granular approach monitoring invasive species in the area, specifically detailing road rights-of-way and tree lines crossing through the site. The findings will be used to inform site-specific seed mix and invasive species management strategies across the site. To assess the success of native and non-native species a monitoring program will be established to address a set of performance standards, yet to be developed. Periodic visual inspections of the establishing and established vegetation will be made to detect native and non-native invasive species and their expansion across the site. The results of the inspections will provide information on the achievement of performance standards and will provide recommendations on management methods and additional seeding. The invasive species monitoring protocol will be implemented by a qualified contractor. The timing and frequency of these inspections will be adapted in response to needs identified during and immediately following construction. The outcome of these inspections will be contractor-developed control recommendations based on the species and circumstances observed. These control recommendations will be reviewed and implemented as appropriate by Darien Solar Energy Center staff.

5.6 Wildlife

5.6.1 *Describe existing wildlife resources and estimate expected impacts to plant and animal habitats and populations.*

Below is a summary of the Darien Site Characterization Study (SCS) (**Appendix F**), a detailed report that describes the existing animal and plant resources and the potential for sensitive species to occur within the Project Boundary.

As detailed in Section 5.3.2 (or **Table 5.3.2** and **Figure 4.1.6.4, Appendix B**), the land cover within the Project Boundary is dominated by cultivated crops, including corn and soybean fields. Corn and soybeans are annual cover types that are typically used by a few common wildlife species on a limited seasonal basis. Species that may use agricultural land include white-tailed deer (*Odocoileus virginianus*), small mammals such as mouse [Family Muridae] and vole [Family Cricetidae] species, raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*) and woodchuck (*Marmota monax*). Bird species that may use the agricultural land include ring-necked pheasant (*Phasianus colchicus*), blackbird [Family Icteridae] species, other small perching birds, and common raptors such as the red-tailed hawk (*Buteo jamaicensis*). After crops are harvested, the fields may offer short term foraging areas for sandhill cranes (*Grus canadensis*) and common waterfowl including the Canada goose (*Branta canadensis*) and mallard (*Anas platyrhynchos*). Reptile and amphibian species known to use agriculture habitat include the common garter snake (*Thamnophis sirtalis*), northern leopard frog (*Lithobates pipiens*), and American toad (*Anaxyrus americanus*). However, due to the relative lack of plant diversity and habitat structure and the temporary seasonal nature of the crop cover, the use of cropped field habitat by the aforementioned species is likely limited. The conversion of agricultural to native herbaceous cover (see **Appendix W**) should improve habitat quality and benefit the populations for many of the species that currently use the areas used for agricultural row crop production. Some larger mammalian species may not be able to access the areas following construction due to fencing, but it is unlikely that it will negatively impact their populations.

The wetland habitat within the Project Boundary (7 percent) may be used by species such as the red-winged blackbird (*Agelaius phoeniceus*), mallard, blue-winged teal (*Anas discors*), great blue heron (*Ardea herodias*). Also, mammal species such as mink (*Neovison vison*) and muskrat (*Ondatra zibethicus*) may occur in wetland areas. Many reptile and amphibian species may occur in the wetland areas, including the aforementioned species and other species, such as the painted turtle (*Chrysemys picta*) and common snapping turtle (*Chelydra serpentina*) Project-related impacts to wetland habitats are largely limited and should not negatively impact the populations of species that use these habitats. Also, erosion control BMPs will be employed to avoid indirect impacts to wetlands.

Forested habitat within the Project Boundary, which comprises approximately 7 percent of the Project Boundary is predominately located along waterways or associated with farmsteads. Species that may use these forested areas include white-tailed deer, gray squirrel (*Sciurus carolinensis*), woodchuck, and mouse and vole species. Birds that may use these woodlots include American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), downy woodpecker (*Picoides pubescens*) and other common bird species. Reptile and amphibian species that use woodlot habitats include common garter snake, wood frog (*Lithobates sylvaticus*), American toad, and tiger salamander (*Ambystoma tigrinum*). Project-related impacts to forested areas are minimal relative to the total of forested areas available within the Project Boundary, thus disturbance should not negatively impact the populations of these forest-dwelling species.

Prairie, grassland, fallow fields, and pastureland comprise approximately 4 percent of the Project Boundary, and are habitats that are similarly disturbed habitat as that found in the agricultural areas. Species that may use hay and pastureland include white-tailed deer, cottontail rabbit (*Sylvilagus floridanus*), mouse and vole species, raccoon, and striped skunk. Bird, amphibian, and reptile species that may use hay and pastureland will be similar to those listed in the agricultural section. However, due to the relative lack of diverse vegetative cover and habitat structure, and regular grazing and hay cutting, this habitat offers mostly temporary habitat for foraging rather than stable long-term habitat. The conversion to stable year-round herbaceous habitat following Project construction should improve habitat quality for many of these species and benefit their populations. As with the large mammalian species that use agricultural lands, the large mammalian species that use hay and pastureland may not be able to access the areas due to fencing, but it likely will not negatively impact their populations.

Developed areas (i.e., commercial/industrial/residential), which comprise 7 percent of the Project Boundary, are typically used by species accustomed to human disturbance, including mammal species such as the gray squirrel and thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*) and bird species, such as the house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*). Species that use developed areas are typically common and tolerant of human activity[12,13,14]. Because these species have robust, secure populations, are adaptable/tolerant to anthropogenic disturbance of land covers, and developed areas are already altered by human activity, impacts to developed areas will not negatively impact populations of these species.

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[12] Scalice, S., M. Benson, and A. Howard. 2018. Increased tolerance of human presence observed in urban compared to rural eastern gray squirrels. Journal of Ecology (2):2-9.
[13] Lowther, P.E. and C.L. Link. 2006. House sparrow (*Passer domesticus*), version 2.0. In the Birds of North America (A.F. Poole, Ed.). Cornell Lab of Ornithology. Ithaca, NY.
[14] Cabe. P.R. 1993. European starling (*Sturnus vulgaris*), version 2.0. In the Birds of North America (P.G. Rodewald, Ed.). Cornell Lab of Ornithology, Ithaca, NY.

Direct and Indirect Effects of Utility-Scale Solar Facilities on Birds

Based on the current relevant literature and available information, the direct impacts to birds, including waterbirds, are limited in absolute numbers and in relative number as compared to other anthropogenic sources. The operational wildlife response and reporting system to be implemented at the Darien Solar Project will gather data helpful in determining if bird mortality is occurring (see Section 5.6.2.3). The potential for indirect effects to birds will be minimized at the Project by prioritizing the use of land in agricultural areas for the Project footprint, implementing a ground cover strategy with a diverse plant community, and employing BMPs for lighting and noise reduction.

Direct effects to birds at PV solar facilities have been described as apparent collisions with the fixed structures of the facilities[15]. However, there is evidence that many of the recorded bird fatalities were indicative of predation or even preening (i.e., feather-spots), and were not collision related[16]. The published literature on avian collisions with fixed PV solar infrastructure is limited to a few studies in regions of the world substantially more arid than Wisconsin[12, 17, 18, 19]. These studies suggest direct impacts to birds were limited and mostly (about 85 percent) comprised of passerine (perching bird) species[13]. Although passerines appear to account for most solar-related bird fatalities, waterbirds often receive a disproportionate amount of attention due to a lake effect hypothesis that posits waterbirds are at a risk of collision due to their misinterpretation of PV-panel arrays as a waterbody. However, to date there does not appear to be a consistent pattern of waterbird fatalities to support the lake-effect hypothesis[12, 13].

Even with conservative inclusion of the bird fatalities attributed to background influences such as predation events, adjusted bird fatality estimates from the studies

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[15] Walston Jr., L.J., K.E. Rollins, K.E. LaGory, K.P. Smith, and S.A. Meyers. 2016. A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. Renewable Energy, 92:405-414.

[16] Kosciuch, K., D. Riser-Espinoza, W. Erickson. 2017. Understanding potential risk, and patterns of avian fatalities from utility-scale photovoltaic solar facilities. Technical memorandum to EDF Renewable Energy in support of the Palen Solar Bird and Bat Conservation Strategy. 10pp.

[17] Visser, E., V. Perold, S. Ralston-Paton, A. C. Cardenal, and P. G. Ryan. 2019. Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa. Renewable Energy, 133: 1285-1294.

[18] H.T. Harvey & Associates. 2015. California Valley Solar Ranch Project Avian and Bat Protection Plan, Final Postconstruction Fatality Report. Project #3326-03. Prepared for HPR II, LLC.

[19] Western Ecosystems Technology, Inc. 2014. Sources of avian mortality and risk factors based on empirical data from three photovoltaic solar facilities. Pp. 1-77.

were low compared to other anthropogenic sources of avian mortality (i.e., vehicle- and building-collisions) with reported annual average bird fatality rates ranging from 1 to 3 birds/MW/year for solar facilities. The total range of statistical variability around reported bird fatality estimates, ranged from 0.5 to 10.0 birds/MW/year. [14, 15, 16]. Walston et al.[12] estimated total annual bird mortality for solar energy facilities (included PV and concentrated solar power tower facilities) in the United States to be 37,800 – 138,600 per year. None of the studies suggest that PV solar facilities present a risk to any species populations. For context, various studies summarized by Walston et al.[12] estimated that, annually, between 97 and 988 million birds die from building and window strikes, and 80 to 340 million die from vehicle collisions.

The primary indirect effect to birds of PV solar facility, as with other development, is loss or fragmentation of suitable habitat[20]. It is generally considered a BMP to site development in a way that minimizes loss of undisturbed or high-quality habitats, as has been done for the Darien Solar Project. Agricultural row crop areas are generally considered of lower ecological value compared to undisturbed, native habitats or semi-natural habitats (e.g., cover crops[21]) or Conservation Reserve Program [CRP] lands[22]. Best et al.[23] assessed habitat use by breeding birds in Iowa agricultural landscapes and found the lowest bird species abundances in agricultural habitats, and greater bird species abundances in natural and strip-cover habitats.

The replacement of monocultural row crops with a higher diversity plant community under and around PV-array fields as proposed by Darien Solar will, for some bird species, increase the attractiveness of the land to individual birds. For example, though different habitat types were evaluated, Visser et al.[14] and Devault et al.[24] found that some bird species used PV-facilities to the same degree or more than the surrounding, undeveloped lands. By prioritizing Project disturbance to lands in active agriculture and minimizing disturbance in existing non-agricultural or natural habitats, and by implementing the proposed ground cover strategy, Darien Solar will mitigate impacts to birds due to loss of the pre-construction land cover.

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[20] American Bird Conservancy. 2020. Habitat Loss. www.abcbirds.org. Accessed April 9, 2020.
[21] Wilcoxen, C.A., J.W. Walk, and M.P. Ward. 2018. Use of cover crop fields by migratory and resident birds. Agriculture, Ecosystems, and Environment. 252: 42-50.
[22] Johnson, D.H. 2000. Grassland bird use of Conservation Reserve Program fields in the Great Plains. Pages 19–34 in W. L. Hohman and D. J. Halloum, editors. A comprehensive review of Farm Bill contributions to wildlife conservation, 1985–2000. U.S. Department of Agriculture, Natural Resources Conservation Service, Wildlife Habitat Management Institute, Technical Report USDA/NRCS/WHMI-2000.
[23] Best, L. B., K. E. Freemark, J. J. Dinsmore, and M. Camp. 1995. A review and synthesis of habitat use by breeding birds in agricultural landscapes of Iowa. The American Midland Naturalist, 134:1-29.
[24] DeVault, T.L., T. W. Seamans, J. A. Schmidt, J. L. Belant, B. F. Blackwell, N. Mooers, L.A. Tyson, and L. VanPelt. 2014. Bird use of solar photovoltaic installations at U.S. airports: Implications for aviation safety. Landscape and Urban Planning, 122:122-128.

Other indirect effects to birds would be related to periodic human disturbance through artificial light and noise associated with equipment and human presence during construction and operations. BMPs used to minimize impacts to birds by artificial light sources include: 1) limiting the use of artificial lights to that which is necessary for human safety and security, 2) using hooded lights that are directed downward, and 3) ensuring lights are illuminated only when needed through use of switches or motion-sensors[25]. These BMPs have been incorporated into the design and plans for the Darien Solar Project. In terms of noise disturbance, noise during the operations phase will be comparable to that of the surrounding agricultural, commercial, and residential communities. Noise during construction is anticipated to occur within a 18-24-month period and will be spatially and temporally variable in response to the construction sequence. Mitigation of noise impacts to birds during construction include avoiding construction activities within or near sensitive habitats at the time of year they are used by birds (e.g., suitable nesting habitat for a protected species). If suitable protected bird species habitat within the Project Boundary is identified, Darien Solar will conduct presence/absence surveys, and if a protected species is observed, Darien Solar will further coordinate with the WDNR to avoid or minimize impact to said species.

Darien Solar will limit impacts to non-agricultural lands and use BMPs to avoid, minimize and mitigate impacts to suitable wildlife habitat and populations. BMPs to be used to avoid or minimize impacts to plant and animal populations and their habitats include avoiding unnecessary disturbance to habitats by driving on existing roads and already disturbed areas (i.e., agricultural land), and installing silt fencing around construction areas, and avoiding wetlands and waterways.

Federally protected species

A USFWS[26] Information for Planning and Consultation (IPaC) request (**Appendix A**) identified two federally-listed as threatened animal species and the non-essential experimental eastern migratory population [redacted] as potentially occurring within the Project Boundary or associated two-mile buffer. Non-essential experimental population designations are assigned to populations deemed unnecessary for the continued existence of the species[27]. Regulatory restrictions are reduced for non-essential experimental populations. The federally-

[25] National Park Service. 2019. Night Skies: Best Practices. Accessed April 9, 2020.
[26] United States Fish and Wildlife Service (USFWS). 2020. Information for Planning and Consultation – Darien Solar.
[27] [redacted]

listed as threatened species identified include the [redacted] and [redacted]

Also, the [redacted] which is protected under [redacted]) and the federally endangered [redacted]) may occur within the Project Boundary or two-mile buffer. [redacted] have been observed nesting in Rock and Walworth counties[28] and on all three of the nearby Christmas Bird Counts (**Appendix F**). Approximately 43 acres of [redacted] are mapped within the two-mile buffer[29]. The two remaining federally-listed species identified in the IPaC are [redacted]

Suitable summer habitat for the [redacted] includes forested/wooded habitats where they roost and forage, and occasionally includes adjacent non-forested habitats, such as emergent wetlands or the edges of agricultural fields, old fields, and pastures[30, 31]. As Project-related impacts to forested areas (roosting habitat) are largely limited and impacts to foraging areas (i.e., agricultural, pastureland, or wetlands) will not reduce the quality of foraging areas, [redacted] habitat and populations are not expected to be negatively affected.

The [redacted] primarily occurs in southern and western Wisconsin where it occurs in [redacted], and [redacted] habitats along [redacted] and [redacted] This species overwinters from November to March in [redacted] or small mammal burrows, or [redacted] within [redacted][33]. As there is potentially suitable habitat for this species near the Project Boundary, desktop habitat mapping was completed and validated by a field assessment and species records (see Section 5.6.2.2). All areas defined as suitable habitat will be avoided throughout the duration of the Project. There is potential that the vegetation detailed in the Vegetation Management Strategy (**Appendix W**) will provide suitable habitat for this species. However, vegetation in-between the Project footprint and near

28 [redacted]
29 [redacted]
30 [redacted]
31 [redacted]
32 [redacted]
33 [redacted]

mapped suitable habitat (i.e., within 50 feet [15 meters]) will be limited to low-growing species and will be mowed to maintain heights below 6 inches (15 centimeters) to reduce the attractiveness to this species. The Project siting and Vegetation Management Strategy will be designed to avoid impacting this species or its habitat. Vegetation Management Strategy

[redacted] typically use large wetland complexes to forage, nest, and roost. The species occasionally use flooded agricultural areas during migration, as stop-over sites. However, no impacts to large wetland complexes are expected from Project construction or operation and row crop areas are considered marginally suitable for stop-over. Therefore, [redacted] populations are not expected to be negatively affected.

The [redacted] occurs in a variety of habitats including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens[34]. The [redacted] requires areas that support sufficient food (nectar and pollen from diverse and abundant flowers), undisturbed nesting sites in proximity to floral resources, and overwintering sites for hibernating [redacted][35]. Although [redacted] will use agricultural areas, Project-related impacts to row crop areas are not anticipated to negatively affect [redacted] populations as implementation of the vegetation management strategy (see **Appendix W**) will likely create more suitable habitat for the species.

[redacted] select sites near lakes and rivers in forested areas where tall, large diameter trees are available for nesting and roosting[36]. Wintering grounds typically contain open water, food resources, and roosting sites; stopover habitat is similar to wintering habitat. As Project-related impacts to potential roosting and nesting habitat or aquatic foraging habitat is limited, it is unlikely that [redacted] populations will be negatively affected.

Although, the [redacted] historically occurred in a wide variety of habitats including mesic prairies, sedge meadows, and bogs, it now typically occurs in moist, undisturbed calcareous prairies or tamarack fens. Other habitat requirements for this species include full sun and grassy areas with minimal woody

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34 [redacted]

35 [redacted]

36 [redacted]

encroachment[37]. Although a small area of potentially suitable habitat exists in a sedge meadow located within two miles of the Project Boundary, most of the wetland habitat within the Project Boundary is associated with a riverine system or located in a heavily disturbed agricultural setting. As the Project will be sited in areas outside of suitable habitat for this species, no impacts to [redacted] populations or habitats are expected.

[redacted] typically occurs in southwestern Wisconsin in dry, dry-mesic, or mesic prairies. More specifically, the species occurs on gravelly or sandy hillside prairies[38]. As the Project will primarily be sited in row crop areas, no impacts to [redacted] populations or habitats are expected.

State-listed threatened or endangered species and species of concern

Six of the federally listed species described above have also been awarded state-level conservation statuses. The [redacted] is state-listed as threatened, the [redacted] and [redacted] are considered species of concern, and the [redacted], [redacted], and [redacted] statuses have potential to occur within the Project Boundary including the [redacted]. The ten additional [redacted] species were identified based on results from nearby USGS Breeding [redacted] Survey routes and National [redacted] Counts. The three [redacted] species, all state threatened, were identified as potentially occurring within the Project Boundary based on range maps and habitat availability.

During the summer months, the state threatened [redacted] uses farmland, urban areas, and edge habitats near water where they roost in trees, [redacted] attics, [redacted], and the eaves of buildings. The Wisconsin population is considered imperiled or secure depending upon the location within the state. [redacted] prefer to forage in urban landscapes along habitat edges, over open water, and along shorelines. During the winter months, [redacted] hibernate in [redacted] mines, buildings, culverts, and basements[39]. Project-related impacts to natural roosting habitat (i.e., woodlands) is limited and non-forested foraging habitat (i.e., edge habitats and

37 [redacted]
38 [redacted]
39 [redacted]

farmland) is temporary during construction (**Appendix W**). Therefore, [redacted] populations are unlikely to be negatively affected.

The state threatened [redacted] roosts in man-made structures during the summer months but will occasionally use trees or rock crevices. The Wisconsin population is considered imperiled or apparently secure depending on location within the state. [redacted] select roost sites based on proximity to water, as they prefer to forage over open water, shorelines, or along edge habitat[40]. During the winter months, [redacted] hibernate in [redacted] or [redacted] Project-related impacts to natural roosting (i.e., woodlands) and foraging habitat (i.e., forest edge habitats, aquatic features) is limited; therefore, [redacted] populations are not expected to be negatively affected.

The state threatened [redacted] roosts in the foliage of deciduous trees and will often switch roost sites during the summer. The population status is considered critically imperiled and vulnerable in Wisconsin. Occasionally, female [redacted] will use barns for maternity roosts but prefer to use oak (*Quercus* spp.) or maple (*Acer* spp.) trees. [redacted] forage along waterways, forest edges, and in forest canopies. During the winter months, they [redacted] or abandoned [redacted][41]. Project-related impacts to natural roosting and foraging habitat (i.e., woodlands) is limited; therefore, [redacted] populations are unlikely to be negatively affected.

The state threatened [redacted] prefers short grasslands with limited forb and woody vegetation cover. The species breeding population is considered imperiled in Wisconsin. This species uses lightly-grazed pastures, old fields, hayfields, and grasslands for nesting and heavily-grazed pasture, hayfields, and row crops for foraging[42]. Although the Project will primarily be sited on row crop agricultural areas (i.e., suitable foraging habitat), the low growing Vegetation Management Strategy for the Project will replace and possibly enhance the habitat quality for this species. Therefore, negative impacts to [redacted] populations are not expected.

The state threatened [redacted] prefers grasslands that are interspersed with shrubs and small trees, although it will occasionally use pastures, old fields, powerline corridors, and sedge meadows[43]. The species is considered uncommon in the

40 [redacted]
41 [redacted]
42 [redacted]
43 [redacted]

southwestern and southcentral parts of the state and rare in the west, central, and southeastern portions of the state during the breeding season. [redacted] avoids cultivated croplands, forested areas, and open grasslands. As the Project will primarily be sited in row crop areas, a habitat avoided by the species, negative impacts to [redacted] populations are not anticipated.

[redacted] are state threatened and identified as a Bird of Conservation Concern[44]. During the breeding season, the species uses grassland habitats such as hayfields, pastures, wet meadows, old fields, and Conservation Reserve Program (CRP) land[45]. Though, it should be noted that hayfields and pastures are typically not suitable habitat due to their being disturbed for agricultural purposes. As the Project will primarily be sited in row crop areas (i.e., unsuitable habitat), negative impacts to [redacted] populations are not anticipated.

The [redacted] is considered a federal Species of Concern and is state endangered. The Wisconsin [redacted] breeding population is considered to be imperiled. This species breeds in marshes, sloughs, and wet meadows, or along lakeshores, rivers, and impoundments. [redacted] prefer sites that provide a mixture of open water and emergent vegetation (i.e., hemi-marsh) such as cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), or burreed (*Sparganium* spp.). As all wetlands are proposed to be avoided during Project construction, [redacted] populations are unlikely to be negatively affected.

[redacted] are a state threatened species that forage in wetlands and colonially nest in trees. The breeding population is considered imperiled in Wisconsin. They are a fairly common migrant in southern Wisconsin, but uncommon in the summer. Most of the [redacted] colony records in Wisconsin are along the Mississippi River, and the species is considered uncommon throughout the rest of the state. Post-breeding dispersal is common for this species and dispersing individuals will forage in shallow water or wetland areas and roost in trees until they migrate. Project-related impacts to suitable woodland and wetland habitats are limited or completely avoided; therefore, it is unlikely that [redacted] populations will be negatively affected.

[redacted] are a state threatened species that typically occur near major rivers. The breeding population is considered vulnerable or secure depending upon location, but the non-breeding population is critically imperiled.

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[44] USFWS. 2008. Birds of Conservation Concern 2008. U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp.

[45] [redacted]

The preferred roosting and foraging habitat of [redacted] is large expanses of mature forest interspersed with open wetlands. However, [redacted] have been known to nest in residential areas with native woodlands[46]. Some adults overwinter in the southern half of Wisconsin. Habitat use of overwintering adults includes similar habitats to those used during the breeding season and includes woodland edge habitat, highway rights-of-way, parks, and residential areas[47]. As Project-related impacts to woodland and wetland habitats are limited or avoided, it is unlikely that the Project will negatively affect [redacted] populations.

[redacted] are considered a federal Species of Concern and are state-listed as threatened. The breeding population in Wisconsin is imperiled and vulnerable. This species typically breeds in mature upland and lowland hardwood forests in wet-mesic to dry-mesic habitats[48]. [redacted] in Wisconsin are more likely to occur in large (>200 acres [> 0.3 square miles]) woodlots. As the Project will not impact suitable [redacted] habitat, it is unlikely that their populations will be negatively affected.

The [redacted] is state-listed as threatened and its breeding population is considered imperiled and vulnerable in Wisconsin. In Wisconsin, most [redacted] occur in Baraboo Hills and the northern and southern units of the Kettle Moraine State Forest. This species is area-sensitive in Wisconsin, requiring 250 to 1500 acres (0.4 to 2.3 square miles) of mostly contiguous upland forest interspersed with dense shrubs, saplings, or brambles[49]. They prefer mesic maple and dry-mesic oak forests and will also use small forest openings created by logging, fires, or roads. As the Project will not impact suitable [redacted] habitat, it is unlikely that their populations will be negatively affected.

The [redacted] is state endangered and the breeding population is critically imperiled in the state. Also, Wisconsin is at the southeastern edge of the [redacted] range and it therefore has likely been uncommon in the state historically[50]. Most [redacted] that breed in Wisconsin occur in Winnebago County. [redacted] prefer seasonally or permanently-flooded wetlands or lakes with

46 [redacted]
47 [redacted]
48 [redacted]
49 [redacted]
50 [redacted]

extensive beds of aquatic macrophytes and emergent vegetation, such as bulrush[51]. Although potentially suitable habitat within the Project Boundary is available, impacts to wetlands will be avoided during construction; therefore, [redacted] populations are unlikely to be affected.

The [redacted] is state endangered in Wisconsin, and the Wisconsin breeding population is considered imperiled to critically imperiled. [redacted] typically nest on high cliffs, bluffs, or buildings near open water and migrate along the Mississippi River and shores of the Great Lakes[52]. Most individuals observed within Wisconsin are birds migrating from breeding grounds in Canada and overwintering grounds in southern North America and Central America. Although, some individuals occur as year-round residents along the Mississippi River and the shores of Lake Michigan[53]. Project-related impacts to [redacted] populations are not expected, as the Project will be sited in agricultural areas which is not suitable habitat for the species.

In summary, as the Project will primarily be constructed on agricultural land, it is not expected that Project construction and operations will adversely impact sensitive species populations or their habitat that may occur in or near the Project Boundary. Negative impacts are unlikely for sensitive forest-dwelling species populations, as these species tend to avoid agricultural habitats. Although it is possible that some sensitive species such as [redacted], and [redacted]t may occasionally use the agricultural land that will be developed into the solar facility (typically for foraging purposes), it is unlikely Project development will negatively affect these species as there is abundant similar habitat in the surrounding region. Disturbance, if any, would be limited to the duration of Project construction and is not anticipated to continue into the operational stage. During Project construction, wildlife within the construction areas may be temporarily displaced due to construction noise and human activity. The displacement will be a temporary impact and will occur mostly in areas that are currently used for row-crop production. Human activity during Project construction is not likely to differ from human activity that takes place during agricultural row-crop production. Also, the surrounding region provides similar habitat to that available within the Project Boundary and is likely to accommodate the temporary displacement of individuals during Project construction. Species using the woodland and wetland areas are unlikely to be negatively affected by Project construction, as the planned siting of facility infrastructure is mostly outside of these habitat types. The operational stage of the Project is expected to have a predominately positive impact on area wildlife. For example, once construction is complete, the majority of the Project Boundary will be disturbed less frequently than

51 [redacted]
52 [redacted]
53 [redacted]

it was during row-crop farming practices. Also, the herbaceous habitat available under the panels and in the general Project Boundary will improve habitat stability and diversity compared to row-crop habitat. It should be noted that the perimeter fence may exclude some large mammals from entering the Project Boundary; most small mammals, birds, reptiles and amphibians will still be able to access this area, whether through or over the fence.

5.6.2 *Wildlife pre-construction surveys. (See Habitat Surveys and Biological Assessments in the Introduction.)*

A Westwood biologist conducted a field reconnaissance for Darien Solar from November 13-15, 2017, and again on April 20-21, 2020, as a rudimentary habitat survey. The field reconnaissance followed a desktop assessment of the biological resources within the Project Boundary that was presented as a Site Characterization Study (**Appendix F**). An additional desktop and field habitat assessment for two species was performed in conjunction with the field wetland delineation as outlined in **Section 5.6.2.2**. No other pre-construction wildlife or wildlife habitat surveys were conducted.

5.6.2.1 *Provide a summary of pre-application consultation meetings held with DNR or USFWS for the purposes of determining whether or not any pre-construction wildlife studies would be required for the project.*

The Project had its first meeting with WDNR staff on October 7, 2019. During the meeting, a project development plan, including preliminary environmental study results and future survey plans was shared with WDNR. During the meeting, the WDNR asked about siting plans, construction plans to avoid impact to suitable habitat for federally- and state-listed threatened species, and long-term vegetation management strategies and the potential for current vegetation management strategies to create suitable habitat for said threatened species. It was determined that further consultation with the WDNR would be warranted following species-specific habitat assessment surveys and additional project planning. Darien also discussed the potential need to cross state-managed lands adjacent to Turtle Creek with underground collection lines. The WDNR indicated that the USFWS should be consulted, as the easement was purchased using USFWS funds.

On January 15, 2020, a pre-application consultation meeting for the Project was held by PSC, WDNR, Westwood, and Darien staff. During this meeting, another review of the aforementioned environmental study details and Project plans was provided, and further discussion on wetland/stream impact strategy occurred.

A second meeting was held on April 14, 2020 with the USFWS, Darien, and Westwood staff to introduce the project, review survey results and plans, and discuss any agency concerns. Darien also described the ongoing coordination with the

WDNR and reviewed Turtle Creek crossing areas and discussed coordination between the two agencies.

On May 12, 2020, Darien met with USFWS, WDNR, and PSC staff to share the results of the threatened species habitat mapping and discuss how mapping results guided Project siting, construction, and operational plans, as well as to continue coordination for the potential crossing easement associated with the Turtle Creek crossing. Based on the habitat mapping results, Darien indicated that the Project design was modified to avoid existing suitable habitat by a minimum of 50 ft (15 m), and to ensure Project activities did not attract or negatively affect the species, they planned to incorporate BMPs to protect the species. Based on the discussion, USFWS and WDNR indicated that they felt the Project avoided risk to the species and no further action(s) were identified by the USFWS or WDNR. The WDNR requested the information (i.e., mapping and BMPs) be submitted for incorporation into an updated ERR response.

Darien will schedule a follow-up meeting with the WDNR and USFWS to continue discussing consultation logistics associated with potential underground collection crossings of the state-managed land, should they be necessary.

5.6.2.2 *If, after consultation with DNR or USFWS, wildlife pre-construction studies are required, provide the following:*

- *A copy of the approved survey methodologies for any studies including the species of interest, dates of surveys, and a schedule for releasing data and reports to the PSC and DNR.*
- *Copies of all data collected for all pre-construction studies (data should be provided using a format acceptable to DNR and PSC staff).*

Habitat mapping for two threatened species identified as potentially occurring within or near the Project Boundary in the WDNR ERR or USFWS IPaC was completed as discussed with WDNR and USFWS. Suitable habitat was defined based on literature review[54,55,56] and correspondence with the WDNR on January 15, 2020. Desktop habitat mapping for the two threatened species was conducted using GIS techniques

[54] [redacted]

[55] [redacted]

[56] [redacted].

and the results of the desktop modeling effort were verified using WDNR NHI records of each species and through field verification of the habitat identified.

Suitable habitat for one of the threatened species included all [redacted] habitat (identified using the WDNR Waterbody Identification Code [WBIC] dataset[57]), and an associated 20-foot (ft) (6-meter [m]) buffer of [redacted][47]. A 20-ft (6-m) buffer was used as the species is [redacted] and rarely travels beyond this distance from [redacted]

Suitable habitat for the other species included emergent and shrub/scrub [redacted] or [redacted][45, 46]. Residential areas, upland deciduous forest, and agricultural land in row crop production were considered unsuitable habitat for the species[45, 46]. A 240-m (787-ft) buffer was applied to core habitat (i.e., all [redacted] and all [redacted] as it represents the upper quantile of the two-day maximum distance travelled by males and non-gravid females of this species[45]. [redacted] were identified using the [redacted] dataset[48]and [redacted] were identified using a combination of WDNR [redacted]) data[58,59] and results from Westwood's [redacted] field delineations conducted in October 2019 and April 2020. All areas within the 240-m (787-ft) buffer that were identified as unsuitable habitat (using the previously mentioned list) from aerial imagery or field reconnaissance were omitted from the buffer.

- *Final report/s or analyses prepared using the data collected.*

Figures depicting the results of the desktop and field habitat mapping efforts are provided in **Appendix K**.

5.6.2.3 *Provide any monitoring and response protocol for wildlife accessing the solar arrays.*

Darien Solar will implement a wildlife response and reporting system during operation, which will allow the Project to assess wildlife impacts. The wildlife response and reporting system incorporates an electronic and communications pathway that uses a software program to expedite the transfer of wildlife data from the field staff to environmental managers. This system includes operations staff training, monitoring for wildlife incidents (e.g., injured or deceased animal) by operations staff, and active reporting of and potentially response to wildlife incidents.

57 [redacted].
58 [redacted]
59 [redacted]

The operations staff training will occur during staff onboarding and on an annual basis. The training will provide instruction to operations staff on reportable wildlife incidents, data documentation when an incident is identified, and the incident report process. The training also includes BMPs (e.g., only drive on designated access roads). The operations staff are expected to view their surroundings while performing regular maintenance visits and incorporate scans for wildlife into their work habits. Should an incident be observed, the technicians are required to collect data (e.g., date, time, location, etc.) and photographs of the wildlife and surroundings. This data is reported to the site manager, who submits it to an electronic database and notifies the designated environmental manager for the project.

The site and environmental manager will then coordinate to take the appropriate actions. The actions include working with a qualified biologist (e.g., consultant) to confirm species identification. For injured animals, the site manager will contact a wildlife rehabilitator or local wildlife agent to capture, treat, and if able, release the animal. If the species is identified as a state- or federally-listed species, the appropriate agency will also be notified. The site environmental manager also reviews the circumstances around each incident and the combined incidents on an annual basis, to determine if any trends such as a common location or circumstance are evident. Identification of such a trend would trigger an analysis to identify appropriate mitigation actions.

If a member of the public observes a potential wildlife incident within the Project's operational footprint, they should bring that observation to the project's site manager. From this point, the reporting process and coordination around the incident will be similar to those found and documented by the Operations Staff during routine Project visits, as described above.

5.7 Public Lands

List all public properties within the project area and in a separate list all public properties within two miles of the project area boundary.

5.7.1 *State properties, including:*

5.7.1.1 *Wildlife Areas*

A desktop evaluation was conducted using the U.S. Geological Survey (2019) Protected Areas Database of U.S. (PADUS), to document special biological resource management areas, such as conservation easements and state or federal land managed for biodiversity within the Project Boundary or the two-mile buffer. Results of this effort indicated that approximately 144 acres of the state-managed Turtle Creek Wildlife Area are within the Project Boundary, and an additional 899 acres are within a two-mile buffer. All other surface land within the Project Boundary is privately owned. No other public lands were mapped within the two-mile buffer. Less than 0.1 acres of the WDNR-managed Scattered Wildlife conservation easement and 1.1 acres of another conservation easement were mapped just outside of the two-mile buffer.

5.7.1.2 *Fisheries Areas*

There are no fisheries in the Project Boundary or within two-miles of the Project Boundary.

5.7.1.3 *State Parks and Forests*

There are no state parks or forests within the Project Boundary or within two-miles of the Project Boundary.

5.7.2 *Federal properties, including:*

5.7.2.1 *Wildlife Refuges*
5.7.2.2 *Parks*
5.7.2.3 *Scenic Riverways*

There are no federally managed properties located within the Project Boundary or within two miles of the Project Boundary.

5.7.3 *County Parks*

There are no county parks located within the Project Boundary, however there are two town parks, Spooner Nature Park and McCarthy School Park (**Figure 4.1.6.3**, **Appendix B**).

5.7.4 *Recreation Trails*

There are no recreational trails on public land located within the Project Boundary but the Pelishek-Tiffany Nature Trail is approximately 0.5 miles southwest of the Project Boundary.

5.8 Contaminated Sites

List all contaminated sites and solid waste sites within the project area, and in a separate list, all contaminated sites and solid waste sites within two miles of the project area boundary.

5.8.1 *Using the Wisconsin Remediation and Redevelopment Database (WRRD),* http://dnr.wi.gov/topic/Brownfields/WRRD.html*, identify any contaminated sites (open and closed) within the project area and within 2 miles of the project area.*

Tables 5.8.1a and **5.8.1b** list the open and closed contaminated sites in and within 2 miles of the Project Boundary as identified from http://dnr.wi.gov/topic/Brownfields/WRRD.html.

Table 5.8.1a BRRTS Listings Within the Project Boundary			
Site Name	**BRRTS #**	**Facility ID**	**Closure Status**
Waste Management of Wisconsin	0365197526	265161710	Closed
Walrock Disposal (Waste Management)	0365002083	265040930	Closed
Walworth Foundries Inc.	0265269770	265038180	Closed
Walworth Foundries Site 2	0265553706	265038180	Closed

Table 5.8.1b BRRTS Listings Within 2-miles of the Project Boundary			
Site Name	**BRRTS #**	**Facility ID**	**Closure Status**
Delavan City Municipal Garage	0365004961	265144660	Closed
Delavan Mobil Service	0365001479	265050170	Closed
Del Mart 66	0365557985	265050170	Closed
Sikes Property	0365000501	265093290	Closed
Delavan Parks Dept	0365106256	265150930	Closed
SS Express C-Store-Former (Vacant Property)	0365551007	265171610	Closed
Wisconsin School for the Deaf	0365004901	265085370	Closed
Hirte, Betty Property	0365005191	265146640	Closed
Advanced Disp SVCS Midwest Mallard Ridge LP	0365001247	265128270	Closed
Delavan Darien High School	0365177182	265081850	Closed
Walworth County Metro Sewerage Dist	0365001476	265095050	Closed
Swatek Bulk Terminal – Former	0265190428	265161160	Closed
Walworth County Metro Sewer Dist Pump S	0365001340	265129260	Closed
Cusack, Eileen Residence	0365107941	265151480	Closed
Crop Production-Darien	0265000249	265104620	Closed
Chaney Tire (FMR)	0365562428	265097690	Closed
Smith Petroleum Bulk Plt	0365209443	265057210	Closed
Scott, Jerry Property	0365005049	265145430	Closed
WI DOT Sunoco Service Station	0365004343	265137070	Closed
WI DOT ROW UST	0365553534	265166330	Closed

Table 5.8.1b BRRTS Listings Within 2-miles of the Project Boundary			
Site Name	**BRRTS #**	**Facility ID**	**Closure Status**
WI DOT Rollette Oil Co	0365004344	265010460	*Open*
Darien Elementary School	0365177176	265158960	Closed
Country Station	0365119417	265040820	Closed

5.8.2 *Using the Historic Registry of Waste Disposal Sites,* http://dnr.wi.gov/topic/Landfills/registry.html*, identify any Environmental Repair and Solid Waste disposal sites within the project area and within 2 miles of the project area.*

Table 5.8.2 lists the Environmental Repair and Solid Waste disposal sites within 2 miles of the Project Boundary as identified from http://dnr.wi.gov/topic/Landfills/registry.html. According to the WDNR Historic Registry of Waste Disposal Sites, there are no sites located within the Project Boundary.

Table 5.8.2 Environmental Repair and Solid Waste Listings Within 2-miles of the Project Boundary		
Site Name	**Object ID**	**Site ID**
Advanced Disp SVCS Midwest Mallard Ridge LP	443	1770700
Advanced Disp SVCS Midwest Mallard Ridge LP	594	1585200
Lake Comus Dredge Sediment Site	2485	1763200
Delavan City	2483	27548000
Delavan City	2482	27548100
Delavan City	2484	27547900
Byron Tully	170	1724600

5.9 Local Zoning and Safety

Utilities (CA)

5.9.1 *Provide copies of any zoning ordinances affecting the project area and within two miles of the project boundary. Provide only the page(s) directly citing ordinance language.*

5.9.2 *Describe any zoning changes needed for the project.*

5.9.3 *Describe zoning changes that the applicant has requested of local government for the proposed project. Include:*

5.9.3.1 *The name of the entity responsible for zoning changes.*

5.9.3.2 *Description of the process required to make the zoning change.*

5.9.3.3 *The outcome or expected outcome for requested zoning changes.*

5.9.4 *Township road safety and use plans.*

5.9.4.1 *Provide details on any plan or permit requirement pertaining to local road safety, use, or repair.*

5.9.5 *Other conditional use permits*

5.9.5.1 *Provide details on any other conditional use permit required by local government.*

[SECTIONS OMITTED, ONLY APPLY TO UTILITIES]

Utilities and IPPs (CPCN)

5.9.6 *Provide a list of potential local issues normally associated with zoning, road use and safety, or other condition uses.*

5.9.6.1 *Provide copies of all correspondence to and from local government pertaining to issues of zoning, safety, or local road use safety plans.*

Copies of local government correspondence are included in **Appendix A**.

Darien Solar has discussed zoning and other local issues with Town of Darien Officials, Walworth County Land Use and Resource Management Staff, and Rock County Planning, Economic & Community Development Staff. In Rock and Walworth Counties, zoning authority is exercised at the county level, unless the local municipality has adopted general zoning regulations under Section 62.23 of Wisconsin State Statutes[60]. Shoreland and floodplain zoning regulation enforcement is retained by the County. The Project Boundary is sited entirely outside of any local city or village. Land in the Project Boundary is primarily zoned "Agricultural Preservation" pursuant to the conditions of Chapter 74 of the Walworth County Zoning Ordinance[61] and Chapter XVI of the Rock County Code of Ordinances[62]. Solar infrastructure in Walworth County is proposed within the A-1 Prime Agricultural Land District, A-2 Agricultural Land District, C-2 Upland Resource Conservation District, B-4 Highway Business District, M-3 Mineral Extraction District and P-1 Recreational Park Districts. Solar infrastructure in Rock County is proposed within the A-1 Exclusive Agricultural District and NROS - Natural Resource Open Space District. The proposed transmission line in Walworth County will extend from the Project Substation (zoned A-1) to the Solar Project Substation,

[60] Wisconsin State Statutes Section 62.23 – City planning.
[61] Walworth County. Code of Ordinances. Accessed April 2020.
[62] Rock County. Code of Ordinances. Accessed April 2020.

which is located in the A-1 Prime Agricultural Land District. Rock and Walworth Counties have a Farmland Preservation Plan in compliance with Chapter 91 requirements.[63,64,65]

Under Wis. Stat. 91.42(2) and 91.46(1)(f)[65], allowable uses in a farmland preservation zoning district include "[t]ransportation, communications, pipeline, electric transmission, utility, or drainage uses that qualify under sub. (4)." Under Wis. Admin. Code ATCP 49.01(19)[66], "'[u]tility use' as used in s. 91.46(1)(f), Stats., includes facilities for the generation of electricity from sunlight, wind, coal, or natural gas." Therefore, the proposed solar electric generating facility qualifies as an allowable use in the farmland preservation zoning district.

Darien Solar has stated a desire to work cooperatively with Town and County authorities to identify and address issues and concerns. Walworth and Rock County zoning exists for land development and construction activities within the unincorporated lands in the Project Boundary. Communication is ongoing with County and Town Officials.

In addition to zoning/land use issues, local officials and members of the public have inquired about the following issues:

- Responsibility for maintenance and repair of roads used during construction.
- Type and size of vehicles used in construction.
- Construction materials and employee traffic routes.
- Location of any new driveways.
- Site vegetation management strategies.
- Stormwater management impacts during and after construction.
- Emergency response needs of the proposed facility.
- Source of Project construction and operations staff.
- Facility lighting.
- Local government tax impacts.

5.9.6.2 *Provide a discussion of how local concerns would be accommodated.*

Darien Solar has proposed that a local agreement such as a Joint Development Agreement (JDA), Memorandum of Understanding (MOU) or Local Operating Contract (LOC) be used to memorialize agreements on management and responsibility for local concerns on both the County and Town level. These communications and negotiations are already in process and will continue throughout

[63] Rock County Planning and Development Committee. December 2016. Rock County Agriculture Plan.
[64] Walworth County. 2012. Farmland Preservation Plan.
[65] Wisconsin State Statutes Chapter 91 – Farmland Preservation.
[66] Wisconsin Administrative Code Chapter ATCP 49 – Farmland Preservation.

the CPCN approval process. The drafts of the agreements themselves are included in **Appendix AD**.

Darien Solar has established a thorough and multi-faceted outreach plan to receive and address local concerns as further discussed in section 6.1.

Upon receipt of a local concern, Darien Solar will work in good faith to reach a mutually agreeable resolution.

Appendix G includes a study of Health and Safety Impacts of Solar Photovoltaics performed by North Carolina State University[67], which also addresses concerns that the public may have regarding the Project. The study addresses concerns of public health and safety in the following categories: (1) Toxicity, (2) Electromagnetic Fields, (3) Electric Shock and Arc Flash, and (4) Fire. In each of these sections, the negative health and safety impacts of utility-scale PV development were shown to be negligible, while the public health and safety benefits of installing these facilities are significant and far outweigh any negative impacts. In particular, the study identifies that due to the reduction in the pollution from fossil-fuel-fired electric generators, the overall impact of solar development on human health is overwhelmingly positive. This pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free PV-generated electricity, which reduces harmful sulfur dioxide (SO2), nitrogen oxides (NOx), and fine particulate matter (PM 2.5).

5.9.7 *Describe any impacts the proposed project would have on existing infrastructure including electric distribution lines and gas pipelines.*

Prior to initiating construction, all crossings of Project infrastructure with existing infrastructure will be field-located by a licensed land surveyor. The Darien Solar development team will seek to negotiate crossing agreements with the owners of the infrastructure.

Major existing infrastructure within the Project Boundary includes two natural gas pipelines traveling southwest to northeast through the western portion of the Project Boundary, one oil pipeline running north to south through the eastern portion of the Project Boundary, and one overhead transmission line running west to east through the central portion Project Boundary. Solar infrastructure has been sited to avoid impacts to the identified natural gas and oil pipelines and electric transmission line to the greatest extent practicable; however, collection lines, access roads and security fences will require crossing existing infrastructure in several locations. Lower voltage electrical distribution lines are in multiple locations around the project and are primarily along road right of way lines. Project infrastructure will need to cross these

[67] North Carolina State University. May 2017. Health and Safety Impacts of Solar Photovoltaics.

in multiple locations based on final engineering, particularly for surface-level access roads and underground collection lines.

Crossing agreements will determine, among other things, the appropriate cover required to provide adequate protection to existing infrastructure. Underground collection cables will cross the natural gas and oil pipelines underground, as close to perpendicular as possible. Access roads are planned to cross existing natural gas pipelines as close to perpendicular as possible and provide adequate cover. Proposed fences that need to cross existing infrastructure will have carefully located posts in the vicinity of the infrastructure to provide adequate spacing to existing infrastructure and avoid negative impacts. Solar array tracker and foundation infrastructure will be set back outside of the right of way of existing pipelines and the transmission line to minimize impacts.

5.10 Land Use Plans

Provide a copy of all land-use plans adopted by local governments that pertain to the project area, extending out two miles from the project boundary. (See Application Size in the Introduction.) Include not only general land-use plans, but also other relevant planning documents such as:

5.10.1 *County Recreation Plans*
5.10.2 *Farmland Preservation Plans*
5.10.3 *Highway Development Plans*
5.10.4 *Sewer Service Area Plans*

Copies of the requested land-use plans within the Project Boundary are included in **Appendix I**. A table of the additional plans and links to where they can be found on the internet is also included in **Appendix I**.

5.11 Archaeological and Historic Resources

Confidential information includes the location and other sensitive details of archaeological and historic resources (e.g., maps, traditional tribal knowledge, etc.). Confidential information should be submitted in redacted documents on ERF or under separate cover to the Commission's Historic Preservation Officer. The Wisconsin Historical Society (WHS) can provide a list of qualified archaeologists, architectural historians, human burial specialists, or tribal preservation officers who may be required to perform steps of this review. Access to the Wisconsin Historic Preservation Database (WHPD) is required to complete this review. Access to WHPD is free at the WHS headquarters or can be used online for a fee. Depending on the outcome of this review, the Commission may be required to consult with the State Historic Preservation Office (SHPO). SHPO consultation may take up to an additional 30 days. The 2012 Guide for Public Archeology in Wisconsin, provides information about best management practices.

5.11.1 *Provide maps and a description of all archaeological sites, historic buildings and districts, and human burial sites within or near the proposed project area.*

5.11.2 *Determine the boundaries, historic significance, and integrity of each resource. Additional field surveys may be required to make these determinations.*

5.11.3 *Identify the potential project effects on each resource.*

5.11.4 *Describe modifications to the project that would reduce, eliminate, avoid, or otherwise mitigate effects on the resources. Examples of modifications include changes to construction locations, modified construction practices (e.g. use of low-pressure tires, matting, etc.), placement of protective barriers and warning signage, and construction monitoring.*

5.11.5 *Obtain a Burial Site Disturbance Authorization/Permit from WHS for all human burial sites that would be affected by the project.*

No recorded human burial sites will be affected by the project. A Burial Site Disturbance Authorization/Permit is not required.

5.11.6 *Provide an unanticipated archaeological discoveries plan. The plan should outline procedures to be followed in the event of an unanticipated discovery of archaeological resources or human remains during construction activities for the project.*

Sections 5.11.1 through 5.11.6 are addressed in the Cultural Resources Report [CONFIDENTIAL] and Unanticipated Archaeological Discoveries Plan provided in **Appendix J**.

To examine for previously unrecorded resources, archaeological survey methods of high potential areas included pedestrian survey at 15 m intervals. The survey was performed in agricultural fields with sufficient ground surface visibility. No archaeological resources were identified during the current survey. All previously recorded archaeological sites within the Project Boundary will be avoided by project design. No National Register of Historic Places (NRHP) significant archaeological sites will be impacted by the project.

Background research revealed that houses and agricultural buildings on several farmsteads and other historic resources in the vicinity of the Project Boundary have been previously inventoried. Nineteen properties were identified in the Wisconsin Architectural History Inventory (AHI) database. The project will have no adverse impacts to those recorded historic properties listed or eligible for listing in the NRHP..

If unrecorded archaeological sites are discovered during construction, the Unanticipated Discovery Plan will be followed.

5.12 ER Review – Endangered, Threatened, and Special Concern Species and Communities

5.12.1 *Provide a copy of the DNR approved ER Review and all supporting materials (see DNR Application Needs in the Introduction).*

Westwood Professional Services requested an updated ERR from the WDNR for the Project on behalf of Darien Solar and received a response on May 26, 2020 (ERR Log# 18-586) (**Appendix K**).

5.12.2 *Discuss how any DNR-required actions to comply with endangered species law would be incorporated into the project construction or operation.*

The WDNR identified required actions for four species. Shoreland zoning setbacks and Darien's commitment to comply with them will ensure that direct impacts to three of the species and their habitats will be completely avoided. Indirect impacts to their habitats will be avoided by employing wildlife safe erosion control BMPs during Project construction to eliminate any potential entanglements and eliminate any erosion or sedimentation concerns. A detailed habitat assessment was completed in April 2020 (see **Section 5.6.2.2**). Areas identified as existing suitable habitat for the fourth species are avoided by 50 ft (15.2 m) in the Project design; additionally, Darien will employ BMPs to further avoid impacts to this species should it depart the suitable habitat areas. BMPs include reducing speed limits (≤ 15 miles per hour [mph], 24 kilometers per hour [kph]) near suitable habitat, educating all on-site staff about the species, posting signage about the species and relevant areas on-site, installing wildlife-safe exclusionary fencing near suitable habitat (i.e., within the 240-m [787-ft] buffer) during the species inactive season, implementing a mowing regime that will avoid times when the species is likely to be active, using a biological monitor to monitor the wildlife-safe fencing within the 240-m (787-ft) buffer during the species active season for the species and to assess the constitution of the fencing, and maintaining vegetation height at less than or equal to six inches (15 cm) near suitable habitat to reduce the attractiveness to the species. Darien Solar shared the results of the habitat mapping effort with the WDNR and USFWS on May 12, 2020 and both agencies accepted the mapping results and the proposed BMPs for the species that were discussed.

5.12.3 *Discuss how any DNR-recommended actions to comply with endangered species law would be incorporated into the project construction or operation.*

The WDNR also made recommendations to avoid impacts to fifteen sensitive biological resources. The fifteen biological resources included thirteen animal species and two natural plant communities. The two plant communities and suitable habitat for twelve of the species will be completely avoided during Project construction and operation. BMPs will be employed to minimize indirect impacts to these species or communities. Core suitable habitat will be avoided for the remaining species;

however, potentially suitable nesting habitat may be impacted during Project construction. Darien Solar will employ species-specific BMPs (i.e., installing exclusionary fencing during the species inactive season) to minimize impacts to this species.

5.13 Agricultural Impacts

5.13.1 *Identify current agricultural practices in the project area.*

The proposed areas of the site where construction activities will occur are typically planted in a rotation of corn and soybeans. Some areas of alfalfa and hay fields used for grazing or for harvesting are also within the Project Boundary.

5.13.2 *Identify the location of drainage tiles or irrigation systems in the project area that could be impacted by construction activities.*

Drainage tiles are not present in significant quantities in the Project Boundary and therefore are not being considered for any special mitigation planning during construction or operations.

Two center pivot irrigation systems have been identified in signed parcels being considered for solar arrays. Individual agreements with those landowners have been arranged to allow for their removal.

5.13.3 *Describe how damage to drainage tiles would be prevented during construction, or if it occurs, how it would be detected and repaired.*

Drainage tiles are not present in significant quantities in the Project Boundary and therefore are not being considered for any special mitigation planning during construction or operations. In the event drain tile is unexpectedly encountered and damaged, Darien Solar will repair and restore tiled areas to a condition reasonably similar to its pre-construction state.

5.13.4 *Provide information on any farmland preservation agreements for the proposed sites.*

To the best of Darien Solar's knowledge none of the Project's participating landowners have property enrolled in farmland preservation agreements.

5.13.5 *Indicate whether any lands within the project boundary are enrolled in the Conservation Reserve Program.*

To the best of Darien Solar's knowledge, three participating landowners have portions of property leased to the Project enrolled in CRP. The locations of CRP property will be included as a GIS Shapefiles upon receipt from the local FSA office.

5.13.6 *Describe the process for returning land to agricultural use after decommissioning, including any subsequent years of monitoring.*

Detailed decommissioning steps are provided in Section 1.7.3 and provide a viable process for returning the Project Boundary to productive agricultural use. Decommissioning steps include the removal of impervious surfaces and below- and above-ground infrastructure and decompacting in all areas. Primary Array areas planted in native perennial cover during the life of the Project should result in soil improvements (**Appendix W**). Thus the return to agricultural use following decommissioning should only require tilling to break the new vegetative growth. The selection of native/naturalized prairie and savanna species as the primary vegetation cover for the Project is ideal for improving and maintaining soil health. The topsoil present on the Project site, which has benefitted agriculture for several decades, was created over time by deep-rooted perennial native species prior to its conversion for agricultural use. Even minimally diverse prairies provide superior rainwater infiltration and control, filtering and improving the quality of groundwater, and increasing soil health. It has been well documented that the integration of native prairie and savanna species on the land will result in tangible soil improvements including significantly reduced topsoil loss through erosion, an increase in soil organic carbon levels, improved soil fertility through increased organic matter, and improved soil moisture and drought resilience. In addition, a shift in soil microorganisms to a higher fungal/microbial ratio overall is expected to improve the soil structure and stability against erosion. Accordingly, because of the improvement to soils, it is very likely the cropland will be returned to pre-construction yields or better after years of use as a solar generating facility.

In addition, the Project will provide benefits to the agricultural land and landowners which relate to the agricultural land use concerns raised by the Commission in recent approvals of other solar projects.

Darien Solar has voluntary easements with the owners of the agricultural land that would host the Project. These landowners are sophisticated, experienced agricultural producers. They have an educated view of the agricultural market and have knowingly and voluntarily decided to participate in the Project. Their property rights deserve to be respected and their economic opportunities not unfairly restricted. Darien Solar is seeking a merchant CPCN and not a Utility CPCN and has affirmatively stated within this application that the Project will not be seeking condemnation powers. Thus, any landowners who own land that is presently agricultural and would host solar generating facilities are choosing to do so purely voluntarily.

As discussed in **Appendix W** Vegetation Management Strategy, Darien Solar is seeking to utilize some areas of the array for native seed production. Additionally, Darien Solar will employ commercially reasonable efforts to implement more

agricultural co-use at the site, including possible activities such as grazing with sheep and honey production. **Appendix W** includes information that explains how the anticipated increase in pollinator activity can boost agricultural production on adjacent, non-participating agricultural land.

Darien Solar has prepared new information in **Appendix X** Preliminary Drainage Study that describes some of the significant, but previously unheralded environmental benefits that come from the proposed Vegetation Management Strategy, namely:

Phosphorous reductions of 457 lbs/year and nitrogen reductions of 2,172 lbs/yr for a 1,970 acre site. This will improve water quality downstream of the Project. 1,970 acres represents the Primary Array area (2,006 acres) less the estimated impervious surface from access roads and inverter pads inside the array fence (~34 acres) and rounded down. Water run-off rate reductions of 546 gal/s during a 1-year 24-hour rainfall event and 2,873 gal/s during a 100-year 24-hour rainfall event for a 1,970 acre site. This will reduce flooding downstream of the Project.

Beyond these water benefits, there are significant additional environmental benefits that will come from the Project. Perennial native vegetation naturally captures and converts atmospheric carbon into soil organic carbon which can build soils over the life of the project[68]. Soil building through carbon sequestration not only improves local land fertility but also assists to offset human-caused atmospheric carbon emissions. Perennial native vegetation offers superior erosion control. The dense network of roots serve as anchors and are exceptionally efficient at holding soil in place. Studies have shown that similar soil conservation practices reduced soil wind erosion by 58% and soil water erosion by 72%[69].

Perennial native vegetation provides habitat for birds, butterflies, insects, reptiles and other small wildlife. When converted from cropland, studies have shown an increase in species abundance and biodiversity[70]. Perennial native vegetation also creates complex soil food webs which can accommodate a larger population of beneficial microorganisms. Restored prairies have been found to significantly increase an ecosystem's total biomass, arbuscular mycorrhizal fungi biomass, and gram-negative bacteria biomass approaching levels found in long-established prairies[71].

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[68] Ecological Society of America. 2006. Mclauchlan, K. K., Hobbie, S. E., & Post, W. M. Accessed August 20, 2019.
[69] United States Department of Agriculture. 2012. Conservation Effects Assessment Project. Accessed August 20, 2019.
[70] Proceedings of the National Academy of Sciences of the United States of America. 2017. Schulte, L. A., Niemi, J., Helmers, M. J., Liebman, M., Arbuckle, J. G., James, D. E., Kolka, R. K., O'Neal, M. E., Tomer, M. D., Tyndall, J. C., Asbjornsen, H., Drobney, P., Neal, J., Van Ryswyk, G., & Witte, C. https://www.pnas.org/content/114/42/11247.full. Accessed August 20, 2019.
[71] Plos One. 2014. Herzberger, A. J., Duncan, D. S., & Jackson, R. D. Accessed August 22, 2019.

The physics of solar energy generation are fundamentally about harnessing the energy from the sun as it shines on a given area of the earth's surface, and because that energy is produced without air emissions as described in **Appendix AB**, a bigger project generates more air pollution offsets.

A solar farm is a long term but ultimately temporary use. The Project will have a robust decommissioning plan (Section 1.7.3) based upon recent Commission precedent and the Project's leases are finite and have decommissioning requirements. Thus, it can be helpful to think of a solar energy project as an "agricultural reserve," if one's hope is to eventually see the land return to production of cereal grain crops, as the site is presently used for the most part. And at the future point in time, the soil should be healthier and more productive than before.

A more thorough analysis of the benefits that solar can provide to not only the participating property, but also to the participating landowners can be found in our detailed economic impact analysis attached as **Appendix M**.

5.13.7 *Discuss induced voltage issues as they relate to the project arrays, collector circuits, and generator tie line. Provide the following information:*

5.13.7.1 *The number of confined animal dairy operations within 300 feet of any proposed electric transmission or distribution centerline on or off the project site alternatives.*

No DNR-permitted concentrated animal feeding operations (CAFO; greater than 1,000 animals) are located within the Project Boundary or one mile buffer[72]. Darien Solar has attempted to identify the locations of smaller confined animal operations based on publicly available data and aerial imagery (Section 4.2.15.5). Specific types and numbers of animals are not known; however, cattle, sheep, and horses are common in the region. None of the identified confined animal operations are located within 300 feet of any proposed collection circuits, overhead collection lines, or transmission lines; however, three animal operations are located within 300 feet of the proposed solar array. The proposed array will be constructed with DC cables that will connect the strings of panels. These cables may be affixed or hung in line with the racking system to the end of each row, then sent to combiner boxes where larger gauge cables will exit and run to an inverter. Locations of identified confined animal operations in close proximity to the proposed solar array and DC lines will be verified during a field reconnaissance investigation.

5.13.7.2 *The number of agricultural buildings located within 300 feet of the proposed centerline.*

[72] Wisconsin Department of Natural Resources. CAFO Permittees search. Accessed April 22, 2020.

Beyond the aforementioned suspected confined animal operations, no other agricultural buildings are located within 300 feet of any proposed collection circuit, overhead collection line, or transmission line centerlines (**Figure 4.1.2**).

5.13.7.3 *A discussion of induced voltage issues as they relate to the project and its related power line routes.*

The Darien Solar Project will be constructed to meet the standards of Chapter SPS 316 (Electrical)[73] and Chapter SPS 371 (Solar Energy Systems)[74] of the Administrative Code of the State of Wisconsin, PSC 114 – Wisconsin State Electrical Code[75], and the National Fire Protection Association's NFPA70 National Electric Code. Following the adopted electric codes and guidelines will ensure the system is designed correctly and potential issues of induced voltage are mitigated in accordance with applicable law.

5.13.7.4 *Any plans to conduct stray voltage testing pre and post construction.*

Given the minimal number and proximity of confined animal operations as outlined in Section 5.13.7.1, Darien Solar will conduct both pre and post construction stray voltage testing, so long as any animal operation is located within 300 feet of the final Project layout and the landowner grants permission. If the Project can setback over 300 feet from any identified animal operation, Darien Solar requests that stray voltage testing be waived. The 300-foot distance is used as that is the distance used in prompt 5.13.7.1.

Given that there are no DNR permitted Confined Animal Feeding Operations in Rock or Walworth Counties, nor agricultural buildings within 300 feet of proposed collection circuits or transmission line centerlines, Darien Solar does not feel that an increased range of, for example, one half mile from Solar facilities would provide much useful information and is not warranted at this site.

5.14 Airports and Landing Strips

5.14.1 *Airport, Landing Strips, and Helipads*

5.14.1.1 *Identify all public and private airports, landing strips, and helipads within 10 miles of the project facilities (both for solar arrays and the nearest generator tie line structure).*

5.14.1.2 *Describe each of the airports, landing strips, and helipads with a description of the runways/landing zone and type of use.*

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[73] Wisconsin Administrative Code Chapter SPS 316.
[74] Wisconsin Administrative Code Chapter SPS 371.
[75] Wisconsin Administrative Code Chapter PSC 114.

5.14.1.3 *Describe any potential for impacts to aircraft safety and potential facility intrusion into navigable airspace.*

5.14.1.4 *Describe any mitigation measures pertaining to public airport impacts.*

This section addresses the requirements of Section 5.14.1 of the Application Filing Requirements, including all subsections, i.e., 5.14.1.1 through 5.14.1.4.

Table 5.14.1 – Airports and Landing Strips

Facility Name	Airport ID:	Distance from Project	Ownership	Runway Information
Ames Private Airport	05WI	1.4 miles north	Private	One turf runway, private uses
Barten Airport	WS55	4.7 miles south	Private	One turf runway, private uses
Big Foot Airfield Airport	7V3	6.4 miles south	Privately-owned, public airport	One turf runway, general aviation uses
Big Foot Farms Heliport	WS73	8.6 miles southeast	Private	One helipad, private uses
Hacklander Farms Airport	76WN	4.8 mile northwest	Private	One turf runway, private uses
Johnstown Center Airport	WI84	4.9 miles north	Private	One turf runway, private uses
Lake Lawn Airport	C59	3.9 miles east	Privately-owned, public airport	One paved runway, general aviation uses
Lakeland Hospital Heliport	0WI3	9.2 miles east	Private	Two helipads, medical emergency services
Melin Farms Airport	3WI6	3.3 miles west	Private	One turf runway, private uses
Paddock Field Airport	41WI	8.0 miles northeast	Private	One turf runway, private uses
Pine Hill Airport	09LL	8.2 miles south	Private	One turf runway, private uses
Smilin' Sam's Airport	WI66	2.5 miles south	Private	One turf runway, private uses
Swan Airport	WI70	4.5 miles northeast	Private	One turf runway, private uses
Turtle Airport	WI02	8.8 miles southwest	Private	Two turf runways, private uses

Table 5.14.1 – Airports and Landing Strips				
Facility Name	**Airport ID:**	**Distance from Project**	**Ownership**	**Runway Information**
Weedhopper Meadow Airport	WI71	4.8 miles northeast	Private	One turf runway, private uses

The approximate maximum height of solar panels is 15 feet aboveground and, thus, will not interfere with airspace uses by any aforementioned airport or airstrip. Given the low height of the solar panels and distance from existing airports, no impacts to private or public airports, airstrips, heliports, or other facilities are anticipated as a result of Project development. Therefore, no mitigation measures have been proposed.

5.14.2 *Commercial Aviation*

5.14.2.1 *Identify all commercial air services operating within the project boundaries (i.e. aerial applications for agricultural purposes, state programs for control of forest diseases and pests (i.e. Gypsy moth control).*

5.14.2.2 *Describe any potential impact to commercial aviation operations.*

5.14.2.3 *Describe any mitigation measures pertaining to commercial aviation.*

According to the DATCP's Interactive Map of the Gypsy Moth Aerial Spray Program, no areas in Walworth or Rock County have been treated with aerial applications in 2020. Neither Walworth nor Rock County are expected to have aerial application conducted in 2020. Aerial spraying mainly occurs in western Wisconsin[76].

No agricultural aerial application services (i.e., crop-dusting services) were identified within Walworth or Rock County. Inquiries with local landowners determined that use of aerial applications services are not known to be used by anyone within or in close proximity to the Project.

Based on the maximum height of the facility equipment and the absence of airports as described above, no commercial aviation operation impacts are anticipated for the Project.

[76] Wisconsin Department of Agriculture, Trade and Consumer Protection. Gypsy Moth Aerial Spray Program. Accessed April 2020.

This is supported by 14 CFR 91.119[77], which stipulates minimum safe altitudes for aircraft while flying over other than congested areas is 500 feet above the surface; or in excess of 500 feet from any person, vessel, vehicle, or structure when operating above sparsely populated areas. This rule is superseded by 14 CFR 137.49[78] which states, "during the actual dispensing operation, including approaches, departures, and turnarounds reasonably necessary for the operation, an aircraft may be operated over other than congested areas below 500 feet above the surface and closer than 500 feet to persons, vessels, vehicles, and structures, if the operations are conducted without creating a hazard to persons or property on the surface[79].

No mitigation measures have been considered pertaining to commercial aviation as there are no aerial services provided in or within the region surrounding the Project Boundary.

5.14.3 *Agency Consultation*

5.14.3.1 *Identify any potential construction limitations and permit issues.*

5.14.3.2 *Provide a summary of the status of any FAA determinations with details on mitigation actions or how any unresolved problems with aircraft safety are being addressed (including generator tie line structures)*

5.14.3.3 *Provide a list of any structures requiring WisDOT high structure permits, and the status of any such permits.*

This section addresses the requirements of Section 5.14.3 of the Application Filing Requirements, including all subsections, i.e., 5.14.3.1 through 5.14.3.3.

Evaluation of proposed infrastructure in conjunction with nearby airports was conducted using the FAA's Notice Criteria Tool[80]. Results of the investigation revealed that solar infrastructure construction will not exceed notice criteria in accordance with CFR Title 14, Part 77.9[81].

CFR Title 14, Part 77.9[81] states that notice is required for any construction or alteration exceeding 200 feet above ground level, any construction or alteration within 20,000 feet of a public use airport which exceeds a 100:1 surface from any point on the runway of each airport with at least one runway more than 3,200 feet, any construction or alteration within 10,000 feet of a public use airport which exceeds

[77] Code of Federal Regulations. Doc. No. 18334, 54 FR 34294, Aug. 18, 1989, as amended by Amdt. 91-311, 75 FR 5223, Feb. 1, 2010.
[78] Code of Federal Regulations. Doc. No. 1464, 30 FR 8106, June 24, 1965, as amended by Doc. No. 8084, 32 FR 5769, Apr. 11, 1967; Amdt. 137-13, 54 FR 39294, Sept. 25, 1989; Docket FAA-2018-0119, Amdt. 137-17, 83 FR 9175, Mar. 5, 2018
[79] Code of Federal Regulations. Amdt. 137-3, 33 FR 9601, July 2, 1968.
[80] Federal Aviation Administration. Notice Criteria Tool. Accessed April 2020.
[81] Federal Register. Docket No. FAA-2006-25002; Amendment No. 77-13.

a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 feet, or within 5,000 feet of a public use heliport which exceeds a 25:1 surface.

The Ames (05WI), Melin Farms (3WI6), and Smilin' Sam's (WI66) private airports were identified within 20,000 feet of the Project Boundary. No other airports were identified within 20,000 feet of the Project boundary. The Ames, Melin Farms, and Smilin' Sam's private airports do not meet the criteria listed in §77.9 paragraph (d); therefore, Notice of Construction is not required under Title 14 Part 77.9

Based on Wisconsin Statutes Section 114.135(7)[82], the necessity of a permit for the erection of high structures is limited to objects that extend to a height greater than 500 feet aboveground within one mile of the location of the object, or above a height determined by the ratio of one vertical foot to 40 horizontal feet measured from the boundary of the nearest public airport or spaceport within the state. As there will be no structures constructed above 500 feet in height or within two miles of a public airport or spaceport for the Project, there is no need for a permit for the erection of high structures.

Overall heights of solar infrastructure will be between 867 feet and 1017 ft amsl when including the maximum height of 15 feet for solar panels. Project development will not trigger the need for any FAA Notice or WisDOT high structure permits. Therefore, no mitigation measures or other airport safety assurance measures have been considered for the Project.

5.15 Communications Towers

For the following sections, include in the assessment all facilities that make up the solar arrays as well as any structures that are part of a necessary generator tie line for the project.

5.15.1 *Cell phone communications*

5.15.2 *Radio broadcasts*

5.15.3 *Internet (WiFi)*

5.15.4 *Television*

5.15.5 *Doppler radar network*

5.15.5.1 *Cell phone communications*

Comsearch has developed and maintains comprehensive technical databases containing information on licensed mobile phone carriers across the US. Mobile phone carriers operate in multiple frequency bands and are often referred to as Advanced Wireless Service, Personal Communication Service, 700 MHz Band, Wireless Communications Service, and Cellular. They hold licenses on an area-wide

[82] Wisconsin State Statute Chapter 114 – Aeronautics and Astronautics.

basis which are typically comprised of several counties. For the cellular towers located within the Project Boundary, no setback distance is required from an interference standpoint due to the higher frequencies in which they operate within the UHF band. Electromagnetic interference (EMI) from a solar farm could be caused by an induction field, which is created by the AC electrical power and harmonics at the inverter of the Power Conversion Stations located throughout the facility. The propagation of the interference occurs over very short distances which are generally around 500 feet or less, and due to the low frequency (60 Hz) operation of the PV inverter, EMI from solar farms does not normally extend above 1 MHz. Full details are in **Appendix O**.

5.15.5.2 *Radio broadcasts*

Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the Project. No recommendation for mitigation is necessary for Darien, as the location of the solar arrays meets or exceeds the required distance separation from all licensed AM and FM broadcast stations near the Project Boundary. Full details are in **Appendix O**.

5.15.5.3 *Internet (WiFi)*

Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services. This report focuses on the potential impact of a proposed solar farm on licensed, proposed, and applied non-federal government microwave systems.

This study identified four microwave paths intersecting the Darien Solar Energy Center area of interest. The Fresnel Zones and Consultation Zones for these microwave paths were calculated and mapped. The lower edge of the zones for all paths were found to be at least 34 feet above ground throughout the Project Boundary. The solar panels have a maximum height of 15 feet. Therefore, all proposed solar array structures within the defined Project Boundary (AOI) have sufficient vertical clearance and avoid the risk of obstructing or causing harmful interference to the microwave paths in and around the Project Boundary. Full details are in **Appendix O.**

5.15.5.4 *Television*

Comsearch performed an Over-the-Air (OTA) TV Analysis and concluded that television reception interference was unlikely. Specifically, the inverters of a power conversion station will be installed away from residential areas to reduce the likelihood of EMI to households that may rely on OTA television service. At

minimum, a setback distance of 500 feet from any household is recommended. In the unlikely event that EMI is observed at a certain household following the construction of the solar farm, a high-gain directional antenna may be employed, preferably outdoors, and oriented towards the signal origin to mitigate the potential impact on OTA TV signal reception.

Both cable service and direct broadcast satellite service will be unaffected by the presence of the solar farm and may be offered to those residents who can show that their OTA TV reception has been disrupted by the presence of the solar farm after it is installed. Full details are in **Appendix O**.

5.15.5.5 *Doppler radar network*

Doppler radar works through the interpretation of data received from radar signals that have returned to the sending station after being reflected by an object in the path of the beam. Some of the things that can interfere with this beam to create a false positive interpretation include dense bird populations, adverse atmospheric conditions, and smoke plumes. Tall structures such as trees or buildings within the sight line of the sending position are also described as a growing problem by the National Oceanic and Atmospheric Administration. The development of a solar farm would have a maximum topographic impact of fifteen feet. Because the radar towers are elevated to avoid interference from topography (minimum height of the NEXRAD towers is 10 meters in height), Darien Solar believes there will be no impact from the development of a solar facility. Full details are in **Appendix O.**

5.15.6 *Describe mitigation measures should interference occur during project operation for any of the communications infrastructure listed above.*

In addition to the items analyzed in Sections 5.15.1.1 through 5.15.1.5, Darien Solar has commissioned an assessment of the emergency services in the Project Boundary by Comsearch to identify potential impact from the proposed solar farm. Comsearch evaluated the registered frequencies for the following types of first responder entities: police, fire, emergency medical services, emergency management, hospitals, public works, transportation and other state, county, and municipal agencies. Comsearch also identified all industrial and business land mobile radio systems and commercial E911 operators in proximity of the solar farm Project.

No recommendation with regard to coverage impact mitigation is necessary for any of the items referenced in Sections 5.15.1.1 through 5.15.1.5, or herein, as the proposed Project is not expected to cause any significant degradation in signal strength after construction. Further, appropriate military personnel identified in **Appendix O** have been contacted to verify the project has no impacts to military airspace. Full details are in **Appendix O**.

5.16 Electric and Magnetic Fields (EMF)

5.16.1 *Provide an estimate of the magnetic profile created by collector circuits. Estimates should be made using the following criteria:*

- *Show a separate profile for the typical buried collector circuits. If some trenches would support more than one buried circuit, provide a separate estimate for each bundled configuration.*
- *Show a separate profile for any overhead collector circuits.*
- *Assume all panels are working and project is producing at maximum capacity.*
- *Show EMF profile at 0 ft., 25 ft., 50 ft., and 100 ft. from the centerline of each circuit type modeled.*

5.16.2 *Provide an estimate of the magnetic profile created by any necessary electric transmission facilities (generator tie line). Estimates should be made using the following criteria:*

- *Show a separate profile for the typical buried collector circuits. If some trenches would support more than one buried circuit, provide a separate estimate for each bundled configuration.*
- *Show a separate profile for any overhead collector circuits.*
- *Assume all panels are working and project is producing at maximum capacity.*
- *Show EMF profile at 0 ft., 25 ft., 50 ft., and 100 ft. from the centerline of each circuit type modeled.*

Magnetic fields, measured in milliGauss (mG), are generated when electricity flows on a conductor such as an underground collector circuit in this case. The intensity of the magnetic field is dependent on the voltage and load on the line and rapidly decreases with the distance from the conductors. The magnetic field generated from the conductors of an electrical circuit extends from the energized conductors to other nearby objects. The load on a circuit varies throughout the day and therefore the magnetic field level will also vary from hour to hour. For the purposes of this study, maximum loading was assumed for the unique line segments associated with this Project. Considerable research has been conducted to determine whether exposure to 60 Hz (the electrical grid frequency in the United States) magnetic fields cause negative health effects. These studies have shown no statistically significant association. The PSC has also concluded that there is no correlation between magnetic fields and negative health effects.

Appendix N details the magnetic field profiles for each unique underground circuit configuration at the Project's full capacity. A separate profile was added for the proposed transmission line. Predicted electric fields are de minimus due to the design of the underground collection system. Predicted magnetic fields are below levels associated with typical household electric appliances and tools.

5.17 Noise

Pre- and post-construction noise studies are required for all electric generation projects. Noise measurement studies must be approved by PSC staff.

5.17.1 *Provide existing (ambient) noise measurements and projected noise impacts from the project using the PSC's Noise Measurement Protocol. The PSC Noise Measurement Protocol can be found on the PSC website at:* https://psc.wi.gov/SiteAssets/ConventionalNoiseProtocol.pdf.

A pre-construction noise analysis was conducted for the Project by Hankard Environmental. The analysis consisted of determining the location of all noise-sensitive receptors located near the Project (primarily houses), measuring existing noise levels within the Project study area, and predicting both construction and operational noise levels. The analysis was carried out in accordance with the PSC's Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electrical Power Plants. For more detailed information, refer to the Pre-Construction Noise Analysis for the Proposed Darien Solar Farm, **Appendix P**, which includes recent operational noise measurements performed by Hankard Environmental at other Invenergy-operated solar projects which have served to calibrate and validate the model used by Hankard here.

Noise-producing elements of the operation of the Project include inverters, transformers and the BESS. The two main power transformers are located at the Project's substation near the middle of the Project. Operational monitoring as shown that tracking motors contribute negligible quantities of noise. Wisconsin siting rules require the inclusion of Alternate sites, so the Project layout version studied for this analysis includes all 365 MW.

Noise-producing equipment to be employed during construction includes typical bulldozers, graders, excavators, trucks, vibratory post setters, and cranes.

In summary, the Pre-Construction Noise Analysis shows that all residences and other noise-sensitive receptors within the Project Boundary are predicted to experience less than 40 dBA at night and less than 45 dBA during the day from the Project.

5.17.2 *Provide copies of any local noise ordinance.*

Rock County Code of Ordinances Chapter 3 Part 2 - 3.202 *Unnecessary and Annoying Noise* can be found attached in **Appendix I**. Walworth County Code of Ordinances contains a *Noise criteria* subsection specific to wind energy facilities; however, no noise criteria was identified for solar energy facilities or other general construction noise regulations.

5.17.3 *Provide equipment manufacturer's description of noise attenuating methods and materials used in the construction of proposed facilities.*

See Section 5.17.1 and **Appendix P** for detailed information responsive to this section.

5.17.4 *Describe how noise complaints would be handled.*

Darien Solar will meet with any local resident submitting a noise complaint to fully understand the complaint. Observations of excess noise can sometimes indicate the need to repair or maintain equipment, and Darien Solar will determine if the noise is the result of a mechanical issue that can be repaired. If not, Darien Solar will attempt to negotiate a mutually agreeable solution.

5.17.5 *Discuss any mitigation measures that would be used to address noise complaints during the operation of the project.*

With a predicted maximum noise level of less than 45 dBA during daytime, Darien believes it unlikely that the Project will elicit noise complaints that require mitigation.

5.18 Solar Panel Glint or Glare

5.18.1 *Provide an analysis showing the potential for glint or glare from a typical project solar panel, as well as from the project as a whole. Include the following:*

- *The analysis should list the basic assumptions used and the methodology/software used for creating the glint or glare analysis.*
- *The analysis should evaluate impacts to aircraft and air traffic controllers from any impacted airports.*
- *The analysis should also examine the risk of glint or glare to local residents and road users in the project area.*
- *The analysis software may indicate that proposed array areas are large enough to impact the accuracy of glare results. If this warning is encountered in the modeling, the applicant should break the affected array areas into smaller sub-arrays and perform the glare analysis using these smaller sub-arrays.*
- *The analysis software may model different amounts of glare at observation points with different elevations. For any stationary observation points that could have human occupancy at higher elevations (e.g. a second story of a residence), the applicant should model multiple elevations for those stationary observation points.*
- *The analysis software may model different amounts of glare depending on the assumed heights of the solar panels. The applicant should model panel elevations for at least two different solar panel heights to establish a range of potential glare results.*

- *The analysis software may model different amounts of glare depending on the assume rest angle of the solar panels. The applicant should model at least two resting angle configurations, including one configuration with a resting angle set at between zero and five degrees.*

A glare analysis for the Project is included in **Appendix Q**. The ForgeSolar PV planning and glare analysis software, GlareGauge[83], was used to characterize the potential of glare from PV panels as viewed by a receptor (i.e., observer). For glare to reach a receptor, the observer must be able to see the top of a PV module, the panels must be angled such that they reflect the sunlight towards the observer, and the view of the panels must be clear of obstruction. Solar PV modules are designed to absorb light to produce energy, not reflect light. They are also manufactured with a non-reflective film.

Initial modelling in GlareGauge used the following assumptions: glare analyses did not account for physical obstructions between reflectors and receptors (e.g., buildings, topography or vegetation) and the glare hazard determination relied on approximations of observer eye characteristics, view angle, and blink time. A model of the topography and solar array was developed in ArcGIS to determine line of sight between the Key Observation Points (KOPs) and the PV panels to eliminate areas that would be blocked from view by the terrain.

Two hundred sixteen (216) KOPs were established within the Project boundary for glint and glare modelling (See Figure 13 and Table 1 in **Appendix Q**). The KOPs were selected to be spatially representative of the Project Boundary and consisted of non-participating occupied residences within 500 feet of an array. Each modeled residence was assigned two numbers, an odd number to represent the first floor (5-foot height above ground) of the residence and an even number to represent the second floor (15-foot height above ground). Additionally, a total of 49 route segments among 11 different roads in proximity to the Project were modeled. Each KOP and route segment was assessed for glare with the array resting angle at 5 degrees and using a 6-foot array height. An alternative sampling using a 0 degree resting angle and 9-foot array height was also completed.

The model classifies the impact of glare for an observer into three color-coded levels: low potential for producing an after-image (green), potential for producing an after-image (yellow), and potential for permanent eye damage (red). The model did not identify any potential for permanent eye damage instances (red), but did identify instances of low potential for producing an after-image (green) at eight KOPs and one road segment; and instances of *potential for producing an after-image* (yellow) glare at 35 KOPs and glare from three arrays on one route for arrays having a resting angle of 5 degrees (Tables 5A-5B in **Appendix Q**). The remaining KOPs and road

[83] ForgeSolar. GlareGauge Comprehensive Solar Glare Analysis Software. Accessed 2020.

segments are not expected to experience glint or glare effects. The sampling of arrays modeled at 9 feet essentially produced the same glare as arrays modeled at 6 feet; however, the sampling of arrays modeled at a 0 degree resting angle produced significantly more glare.

5.18.2 *In the event of an inquiry or complaint by a resident in or near the project area, describe what modeling or other analysis would be used to evaluate the possibility of unreasonable panel glint or glare at the residence.*

In the event of a complaint about glare by a resident within or outside of the Project boundary, GlareGauge modelling will likely be used to assess the extent and time of day of glare at the point of concern and to determine potential mitigation options.

5.18.3 *Describe mitigation options available to reduce unreasonable panel glint or glare.*

As the PV panels will be mounted to single-axis tracking systems, the surface of the PVs will be in-line with the position of the sun; thereby, reducing the potential for steep, glancing angles (i.e., chance for glare) compared to fixed-tilt systems. If glint or glare prove to be problematic for an observer, Darien may use fencing, vegetation, or other objects of obstructive nature to mitigate glint or glare effects, or possibly slightly adjust the resting angle.

Darien Solar expects nighttime resting angles to be consistent across the Project Boundary and will seek to minimize any potential impacts from glint or glare during final engineering of the site. The planned overnight resting angle for the proposed solar arrays varies across tracker manufacturers and the planned resting angle will be determined during final design engineering. The resting angle is likely to be approximately 0 degrees to 30 degrees.

6. Local Government Impacts

6.1 Joint Development and Other Agreements

6.1.1 *Provide a summary of major agreement items agreed upon in any Joint Development Agreements (JDA) or other type of agreement including:*

6.1.1.1 *All services to be provided by the city, town, and/or county during construction and when the plant is in operation (e.g. water, fire, EMS, police, security measures, and traffic control).*

6.1.1.2 *Specifically, address community and facility readiness for incidents such as fires.*

Darien Solar is engaged with Walworth and Rock Counties and the Towns of Darien and Bradford in negotiations on a possible Joint Development Agreement (JDA), and anticipates these discussions to yield an agreement for subjects such as:

- Materials delivery haul routes
- Driveway permits

- Road maintenance and repair
- Stormwater management
- Reimbursement of town or county costs
- Replacement of lost tax receipts for taxing bodies which do not receive Utility Aid Shared Revenue funds.
- State Utility Aid Shared Revenue payments to hold harmless for county and municipal governments
- Decommissioning
- Construction period public safety and EMS service
- Site lighting
- Insurance issues
- Dispute resolution process
- Snowmobile paths

Darien Solar expects that the Joint Darien Fire/EMS Department will provide fire and emergency services to the Project during construction. If needed, the Rock and Walworth County Sheriff's Offices are expected to provide traffic control and security services.

Darien Solar has proposed in draft agreements to meet with local government officials and emergency responders at least 60 days prior to construction to present final plans for use of public roads, location of equipment laydown yards, finalize construction scheduling and discuss safety practices and coordinate local emergency response capabilities.

Construction of a solar photovoltaic electrical generating facility does not create any unique or especially dangerous environments or situations for local emergency responders. Darien Solar will require that all contractors on the site during construction meet all state, federal and industry best practice standards for employee and public safety. Darien Solar intends to communicate regularly with site area Emergency Response agencies to provide project and facility familiarization and establish communication channels. Should any aspect of the Project construction or operations present unfamiliar equipment or situations for responders, Darien Solar will arrange for adequate professional training to deal with those concerns.

Regarding the potential BESS, safe operation of advanced energy storage systems begins with safe equipment and compliance with safety codes and regulations. Any potential equipment suppliers to Darien Solar manufacture to stringent quality standards, and equipment at the Project must be tested and certified by third party professionals. As a member of the U.S. Energy Storage Association's Corporate Responsibility Initiative, Invenergy is an industry leader in advancing responsible supply chain practices and emergency response planning that would be utilized at Darien Solar.

Darien Solar will develop a BESS Emergency Response Plan (ERP) with local authorities. A BESS ERP would typically require quarterly safety drills and annual safety training with local first responders.

The BESS would be equipped with a battery management system (BMS) that provides constant monitoring of key safety parameters and can automatically stop operations if necessary. In a scenario where the Project remains operated by Darien Solar, any alarm also notifies the Invenergy Control Center, which has redundant remote shut-down capability and will alert local Project technicians to investigate further or notify local emergency services if conditions require.

An automatic fire suppression system would be installed as part of a BESS at Darien Solar. This system would use U.S. Environmental Protection Agency-approved suppression agents certified for battery storage systems and meet all relevant codes and regulations, including those set by the National Fire Protection Association.

The final agreement may include information not outlined in the preceding list as a custom approach is taken to address local concerns.

6.1.2 *Provide a copy of all agreements with local communities (e.g. JDA).*

While negotiations are ongoing, agreements are not yet finalized. Darien Solar has proposed using the Badger Hollow Local Operating Contract and/or Paris Solar MOUs as a starting point for discussions. These agreements have been shared with the Rock and Walworth Counties and the Towns of Bradford and Darien and are included in **Appendix AD**.

6.2 Infrastructure and Service Improvements

6.2.1 *Identify any local government infrastructure and facility improvements required (e.g. sewer, water lines, railroad, police, and fire).*

No additional infrastructure or facility improvements are expected to be required for the construction and operation of the Project.

6.2.2 *Describe the effects of the proposed project on city, village, town and/or county budgets for these items.*

The impact to budgets of local governments will be positive due to increased revenue from the Shared Revenue payment and ancillary impacts such as increase in local jobs, landowner payments, and increased spending locally during the construction period.

6.2.3 *For each site provide an estimate of any revenue to the local community (i.e. city, village, town, county) resulting from the project in terms of taxes, shared revenue, or payments in lieu of taxes.*

In summary, under Wisconsin's current Utility State Aid Shared Revenue formula, the state would provide $4,000 per MW per year, or $1,000,000 for the Project, with Walworth and Rock Counties receiving 58% of the total and the Towns of Darien and Bradford 42%.

Darien Solar has proposed a "hold harmless" provision in the draft MOU, such that the Project would make up for all local taxing bodies that will not receive Shared Revenue finds, including annual increases during the life of the project, subject to Commission approval if the Project becomes owned by a regulated utility in Wisconsin.

6.2.4 *Describe any other benefits to the community (e.g. employment, reduced production costs, goodwill gestures).*

Local revenue and other benefits to the community from the Project are presented at length in the Economic Impact Report (**Appendix M**).

7. Landowners Affected and Public Outreach

7.1 Contact lists

Provide a separate alphabetized list (names and addresses) in Microsoft Excel for each of the groups described below:

7.1.1 *Property owners and residents within the project boundary and a separate list of property owners and residents from the project boundary out to a distance of one mile. It is strongly recommended that applicants consult with PSC staff in order to ensure that the format and coverage are appropriate considering the project type, surrounding land use, etc.*

7.1.2 *Public property, such as schools or other government land.*

7.1.3 *Clerks of cities, villages, townships, counties, and Regional Planning Commissions directly affected. Also include on this list the main public library in each county the proposed facilities would occupy.*

7.1.4 *Local media for the project area, at least one print and one broadcast.*

Appendix R addresses the requirements of Section 7.1 of the Application Filing Requirements, including all subsections, i.e. 7.1.1 through 7.1.4.

7.2 Public Outreach and Communication

7.2.1 *List and describe all attempts made to communicate with and provide information to the public. Describe efforts to date and any planned public information activities.*

7.2.2 *Provide copies of public outreach mailings or website addresses for project pages.*

7.2.3 *Describe plans and schedules for maintaining communication with the public (e.g. public advisory board, open houses, suggestion boxes, and newsletters).*

Landowners – Project representatives have been meeting with area landowners to discuss leasing since fall 2017. Landowner dinner meetings for participating and potentially participating landowners were held on December 11, 2018, March 28, 2019 and October 10, 2019. Beginning in early 2020, Darien Solar has employed a part-time Local Representative who has held multiple one-on-one meetings with participating and non-participating landowners. She also maintained office hours at 20 Wisconsin St, Darien, WI, on Tuesdays from 2:00 PM to 6:00 PM and Thursdays from 9:30 AM to 1:30 PM. Office hours were suspended conforming to Wisconsin Department of Health Services Emergency Order 12. Special appointments are also available as needed. The Project has formed a group called "Friends of Darien" made up of participating landowners and other Project supporters to share information on the project, answer questions, and get feedback about local perception of the project.

Regulatory Agencies – Beginning in 2018, meetings and discussions concerning the Project and possible permitting issues were held with staff from the Public Service Commission of Wisconsin, Department of Agriculture, Trade and Consumer Protection (DATCP) and WDNR to discuss potential issues and discuss site vegetation management.

Local Governmental Units – Beginning in mid-2017 meetings to describe the possible solar project were held with local elected representatives for the site area, such as Walworth and Rock County Representatives (County Administration, County Executive, Supervisors, general counsel), Town of Darien (Board Members, Chairman, general counsel), the Village of Darien (Board of Trustees), the Town of Bradford (Board members, Chairperson), and the Town and City of Delavan (Administration and Public Works).

General Public – Project representatives have shared information with the general public via presentations to the Town of Darien, the Town of Bradford, the Delavan Lake Area Chamber of Commerce, The Delavan Darien Rotary Club, the Walworth County Economic Development Alliance, the Elkhorn Rotary Club, the UW Whitewater Sustainability Office and the Darien Cornfest Committee. Representatives from Darien Solar shared information with the public during office hours at both the Darien Solar office and a local establishment providing project specific information and discussion. An "office warming" event was hosted at the Darien Solar office with invitations mailed to local residents within the Project Boundary; to participating landowners, potential participants and neighbors alike. Holiday postcards were sent to landowners in the Project Boundary

Local Business Community – Darien Solar Farm is a member of the Delavan Lake Area Chamber of Commerce.

Dates for Appendix S

Mailings – Below is a list of mailings sent to project participants and neighbors within the Project Boundary:

Date	Mailing Title
12/15/2019	Holiday Postcard
12/18/2019	Local Representative Introduction Letter
1/29/2020	Office Warming Invitation
2/21/2020	Friends of Darien Solar Meeting Invite (Cancelled due to Covid-19)
4/15/2020	Friends of Darien Solar Virtual Meeting Invite Packet (email)
4/25/2020	Friends of Darien Solar Virtual Meeting Invite Packet (mail)
4/28/2020	Friends of Darien Virtual Reminder Notice (email)
5/7/2020	Friends of Darien Solar Follow Up/Thank You Letter (email)
5/8/2020	Friends of Darien Solar Follow Up/Thank You Letter (mail)

Meetings/Events – Below is a list of meetings and events held throughout the local community:

Date	Organization/ Meeting Participant
7/26/2017	WI Senate (R - Whitewater) Steve Nass
7/27/2017	Town of Bradford Chair- Sharon Douglas
7/27/2017	Town of Bradford Clerk- Sandra Clarke
8/2/2017	Rock County Supervisor, District 7- Hank Brill
8/3/2017	Walworth County Supervisor, District 9-Susan Pruessing
8/18/2017	Walworth County Administrator- David Bretl
8/29/2017	Walworth County Supervisor, District 5- Charlene Staples
8/29/2017	Walworth County Soil Conservationist- Brian Smetana
8/29/2017	Town of Darien Chairperson- Cecil Logterman
9/6/2017	Town of Darien Supervisor- Daniel Kilkenny
9/26/2017	Landowner Presentation - Darien Public Library
9/27/2017	Walworth County Economic Development Alliance- Derek D'Auria
10/31/2017	Town of Darien Chairperson- Cecil Logterman
11/1/2017	Walworth County Deputy Director, Planning and Land Use- Shannon Haydin
12/27/2017	Town of Bradford Chair- Sharon Douglas
1/16/2018	Town of Bradford Board
1/18/2018	Walworth County Zoning Committee

Date	Organization/ Meeting Participant
2/15/2018	Walworth County Zoning Committee
7/19/2018	Walworth County Zoning Committee
8/16/2018	WI Assembly- Amy Loudenbeck (R - Clinton) District 11
8/22/2019	Michael Fields Agricultural Institute Intro - Perry Brown
9/16/2019	Walworth County Supervisor, District 5-Charlene Staples
10/10/2019	Walworth County Administrator- David Bretl, Supervisor, District 5-Charlene Staples
10/4/2019	Town of Darien Clerk- Marilyn Larson
10/7/2019	WI Senate Steve Nass (R - Whitewater) District 11 - Chief of Staff
10/7/2019	WDNR Consultation
10/11/2019	Village of Darien Administrator/Clerk-Treasurer- Rebecca Houseman LeMire
10/25/2019	Nature at the Confluence/Friends of Turtle Creek Introduction - Therese Oldenburg
10/25/2019	WI Assembly- Amy Loudenbeck (R - Clinton) District 11
10/31/2019	Rock County Assistant Administrator- Randy Terronez
11/1/2019	Landowner Dinner (Participating Only)
11/4/2019	Town of Bradford Chair- Sharon Douglas
11/5/2019	Walworth County Executive Director, Economic Development Alliance- Derek D'Auria
11/5/2019	Town of Darien - Town Board Presentation
11/11/2019	WDNR Real Estate Team Conference Call - Jim Jackley, Nathan Holubeck
11/18/2019	Village of Darien - Board of Trustees Presentation
11/20/2019	Walworth County Supervisor, District 5-Charlene Staples
12/17/2019	Town of Bradford Chair- Sharon Douglas
12/19/2019	Town of Delavan Meeting with John Olson
1/7/2020	Town of Darien Board of Supervisors Meeting
1/8/2020	Elkhorn Rotary Project Presentation
1/14/2020	Delavan Lake Area Chamber of Commerce Member Meeting
1/15/2020	CPCN Pre-Application Meeting - PSCW, WDNR
2/4/2020	Town of Darien Board of Supervisors Meeting
2/11/2020	Delavan Lake Area Chamber of Commerce Ribbon Cutting & Presentation
2/12/2020	Delavan Darien Rotary Project Presentation
2/13/2020	Office Warming
2/17/2020	Village of Darien Board of Trustees
2/19/2020	City of Delavan Meeting - Denise Pieroni & Mark Wendorff
3/3/2020	Town of Darien Board of Supervisors Meeting
3/10/2020	Cornfest Committee Member Meeting
3/10/2020	Michael Fields Agricultural Institute Meeting - Perry Brown
3/25/2020	UW Whitewater Sustainability Virtual Meeting

Date	Organization/ Meeting Participant
4/14/2020	USFWS Consultation
4/17/2020	Town of Darien JDA Discussion - Town Chair, Counsel and Public Works
4/20/2020	Virtual Village of Darien Board of Trustees
4/22/2020	Climate Commitment Virtual Meeting UW-Whitewater Sustainability
4/22/2020	Gateway Technical College Earthday Facebook Virtual Event
4/28/2020	Virtual Friends of Darien Meeting
5/5/2020	Virtual Town of Darien Board of Supervisors Meeting
5/12/2020	USFWS, WDNR, PSC Consultation
5/13/2020	Delavan Darien Virtual Rotary Meeting
5/13/2020	Sierra Club Virtual Chat - All Kids Outdoors

Online - The Darien Solar Facebook presence is nested within a single, statewide page called "WisconSUN." This is updated regularly to share solar information, receive questions and comments from the public, and further communicate on Project status. The Facebook pages can be found at https://www.facebook.com/WisconSUN.

Print - Darien solar has posted print advertisements in local establishments to encourage visitors from the public to visit the Darien Solar office. These advertisements have been updated to conform to WDHS Emergency Order 12 and encourage community members to reach out to the Local Representative via phone or email for the duration of its issuance. The posting locations are:

Posting Locations	Address
Deb's Country Cafe	24 W Beloit St, Darien, WI 53114
Darien Post Office	1 E Beloit St, Darien, WI 53114
Darien Public Library	47 Park Avenue Darien, WI 53114
Darien Super Mart	500 N Walworth St, Darien, WI 53114
West Wind Diner	620 N Walworth St, Darien, WI 53114
Aram Public Library	404 E Walworth Ave, Delavan, WI 53115
Darien Solar Energy Center Office	20 Wisconsin Street, Darien, WI 53114
Country Station BP	W9003 US-14, Darien, WI 53114
Suds N Dud's	15 W Beloit St Darien, Wisconsin 53114

Examples of project mailings and other community informational material is attached in **Appendix S**.

As evidenced by the pre-application communication efforts put forth, Darien Solar recognizes the importance of community outreach and information sharing.

7.2.4 *Identify all local media that have been informed about the project.*

Local media informed about the Project include the Janesville Gazette, Lake Geneva News, The Delavan Enterprise, and WSLD 104.5 radio station.

7.2.5 *Describe the ongoing ways that the public would be able to communicate with plant operators or the company. Describe any internal process for addressing queries or complaints.*

Throughout the remainder of the Project's development, the Project team will continue communication via a continuation of advertisements, social media, mailings, local governmental board meeting attendance, local service club presentations, and local office/local project representative presence.

When construction commences, Darien Solar will select a Construction Site Manager as the primary local point of contact. This person will be available for local inquiries via phone and email.

During the operation of the Project, members of the community will be able to communicate with project personnel through the operations & maintenance facility, which will be centrally located near the project substation and house full time maintenance personnel. Any maintenance or operations related questions can be directed to the maintenance staff at this location.

8. Waterway/Wetland Permitting Activities

Section 8.0 covers information required by DNR for waterway, wetland, and erosion control permits. The following subsections apply to both proposed and alternate solar array sites. Questions about this section should be directed to DNR Office of Energy staff.

8.1 Waterway Permitting Activities

This section should be consistent with the waterways included in DNR Tables 1 and 2 and associated maps. See page iii in this document on what to include in DNR Tables 1 and 2 regarding waterway resources.

8.1.1 *Identify the number of waterways present, including all DNR mapped waterways and field identified waterways, assuming all waterways are navigable until a navigability determination is conducted (if requested). Provide an overall project total, as well as broken down by the primary/preferred site and the alternate site and their associated facilities.*

A desktop delineation of wetlands and waterways for the overall Project Boundary was completed for preliminary planning and familiarity of what resources may be around the land proposed for development. The desktop delineation was completed using available public resources such as USGS topography, National Wetlands Inventory Mapping (NWI), National Hydrography Dataset flowlines and waterbodies (NHD), Wisconsin Wetland Inventory Mapping (WWI), WDNR 24K Hydrography

Dataset, FEMA floodplain mapping, Digital Elevation Model mapping, Natural Resource Conservation Service (NRCS) Soil Survey Geographic database (SSURGO2) for Rock and Walworth Counties, and several years of aerial photography from FSA, Google Earth, and Rock and Walworth County imagery. Wetlands and waterways were desktop-delineated using the level one routine determination method set forth in the USACE 1987 Manual[84] and the Northcentral & Northeast Regional Supplement[85].

For purposes of fine-scale site design and assessment of any Project impacts, a field delineation of wetlands and waterways was completed for a "delineation area" which was created around the proposed Project construction footprint. The field delineation occurred on multiple dates between October 21 and 25, 2019 and between April 20 and 21, 2020. The desktop delineated wetlands and waterways are referenced for the portion of the Project Boundary outside of the field delineation area on maps (**Figures 4.1.6.1**, **8.3.1** and **8.3.2**-**Appendix B**) and DNR tables (**Appendix U**). **Figures 4.1.6.1** and **8.3.3** (**Appendix B**) show which delineation methods were used within the Project Boundary. One 10-acre corridor within the proposed Project footprint was not field delineated as collection lines were only recently proposed in this location. No wetlands or waterways were identified in this location from the desktop delineation. A field wetland delineation will be conducted in this area should Project infrastructure be planned in this area as part of final design.

A summary of the waterways within the Project Boundary is included in DNR Table 2 (**Appendix U**) and shown on **Figures 4.1.6.1**, **8.3.1** and **8.3.2** (**Appendix B**). DNR Table 2 indicates whether a waterway is associated with the Primary or Alternate Areas or is within the greater Project Boundary. A total of eleven waterways occur within the Project Boundary. Two waterways, totaling 0.57 miles were identified within the Project Boundary during field delineation efforts. Both waterways correspond to DNR-mapped WBIC flowlines. Portions of nine WBIC flowlines that occur within the Project Boundary were not field delineated due to these waterways being located outside of the field delineation area. All WBIC-flowlines were assumed navigable. One additional waterway (WC-01) was identified during field delineation but was located outside of the Project Boundary and was not included in DNR Table 2.

Of the eleven waterways that occur within the Project Boundary, one is associated with the Alternate Arrays and is Turtle Creek (WBIC flowline 790300). The proposed Alternate Array layout contains four underground collection line bores that cross

[84] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
[85] U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

under Turtle Creek. No waterways are associated with the Primary Arrays. The other ten waterways (WBIC flowlines) are located in the greater Project Boundary, outside of the Project footprint.

8.1.2 *Identify any waterways in the project area that are classified as Outstanding or Exceptional Resource Waters, Trout Streams, and Wild or Scenic Rivers.*

As indicated in **Figure 4.1.6.1** (**Appendix B**), a portion of Turtle Creek located in the western portion of the Project Boundary is classified as an Exceptional Resource Water starting at stream mile 0.95. No impacts are proposed to Turtle Creek or any adjacent wetland features. No features identified as Outstanding Resource Waters, Trout Streams, or Wild or Scenic Rivers were identified in the Project Boundary.

8.1.3 *State if you are requesting DNR staff perform a navigability determination on any of the DNR mapped waterways and/or field identified waterways that would be impacted and/or crossed by project activities. If a navigability determination is requested, provide the following information in a separate appendix with the application:*

- *A table with columns for:*
  - *The crossing unique ID,*
  - *Waterbody Identification Code (WBIC) for each waterway (found in the Surface Water Data Viewer or in the GIS data for the DNR mapped waterways),*
  - *Latitude and longitude for each crossing,*
  - *Waterway name,*
  - *Waterway characteristics from field investigation, and;*
  - *Any other pertinent information or comments.*
- *Site photographs, clearly labeled with the photo number, direction, date photo was taken, and crossing unique ID. A short description of what the photo is showing, and any field observation must also be included in the caption.*
- *Project map showing the following:*
  - *Aerial imagery (leaf-off, color imagery is preferred),*
  - *DNR mapped waterways (labeled with their unique ID),*
  - *Field identified waterways (labeled with their unique ID),*
  - *the location of each site photograph taken (labeled with the photo number),*
  - *the project area, and;*
  - *Call out box/symbol for each DNR mapped waterway crossing where the navigability determination is requested (labeled with their unique ID).*

No navigability determination requests are being made for the Darien Project; all waterways are assumed navigable.

8.1.4 *For both the primary/preferred and alternate sites and their associated facilities, provide the following:*

8.1.4.1 *The number of waterways that would be crossed by collection lines and specify the installation method (e.g. X waterways would be bored, Y waterways would be trenched, etc.).*

As summarized in the Table 1 (**Appendix U**) Supplement to DNR Form 3500-53, and as shown on **Figures 8.3.1** and **8.3.2** (**Appendix B**), four collection line directional bores are proposed under one navigable waterway (Turtle Creek-WBIC flowline 790300). All of these collection line crossings are associated with the Alternate Arrays. All other waterways present within the Project Boundary are not associated with the Primary or Alternate Arrays.

8.1.4.2 *The number of waterways that would be traversed with equipment for temporary access roads, and how that crossing would be accomplished (e.g. temporary clear span bridges (TCSB), use of existing bridge or culvert, etc.).*

No impacts to waterways are proposed for temporary access roads.

8.1.4.3 *The number of waterways that would be impacted for permanent access roads, and how that crossing would be accomplished (e.g. placement of culvert, ford, permanent bridge, etc.).*

No impacts to waterways are proposed for permanent access roads.

8.1.4.4 *The number of waterways that would be impacted and/or crossed by fence installation and footings.*

No impacts to waterways are proposed for fences.

8.1.4.5 *The number of waterways that would be impacted and/or crossed by other construction activities or facilities (e.g. placement of a stormwater pond within 500 feet of a waterway, stream relocation, etc.).*

No impacts to waterways are proposed from other construction activities. The proposed stormwater pond is more than 500 feet from a waterway.

8.1.5 *Provide the methods to be used for avoiding, minimizing, and mitigation construction impacts in and near waterways. This discussion should include, but not be limited to, avoiding waterways, installation methods (i.e. directional bore versus open-cut trenching or plowing), equipment crossing methods (i.e. for temporary access, the use of TCSB versus temporary culvert; for permanent*

access, the use of permanent bridge versus permanent culvert), sediment and erosion controls, invasive species protocols for equipment, etc.

Impacts to waterways have been avoided through siting and construction planning. All collection line crossings of waterways will be directionally bored to avoid impacts. Appropriate sediment and erosion control measures as detailed in the ECSWMP will be put in place to avoid sedimentation into waterways (**Appendix L**). HDD equipment, trenching equipment and backhoes will be power washed before mobilization to the site to prevent introduction of invasive species from off-site sources and equipment will be manually cleaned of plant materials between work zones where invasive species have been identified within the Project site per the VMS (**Appendix W**).

8.1.6 *Describe fence crossings of waterways, including the location of support pilings (i.e. in waterway channel, at the top of the waterway banks) and the amount of clearance between the bottom of the fence and the ordinary high-water mark. Also describe any existing public use of the waterway and how this public use may be impacted by the fence crossing.*

No fence crossings of waterways are proposed.

8.1.7 *For waterways that would be open-cut trenched, provide the following:*

8.1.7.1 *The machinery to be used, and where it would operate from (i.e. from the banks, in the waterway channel) and if a TCSB is needed to access both banks.*

8.1.7.2 *The size of the trench (length, width, and depth) for each waterway crossing.*

8.1.7.3 *The details on the proposed in-water work zone isolation/stream flow bypass system (i.e. dam and pump, dam and flume, etc.).*

8.1.7.4 *The details on the proposed dewatering associated with the in-water work zone isolation/stream flow bypass system, including where the dewatering structure would be located.*

8.1.7.5 *The duration and timing of the in-stream work, including the installation and removal of the isolation/bypass system and the trenching activity.*

8.1.7.6 *How impacts to the waterway would be minimized during in-water work (e.g. energy dissipation, sediment controls, gradually releasing dams, screened and floating pumps, etc.).*

8.1.7.7 *How the waterway bed and banks would be restored to pre-existing conditions.*

The following addresses prompts 8.1.7.1 through 8.1.7.7. All utility line crossings of waterways are expected to be directionally bored. No open-cut trenching across waterways is proposed and no other crossings of waterways from access roads or fences is proposed.

8.1.8 *For waterways that would be directionally bored, provide the following:*

8.1.8.1 *Where the equipment would operate from (e.g. from upland banks, from wetland banks, etc.) and if a TCSB is needed to access both banks.*

Entry points and exit points will be positioned at least ten feet outside of the established waterway boundaries and will be moved further away when appropriate to achieve the proper depth required for each bore and to avoid tree lines or other obstacles.

8.1.8.2 *The location and size of any temporary staging and equipment storage.*

Temporary staging and equipment storage will be located in upland areas in an area of up to five hundred feet by thirty feet, which includes area to stage the bore pipe.

8.1.8.3 *The location and size of bore pits.*

Bore pits will generally be twenty feet in length, twenty feet wide, and four feet deep. Installation depths will be at least five feet below the bottom of the waterway crossing.

8.1.8.4 *Provide a contingency plan for bore refusal and a plan for the containment and clean-up of any inadvertent releases of drilling fluid (e.g. a frac-out).*

Typical crossing details and a standard frac-out plan is included in **Appendix D**. In the event of a refused boring, the boring will be re-attempted from the same boring pit on a slightly different path than the refused bore. In the case it is determined that the area of the refused bore is not adequate for a bore, the bore location will be moved to a new location and the bore re-attempted, which may require an additional bore pit at that location.

Appendix D describes in detail the response actions for clean-up of inadvertent releases of drilling fluid, but in general the actions to be taken include ceasing work to assess the nature of the release, containment of the released fluids, and if in a regulated feature, notification of the appropriate agency(ies).

8.1.9 *For waterways that would have a TCSB installed across them, provide the following:*

8.1.9.1 *A description of the TCSB proposed, including dimensions, materials, and approaches.*

8.1.9.2 *State if any waterways are wider than 35 feet, and/or if any in-stream supports would be used.*

8.1.9.3 *State how the TCSB placement and removal would occur (e.g. carried in and placed with equipment, assembled on site, etc.) and if any disturbance would occur to the bed or banks for the installation and removal.*

8.1.9.4 *The duration of the TCSB and when installation and removal would occur.*

8.1.9.5 *Describe sediment controls that would be installed during the installation, use, and removal of the TCSBs.*

8.1.9.6 *Describe how the TCSBs would be inspected during use, and how they would be anchored to prevent them from being transported downstream.*

8.1.9.7 *State if the required five foot clearance would be maintained, or if the standards in Wis. Admin. Code NR 320.04(3) would be complied with.*

8.1.9.8 *How the waterway banks would be restored when the TCSB is removed.*

No temporary clear span bridge crossings of waterways are proposed.

8.1.10 *Describe the proposed area of land disturbance and vegetation removal at waterway crossings. Include a description of the type of vegetation to be removed, and if this vegetation removal would be temporary (allowed to regrow) or permanent (maintained as cleared).*

No waterway crossings are proposed that would require vegetation removal aside from that described for the directional bore pits in Section 8.1.8.3. An approximately twenty by twenty-foot area will be temporarily cleared of vegetation for bore pits. Bore pits will be located in uplands at least ten feet from waterways and will be moved further away when appropriate to achieve the proper depth required for each bore. Tree and shrub clearing is not anticipated for bore pits but if necessary will be minimized to the extent practicable. Darien Solar expects that herbaceous vegetation will be removed temporarily and will be replanted and/or allowed to regrow after construction in accordance with the Vegetation Management Strategy.

8.1.11 *If any of the following activities are proposed, provide the information as detailed on the applicable permit checklist:*

- *Culvert placement: https://dnr.wi.gov/topic/waterways/documents/PermitDocs/GPs/GP-CulvertWPEDesign.pdf (General Permit) or https://dnr.wi.gov/topic/Waterways/documents/PermitDocs/IPs/IP-culvert.pdf (Individual Permit).*
- *Permanent bridge: https://dnr.wi.gov/topic/waterways/documents/PermitDocs/GPs/GP-ClearSpanBridge.pdf (General Permit, no in-stream supports) or https://dnr.wi.gov/topic/Waterways/documents/PermitDocs/IPs/IP-bridgeTempCross.pdf (Individual Permit, in-stream supports).*
- *Stormwater pond within 500 feet of a waterway: https://dnr.wi.gov/topic/waterways/documents/PermitDocs/GPs/GP-StormwaterPond.pdf.*

No culverts or bridges are proposed for crossing of navigable waterways. Darien Solar will conform to WPDES requirements for temporary stormwater ponds that may be located within 500 feet of a waterway pending final engineering.

8.2 Wetland Permitting Activities

This section should be consistent with the wetlands included in DNR Tables 1 and 2 and associated figures. See page iii in this document on what to include in DNR Tables 1 and 2 regarding wetland resources.

8.2.1 *Describe the method used to identify wetland presence and boundaries within the project area (i.e. wetland delineation, wetland determination, review of desktop resources only, etc.). If a combination of methods were used, describe which project areas utilized which method. The associated delineation report and/or desktop review documentation should be uploaded to the PSC's website as part of the application filing.*

As stated in Section 8.1.1, a desktop delineation of wetlands and waterways within the overall Project Boundary was completed using available public resources prior to the field delineation. Desktop-delineated wetlands were classified by their probable Wetlands and Deepwater Habitats of the United States[86], Wetland Plants and Communities of Minnesota and Wisconsin[87], and Wetlands of the United States[88] wetland types for the wetland or wetland complex.

A field delineation of wetlands and waterways was completed on October 21 to 25, 2019 and April 20 to 21, 2020 for the "delineation area" which was created around the proposed Project construction footprint. Wetlands were delineated in accordance with the level two routine determination method set forth in the USACE 1987 Wetlands Delineation Manual[84] and the supplemental methods set forth in the regional supplement to the USACE Wetland Delineation Manual: Northcentral & Northeast Region[85]. A total of 48 wetlands totaling 111.98 acres were field-delineated within the delineation area inside the Project Boundary. Desktop wetlands within the delineation area were confirmed in the field and, if meeting the criteria for wetland conditions, delineated as wetlands with associated upland/wetland transects using USACE Northcentral & Northeast region datasheets. If the field conditions (hydrology, soils, and vegetation) indicated that a desktop wetland actually an upland, a data point, USACE datasheet, and photos were taken. Upland, a data point, USACE datasheet, and photos were taken. An additional 3 wetlands (WB-01, WB-24, and WB-25) were field delineated but are located outside of the Project Boundary and are

[86] Cowardin, L.M., V.M. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Biological Services Program, Washington, DC, USA. FWS/OBS-79/31. 103 pp.

[87] Eggers, Steve D., and Donald M. Reed. 1997. Wetland plants and communities of Minnesota and Wisconsin. U.S. Army Corps of Engineers, St. Paul District. 263pp.

[88] Shaw, S.P. and C.G. Fredine. 1971. Wetlands of the United States. U.S. Fish and Wildlife Circular 39. U.S. Department of the Interior, Washington, D.C. 67 pp.

not included in DNR Table 2. One 10-acre collection route within the proposed Project footprint was not field delineated as collection lines were only recently proposed in this location. No wetlands or waterways were identified in this location from the desktop delineation. A field wetland delineation will be conducted in this area should Project infrastructure be planned in this area as part of final design.

A summary of field and desktop-delineated wetlands can be found in **DNR Table 2** and the Wetland Delineation Report in **Appendix U**. A mapbook of all desktop- and field-delineated features is shown on **Figure 4.1.6.1** (**Appendix B**)**.** Wetland delineation methods within the Project Boundary are indicated in **Figure 8.3.3** (**Appendix B**)**.**

8.2.2 *Identify the number of wetlands present and by wetland type, using the Eggers and Reed classification. Provide as an overall project total, as well as broken down by the primary/preferred site and the alternate site and their associated facilities.*

A total of 97 wetlands or wetland complexes (field and desktop delineated, combined) are present within the Project Boundary. All of the desktop and field-delineated wetlands are classified according to the Cowardin, Circular 39, and Eggers & Reed methods, and are included in **Appendix U** and **Figure 4.1.6.1** (**Appendix B**). Of the 97 wetlands delineated, 48 were field delineated and 49 were desktop delineated wetlands which have not been confirmed by a field delineation because these wetlands are outside the leased area proposed for development. The majority of wetlands that were field delineated are classified (based on their predominant wetland type) as seasonally flooded basins (17) and wet meadows (19). Other wetland types that were field delineated include shallow marsh (1), shrub-carr (3), shallow open water (4), floodplain forest (2), and hardwood swamp (2). Desktop delineated wetlands within the Project Boundary (and outside of the Project footprint) are mostly comprised of seasonally flooded basins located in farmed fields, wet meadows, and floodplain forest systems.

The Project layout includes five wetlands which would be located inside of the perimeter fences. Two of these wetlands are associated with the Alternate Arrays and the other three wetlands are associated with the Primary Arrays. Both of the wetlands associated with the Alternate Arrays are classified as seasonally flooded basins. Wetlands within the Primary Arrays consist of two wetlands classified as wet meadows and one wetland classified as a seasonally flooded basin. The other 43 field-delineated wetlands and 49 desktop-delineated wetlands are outside of the Project footprint.

8.2.3 *Identify the any wetlands in the project area that are considered sensitive and/or high-quality wetlands, including, but not limited to:*

8.2.3.1 *Any wetlands in or adjacent to an area of special natural resource interest (Wis. Admin. Code NR 103.04).*

A total of five wetlands (four field-delineated and one desktop-delineated) occur adjacent to Turtle Creek where it is deemed an Exceptional Resource Water. None of these wetlands are anticipated to be impacted by Project construction.

8.2.3.2 *Any of the following types: deep marsh, northern or southern sedge meadow not dominated by reed canary grass, wet or wet-mesic prairie not dominated by reed canary grass, fresh wet meadows not dominated by reed canary grass, coastal marsh, interdunal or ridge and swale complex, wild rice-dominated emergent aquatic, open bog, bog relict, muskeg, floodplain forest, and ephemeral ponds in wooded settings.*

Within the Project Boundary, ten wetlands or portions of wetland complexes were desktop-delineated that contain floodplain forest. These features totaled 80.59 acres. Two wetlands or wetland complexes were desktop-delineated that contained fresh wet meadow that may not be dominated by reed canary grass. These wet meadow wetlands totaled 5.77 acres. No open bog, bog relict, muskegs, ephemeral ponds in wooded settings, interdunal or ridge swale complex, wild rice-dominated emergent aquatic wet or wet-mesic prairies, deep marsh, or sedge meadow communities were identified in the desktop delineation.

Within the field delineation area, three wetlands classified as floodplain forest were field-delineated and totaled 15.18 acres. These areas will be avoided by all Project infrastructure. A total of 22 wetlands or portions of wetland complexes within the delineation area were field-delineated as fresh wet meadow. These wetlands totaled 56.5 acres. Fresh wet meadow communities within the delineation area were generally dominated by reed canary grass. No open bog, bog relict, muskegs, ephemeral ponds in wooded settings, interdunal or ridge swale complex, wild rice-dominated emergent aquatic wet or wet-mesic prairies, deep marsh, or sedge meadow communities were identified in the field delineation.

8.2.3.3 *Any wetlands with high functional values based on factors such as abundance of native species and/or rare species, wildlife habitat, hydrology functions, etc.*

Functional values for wetlands within the delineation area were generally low due to their presence within or near cultivated fields. Vegetative diversity within wetlands was generally low and most wetlands were dominated by non-native or invasive species.

8.2.4 *For both the primary/preferred and alternate sites and their associated facilities, provide the following:*

8.2.4.1 *How many wetlands would be crossed by collection lines and specify the installation method (i.e. X wetlands would be bored, Y wetlands would be trenched).*

A total of two wetlands would be crossed by four collection lines each, pending final engineering. All of these crossings are proposed as directional bores. All of these crossings are associated with the Alternate Arrays in wetlands classified as wet meadow and floodplain forest.

8.2.4.2 *How many wetlands would have construction matting placed within them to facilitate vehicle access and operation and material storage. Also provide the total amount of wetland matting, in square feet.*

No construction matting in wetlands will be necessary for the construction and operation of the Project.

8.2.4.3 *How many wetlands would be impacted for permanent access roads and indicate if culverts would be installed under the roads to maintain wetland hydrology.*

No permanent or temporary access roads will be constructed in wetlands.

8.2.4.4 *How many wetlands would be impacted and/or crossed by fence installation and footings.*

No wetlands will be crossed by fences.

8.2.5 *Describe if wetlands would be disturbed for site preparation activities (e.g. grading, leveling, etc.) in the array areas, and for the installation of the arrays and associated supports.*

No grading or leveling of wetlands is anticipated as solar arrays have been sited outside of field-delineated wetlands.

8.2.6 *Describe the sequencing of matting placement in wetlands and the anticipated duration of matting placement in wetlands. For matting placed in any wetland for longer than 60 consecutive days during the growing season, prepare and submit a wetland matting restoration plan with the application filing.*

No placement of construction matting in wetlands will be necessary as construction in wetlands has been completely avoided by the Project. Wetlands within the fence boundary will be protected from adjacent construction activities with appropriate sediment and erosion control.

8.2.7 *For wetlands that would be open-cut trenched, provide the following:*

8.2.7.1 *Provide details on the total disturbance area in wetland, including how total wetland disturbance was calculated. Include the size of the trench (length, width, and depth), where stockpiled soils would be placed (i.e. in upland, in wetlands on construction mats, etc.), and where equipment would operate.*

8.2.7.2 *Details on the proposed trench dewatering, including how discharge would be treated and where the dewatering structure would be located.*

8.2.7.3 *Duration and timing of the work in wetland.*

8.2.7.4 *How the wetland would be restored to pre-existing conditions.*

No open-cut trenching of wetlands is proposed.

8.2.8 *For wetlands that would be directionally bored, provide the following:*

8.2.8.1 *How bored wetlands and associated bore pits would be accessed.*

Bored wetlands and associated bore pits would be accessed from adjacent upland areas.

8.2.8.2 *The location and size of any temporary staging and equipment storage.*

Temporary staging and equipment storage will be located in upland areas in an area of up to five hundred feet by thirty feet, which includes area to stage the bore pipe.

8.2.8.3 *The location and size of bore pits.*

Entry points and exit points will be positioned at least ten feet outside of the established wetland boundaries and will be moved further away when appropriate to achieve the proper depth required for each bore and to avoid tree lines and other obstacles. Bore pits will generally be twenty feet long, twenty feet wide, and approximately four feet deep.

8.2.8.4 *Provide a contingency plan for bore refusal and a plan for the containment and clean-up of any inadvertent releases of drilling fluid (e.g. a frac-out).*

Typical bore crossing details and a standard frac-out plan is included in **Appendix D**. In the event of a refused boring, the boring will be re-attempted from the same boring pit on a slightly different path than the refused bore. In the case it is determined that the area of the refused bore is not adequate for a bore, the bore location will be moved to a new location and the bore re-attempted, which may require an additional bore pit at that location. **Appendix D** describes in detail the response actions for clean-up of inadvertent releases of drilling fluid, but in general the actions to be taken include ceasing work to assess the nature of the release, containment of the released fluids, and as required, notification of the appropriate agency(ies).

8.2.9 *Describe how fence installation would occur in wetlands, including the footing types (e.g. direct imbed, concrete, etc.), any associated wetland impact such as vegetation clearing, operation of equipment, etc.*

No fence installation is proposed in wetlands.

8.2.10 *For wetland vegetation that would be cleared or cut, provide the following:*

8.2.10.1 *The justification for why wetland trees and shrubs are proposed to be cleared, and what construction activity the clearing is associated with.*

8.2.10.2 *The timing and duration of vegetation removal*

8.2.10.3 *Describe the type of equipment that would be used, and if the vegetation removal would result in soil disturbance, including rutting and soil mixing.*

8.2.10.4 *The type of wetland and type of vegetation to be cleared.*

8.2.10.5 *If tree and shrubs removed would be allowed to regrow or be replanted, or if cleared areas would be kept free of trees and shrubs long-term.*

8.2.10.6 *Indicate the plan for removal and disposal of brush and wood chips.*

No wetland vegetation clearing is proposed as part of Project construction.

8.2.11 *Indicate if any permanent wetland fill is proposed, such as for substation placement, permanent roads, fence or array footings, pole locations, etc. and provide the amount of permanent wetland fill.*

No permanent wetland fill is proposed for the construction of the substation, access roads, fence, array footings, pole locations or any other Project infrastructure.

8.2.12 *Provide the methods to be used for avoiding, minimizing, and mitigation construction impacts in and near wetlands. This discussion should include, but not limited to, avoiding wetlands, installation methods (i.e. directional bore versus open-cut trenching, soil segregation during trenching, etc.), equipment crossing methods (i.e. use of construction matting, frozen ground conditions, etc.), sediment and erosion controls, invasive species protocols for equipment, etc. Additional guidance to prepare this discussion can be found here: https://dnr.wi.gov/topic/Sectors/documents/PAAsupp3Utility.pdf.*

Impacts to wetlands have been avoided. All collection line crossings of wetlands will be directionally bored to avoid impact. All other Project infrastructure (solar arrays, buildings, fences, access roads and substations) has been sited to completely avoid wetland impacts. Appropriate sediment and erosion control measures will be put in place to avoid sedimentation into any wetlands during construction and be clearly marked to avoid disturbance (**Appendix L**). Additional information regarding invasive species management is provided in Section 5.4.3.

8.2.13 *Indicate if an environmental monitor would be employed during project construction and restoration activities. If so, describe the monitors roles and responsibilities, frequency of visits, etc.*

A third-party stormwater/environmental monitor will be on site periodically throughout construction to ensure compliance with the construction stormwater permit, that wetland/waterway impacts are being avoided, and that environmental best management practices are being properly utilized to avoid encounters with rare wildlife species.

8.2.14 *Describe how all wetlands within the project area would be restored. This includes wetlands that would be encompassed within the arrays even if not directly impacted by project construction. This discussion should include details on the seeding plan, maintenance and monitoring, restoring elevations and soil profiles, restoring wetland hydrology, etc.*

No temporary or permanent impacts to wetlands are proposed so no restoration activities are necessary.

8.3 Mapping Wetland and Waterway Crossings

For each facility (primary/preferred arrays and alternate arrays, plus associated components such as temporary access roads, permanent access roads, collector circuits, fences, arrays, associated transmission lines, any permanent buildings such as substation and O&M buildings, etc.) in or adjacent to wetlands or waterways, provide three map sets. Each map set should include an index page, as well as small scale map pages showing the project area and features in detail. The same scale and page extent should be used for each map set.

8.3.1 *Topographic map set showing the following:*

- *Delineated wetlands, labeled with the feature unique ID (if a delineation was conducted), or Wisconsin Wetland Inventory and Hydric soils if a delineation was not conducted.*
- *DNR mapped waterways, labeled with the feature unique ID.*
- *Field identified waterways, labeled with the feature unique ID.*
- *Solar arrays and all connecting facilities (permanent and temporary access roads, fences, and collector circuits) with the installation method identified (i.e. directional bore, plow, open-cut trench, etc.).*
- *O&M Building.*
- *Substation.*
- *Generator tie line, including pole locations and all access roads, including off-ROW access.*
- *Locations of proposed stormwater features (i.e. ponds, swales, etc.).*
- *Vehicle crossing method of waterways for both permanent and temporary access (i.e. TCSB, installation of culvert, installation of bridge, installation of*

ford, use of existing culvert, use of existing bridge, use of existing ford, driving on the bed).

- *Placement of construction matting in wetlands.*
- *Excavation areas in wetlands (i.e. bore pits, open-cut trench, etc.).*

8.3.2 *Aerial photo map set showing the following:*

- *Delineated wetlands, labeled with the feature unique ID (if a delineation was conducted), or Wisconsin Wetland Inventory and Hydric soils if a delineation was not conducted.*
- *DNR mapped waterways, labeled with the feature unique ID.*
- *Field identified waterways, labeled with the feature unique ID.*
- *Solar arrays and all connecting facilities (permanent and temporary access roads, fences, and collector circuits) with the installation method identified (i.e. directional bore, plow, open-cut trench, etc.).*
- *O&M Building.*
- *Substation.*
- *Generator tie line, including pole locations and all access roads, including off-ROW access.*
- *Locations of proposed stormwater features (e.g. ponds, swales, etc.).*
- *Vehicle crossing method of waterways for both permanent and temporary access (i.e. TCSB, installation of culvert, installation of bridge, installation of ford, use of existing culvert, use of existing bridge, use of existing ford, driving on the bed).*
- *Placement of construction matting in wetlands.*
- *Excavation areas in wetlands (i.e. bore pits, open-cut trench, etc.).*

8.3.3 *A map showing which method(s) were used to identify wetland presence and boundaries within the project area (i.e. wetland delineation, wetland determination, review of desktop resources only).*

Appendix B includes **Figures 8.3.1**, **8.3.2** and **8.3.3** which address the requirements of Sections 8.3.1, 8.3.2 and 8.3.3.

8.4 Erosion Control and Storm Water Management Plans

DNR may require a detailed description of temporary and permanent erosion and sediment control measures to be utilized during and after construction of the project.

If the project would involve one or more acres of land disturbance, the applicant's request for permits under Wis. Stat. § 30.025 must identify the need for coverage under the Construction Site Storm Water Runoff General Permit [PDF] from DNR. The permit application itself must be submitted through the DNR's electronic Water Permits system after the PSC order. This permit may also authorize construction site dewatering discharges.

The Storm Water Permit and ch. NR 216 Wis. Adm. Code require a site-specific Erosion Control Plan, Site Map, and Storm Water Management Plan. The permittee would be

required to implement and maintain, as appropriate, all erosion and sediment control practices identified in the plans from the start of land disturbance until final stabilization of the site. Final stabilization means that all land-disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established with a density of at least 70 percent of the cover for the unpaved areas and areas not covered by permanent structures or equivalent stabilization measures.

The draft Erosion Control Plan, Site Map, Storm Water Management Plan, and any supporting documentation (such as modeling input/output, design specifications, geotech/soil report, site photos, etc.) must be submitted with the Storm Water Permit application through the DNR's ePermitting system.

8.4.1 *Erosion Control Plan - See Wis. Admin. Code § NR 216.46 for details regarding information required in the Erosion Control Plan as part of a complete permit application. Topics include:*

- *Site-specific plans.*
- *Compliance with construction performance standards in Wis. Admin. Code § NR 151.11.*
- *Details about the site and the project.*
- *List and schedule of construction activities.*
- *Site map(s) with site, project, and erosion and sediment control details.*
- *Description of temporary and permanent erosion and sediment controls.*
- *Compliance with material management, velocity dissipation, and inspection schedule requirements.*

Considerations:

- *All areas of land disturbance associated with the solar project should be identified and included in the permit application, including staging/laydown areas, stockpile areas, temporary access roads, etc.*
- *Minimize or avoid land disturbance, and vegetate the project area as soon as possible to preclude the need for temporary sediment basins.*
- *Design, implement, and maintain erosion and sediment controls in accordance with Wisconsin Technical Standards (https://dnr.wi.gov/topic/stormwater/standards/const_standards.html).*
- *Some storm water discharges from temporary support activities such as portable concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas are authorized under this permit provided that the support activity is directly related to and part of the construction site covered under the permit. The Erosion Control Plan should include provisions to prevent and control discharge of pollutants to waters of the state from any temporary support activity. (See DNR permit section 1.1.2 for more information.)*
- *The permit covers some dewatering activities, such as dewatering of construction pits, pipe trenches, and other similar operations. Dewatering activities that would be covered under the Construction Site Storm Water Runoff General Permit should be*

discussed in the Erosion Control Plan or provided as a separate Dewatering Plan attachment in the permit application. See Dewatering Plan guidance below and DNR permit sections 1.1.1.1 and 3.1.10 for more information.

Darien Solar has prepared a draft Erosion Control and Storm Water Management Plan (ECSWMP) describing the best management practices that will be used on-site for erosion control and post-construction storm water management, included in **Appendix L**. Once a Contractor is selected and prior to construction, the ECSWMP will be finalized, and coverage will be obtained under the Construction Site Storm Water Runoff Permit from the DNR under Wis. Admin. Code § NR 216.[89] The applicant will be required to submit a Construction Project Consolidated Permit Application which will meet the Technical Standards used by the DNR.

8.4.2 *Storm Water Management Plan – See Wis. Admin. Code § NR 216.47 for details regarding information required in the Storm Water Management Plan as part of a complete permit application. Topics include:*

- *Compliance with applicable post-construction performance standards in Wis. Admin. Code § NR 151.121 through § NR 151.128.*
- *Description of permanent storm water management practices at the site and technical rationale.*
- *Groundwater and bedrock information if using permanent infiltration devices.*
- *Separation distances of permanent storm water management practices from wells.*
- *Long-term maintenance agreement for site vegetation and any other permanent storm water management features.*

Considerations:

- *Configure arrays to allow for sheet flow through vegetation beneath, between, and around solar arrays for runoff management during the life of the facility. Vegetation can prevent erosion, filter runoff, and improve infiltration capacity of soils. Depending on site characteristics (such as if the site has steep slopes, erosive soils, concentrated flow, conditions for poor vegetation establishment, etc.), additional permanent/long-term storm water management measures may be necessary. Sun-tracking panels are less likely to contribute to erosion compared to fixed panels and may necessitate less-frequent long-term vegetation maintenance and erosion control.*
- *Runoff from other permanent impervious surfaces associated with the project (i.e., access roads, parking areas, structures) may require permanent storm water*

[89] Wisconsin State Legislature. Wisconsin Administrative Code Chapter NR 216 – Stormwater Discharge Permits. Register November 2018 No. 755.

management practices (i.e., ponds, swales, etc.) to meet post-construction performance standards. Gravel, aggregate, dirt, pavement, and asphalt are examples of impervious surfaces.

- *Avoid or minimize permanent impervious areas by specifying grassed/vegetated permanent accessways instead of impervious access roads. If loaded vehicles require additional support during construction, use temporary impervious access (i.e., gravel or timber/composite matting) that would be replaced with vegetation or a vegetated accessway.*
- *Design, implement, and maintain permanent post-construction storm water management features in accordance with Wisconsin Technical Standards (https://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html).*
- *Develop a long-term maintenance agreement. Some municipalities may have specific formats and/or filing requirements for such agreements. At a minimum identify the responsible party, all permanent storm water management features, and associated inspections and maintenance. Note that vegetation under, between, and around arrays is considered a permanent storm water management feature and should be included in the agreement.*

To meet the Wisconsin Administrative Code NR 151.121-151.128[90] post-construction performance standards for new development and redevelopment projects, a low impact development (LID) approach is proposed. The management plan proposes using a vegetated filter under the proposed panel arrays and throughout the Project Boundary. All-season equipment access will also necessitate aggregate roads leading to inverter skids. Calculations applicable to these requirements can be found in **Appendix X**.

The proposed Project layout minimizes impervious surface coverage and will consist of solar panels, gravel roads, and other electrical equipment. Solar panels have a unique, fully-disconnected impervious surface runoff characteristic that is unlike buildings or roads. The runoff generated from the solar panels will flow to the edge of the panels and be allowed to drip onto the pervious surface below.

To reduce the potential for erosion and scour at the dripline of the panels, the vertical clearance between the panels and the ground will be minimized and shall be less than 8 feet maximum elevation. Also, erosion and sediment prevention and control measures have been specified and will be used during Project construction. Final stabilization will occur at the end of the Project prior to termination of permit coverage and will be achieved when permanent erosion control BMPs are applied and

[90] Wisconsin State Legislature. Wisconsin Administrative Code Chapter NR 151 - Runoff Management. Register November 2018 No. 755.

functioning on-site. Permanent erosion control BMPs may be a combination of vegetative and non-vegetative cover types.

Groundcover including native grasses and pollinator-friendly species will be used throughout the site. In areas under the panels, this will function as a filter and act as a permanent BMP that will capture runoff, sediment, and other pollutants. In addition to stormwater benefits, the native groundcover will reduce vegetation management costs during Project operations, reduce snow drifts, improve drought resistance and create and conserve pollinator and wildlife habitat. Additional details of the groundcover plan can be found in Section 5.5 and **Appendix W**.

The Project Boundary is predominately comprised of agricultural row crops on A/D and C/D soils. For the existing conditions, various curve numbers were used to represent the agricultural row crop and non-agricultural runoff conditions for each subwatershed within the Project Boundary. For the proposed conditions, a weighted curve number was used to represent meadow vegetation for each corresponding watershed and HSG. Changing the landcover to the meadow condition will greatly reduce the amount of runoff from the Project Boundary (**Appendix X**).

Infiltration

The proposed site has less than 10% impervious surface as a whole. Wisconsin Administrative Code NR 151.124 requires that for a site with less than 10% impervious, provided infiltration volume must equal at least 90% of the existing site infiltration. The existing and proposed infiltration rates were calculated for the entire site using the P8 Urban Catchment Model program. For the existing conditions, various curve numbers were used to represent the runoff conditions for each subwatershed within the Project Boundary. For the proposed conditions, a weighted curve number was used to represent meadow vegetation for each corresponding watershed and HSG. This curve number was weighted to include the proposed disconnected impervious surfaces consisting of aggregate access roads, transformers, a substation, a battery energy storage system and an O&M facility. Due to the HSG Type A/D and C/D soils present on-site, an infiltration rate of 0.06 inches/hour was input into the P8 model for both the existing and proposed conditions.

Rock County also requires that developments up to 40% connected imperviousness infiltrate sufficient runoff volume so that the post-construction infiltration volume shall be at least 90% of the pre-construction infiltration volume for low-imperviousness (developments up to 40% connected imperviousness).

Walworth County requires that nonresidential developments follow one of the standards for infiltration:

1. Infiltrate 60% of the pre-development infiltration volume based on the annual rainfall.

2. Infiltrate 10% of the post-development runoff volume calculated for the 2-year, 24-hour design storm.
3. Establish effective infiltration area covering 2% or more of the project site.

The table below compares the existing and proposed infiltration rates for the site:

Pre-construction Infiltration Volume (ac-ft.)	Post-construction Infiltration Volume (ac-ft.)	Infiltration Increase (%)
22,384.36	23,752.53	+6.1%

Runoff Rates

Wisconsin Administrative Code NR 151.123 above requires that pre-construction runoff rates are maintained or reduced in post-construction conditions for both the 1- and 2-year 24-hour storm event. The existing and proposed runoff rates were calculated for the entire Project Boundary using HydroCAD software. The Atlas-14 1- and 2-year 24-hour precipitation values for the Project Boundary are 2.25 inches and 2.90 inches, respectively. For the existing conditions, various curve numbers were used to represent the agricultural row crop runoff conditions for each subwatershed within the Project Boundary. For the proposed conditions, a weighted curve number was used to represent meadow vegetation for each corresponding watershed and HSG. This curve number was weighted to include the proposed impervious surfaces consisting of aggregate access roads, transformers, a substation, a battery energy storage system, and an O&M facility.

In addition, the Rock County Stormwater Management Ordinance Part 8 requires that the peak discharge rates not exceed the pre-developed rates for the 1-, 2-, 10-, and 100-year recurrence interval storms for the Town of Bradford. The Walworth County Stormwater Performance Standards requires that the peak discharge rates not exceed the pre-developed rates for the 2-, 10-, and 100-year recurrence interval storms for the Town of Darien.

The tables below compare offsite flows between the existing and proposed conditions for the 1-, 2-, 10-, and 100-year events, respectively:

1-Year 24-Hour Pre-and Post-construction Peak Discharge Rates

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	15	15
2	136	78
3	0	0
4	42	27
5	0	0
6	1	1

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
7	75	62

2-Year 24-Hour Pre- and Post-construction Peak Discharge Rates

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	36	36
2	293	191
3	0	0
4	87	61
5	0	0
6	12	12
7	130	110

10-Year 24-Hour Pre- and Post-construction Peak Discharge Rates

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	89	89
2	685	498
3	0	0
4	198	149
5	0	0
6	69	69
7	246	216

100-Year 24-Hour Pre- and Post-construction Peak Discharge Rates

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	184	184
2	1,422	1,126
3	7	5
4	415	329
5	17	14
6	169	169
7	435	391

Total Suspended Solids

The Wisconsin Administrative Code NR 151.122, as well as Rock County and Walworth County, requires that new development reduce the total suspended solids (TSS) load by 80%. Per State requirements, the TSS removal from the site overland

flow was calculated for the developed site area using the P8 Urban Catchment Model program. For the existing conditions, a weighted curve number was used to represent the existing agricultural vegetation for each corresponding watershed and HSG. For the proposed condition, a weighted curve number was used to represent the proposed meadow vegetation for each corresponding watershed and HSG. This curve number was weighted to include the proposed impervious surfaces consisting of aggregate access roads, transformers, a substation, a battery energy storage system, and an O&M facility. The runoff generated from the solar panels will flow to the edge of the panels and be allowed to drip onto the pervious meadow vegetation below. The results of this analysis can be found in the table below:

Load In. (lbs.)	Load Out (lbs.)	Load Reduction (%)
127,963	5,056	96%

8.5 Materials Management Plan

Applicants may opt to refer to the company's standard Materials Management Plan to meet most of these requirements, though some form of supplemental information on project-specific elements may be required. The following checklist serves as guidance in the completion of a Materials Management Plan. The Materials Management Plan should contain information on all of the following components, where applicable.

- *Access Point Locations*
  - *List the locations that would be used to gain access to the work site.*
  - *Include a plan view of all access points.*

- *Haul Routes*
  - *Indicate how and where hauled materials would be routed, including inbound and outbound materials, clean fill materials, contaminated materials, and any other materials.*
  - *Alternate locations, if necessary.*
  - *Include a haul route diagram indicating haul route locations.*

This section addresses the requirements of Section 8.5 of the Application Filing Requirements.

The primary haul routes for construction materials to the Project will be on US Interstate 43, US Highway 14, State Highway 89 and State Highway 11. Local roads planned for use in and adjacent to the Project include Clowe's Road, County Highway C, North Road, South Odling Road, East Creek Road and Old 89 Road. **Figure 8.5.1** in **Appendix B** shows the proposed haul routes. Access points from public roads into the various array and facility areas can be seen by the access road layout also shown on **Figure 8.5.1**.

Inbound and outbound materials, clean fill materials (if required), contaminated materials (if or as required), and any other materials will be transported on the project haul routes.

- *Stockpile Areas*
    - *List and describe material to be stockpiled, the location where material would be stockpiled on-site, and the measures to be taken to protect stockpiled areas.*

Construction material stockpiles will be located at the general construction laydown area as identified in Section 2.3.1.2 and materials will be staged for use throughout the project as is consistent with normal construction practices.

Soils stripped or removed during access road construction, grading, and excavation, will be stockpiled near the removal location and used as fill on site, or thin spread on the site. Topsoil stripped from the general construction laydown area will be stockpiled adjacent to the laydown area and replaced upon reclamation. Sediment control measures will be installed prior to any topsoil removal or grading and will be inspected and maintained in accordance with the ECSWMP (**Appendix L**).

- *Equipment Staging Areas*
    - *Identify where equipment would be stored on-site.*

Equipment will be staged in the construction laydown area and in solar array areas where construction activities are imminent or ongoing, or as allowed by agreements with landowners.

    - *Include a plan view of equipment storage areas on-site.*

Appendix D includes an image of a typical laydown area configuration, including equipment and material storage areas, along with parking and office space.

    - *Identify where spill control and kits would be stored on-site.*

Spill control kits will be stored at the Project laydown area and within construction vehicles.

- *Field Screening Protocol for Contaminant Testing*
  If contaminated materials (i.e., soil) are encountered on-site, specify:
    - *The procedure for screening materials.*
    - *The location where materials be tested.*
    - *The protocols that would be followed.*
    - *Whether construction work would be impacted.*

This section addresses the requirements of Section *Field Screening Protocol for Contaminant Testing* of the Application Filing Requirements, including all subsections.

It is not expected that any contaminated materials will be encountered on-site. If suspected contaminated soils or other materials are identified, a qualified firm will be contacted to test suspected materials. If contamination is confirmed, the contaminated materials will be treated and/or disposed of according to the appropriate protocol for the situation encountered and the relevant regulations. The DNR will be contacted as required under state law. If contamination is encountered, work would be suspended as appropriate in the immediate area of contamination until the appropriate remediation measures have been completed.

- *Contaminated Materials*
  If contaminated materials are known to exist on-site, list and describe:
  - *The type of contaminant(s) known to exist on-site.*
  - *The location of the contaminant(s).*
  - *The media in which the contaminant is located within (i.e., soil, water, etc.).*
  - *The estimated concentration of the contaminant(s).*
  - *The estimated volumes of the contaminant(s).*

    No contaminated materials are known to exist on-site.
- *Excavation Methods*
  List and describe:
  - *The materials that would be excavated.*
  - *The location of the excavated materials.*
  - *The way in which the materials would be excavated and removed.*
  - *How the excavated materials would be exported from site.*
  - *The location where excavated materials would be exported to.*

No excavation materials are expected to be removed from site, see detailed discussion of excavation material types below. In the case that it is deemed necessary to remove excavated materials from the site, the materials will be transported via ground transportation on the haul routes to an appropriate location for disposal in accordance with all codes, standards, rules, and regulations that apply.

- *Dewatering of Excavated Materials*
  If free water is found present in excavated materials, list and describe:
  - *The methods that would be used to correct the situation (i.e., how would water be removed).*
  - *Identify where these methods would take place on-site.*

Due to the shallow excavation depths on site, significant dewatering is not expected during construction. If dewatering is required due to intrusion of rainwater, surface

runoff, or groundwater into trenches or other excavations, dewatering will use small pumps and discharge locally applying sediment control as described in Section 9.7 of the draft ECSWMP. It is expected that these dewatering activities would be covered under the Project's General Construction Stormwater Permit.

- *In-channel and Upland Excavated Materials*
  - *Estimate the total volume of dredged materials (cubic yards) that would be excavated from beds and banks of waterways and wetlands.*
  - *Estimate the volume of upland materials (cubic yards) to be excavated from areas outside of waterway(s) and wetland(s).*

Preliminary engineering analysis indicates that approximately 600 acres of the proposed Primary Array areas will require some degree of grading to accommodate the single axis trackers. For the Alternate Array areas, 200 acres of grading is estimated. The grading consists of localized cut and fill to provide a consistent slope under each tracker. A consistent slope is required to maintain adequate ground clearance at all points without requiring excessive post heights in other locations along the tracker. Approximately 130,000 cubic yards of material are expected to be excavated as a result of grading activities to install the Primary Arrays and an estimated 85,000 cubic yards for Alternate Arrays. The excavation numbers above are preliminary pending final engineering. The final grading plan will be designed to both minimize and balance the required cut and fill quantities to the extent practical, and excess soils will be even spread over participating parcels in accordance with the procedures outlined in previous sections.

Topsoil will be stripped prior to construction of the estimated fourteen miles of Project access roads associated with the Primary Arrays, pending final engineering. Road cross sections typically range, pending final engineering, from 12 to 24 inches thick with and average depth of 16 inches. This will result in approximately 74,780 cubic yards of excavation for Project access road construction, dependent on final engineering.

Installation of the Project's estimated 51 miles of underground AC collection system at 3.5 feet deep and 1.5 foot wide will involve approximately 50,000 cubic yards of excavation, all pending final engineering. The collection system installation method will likely involve trenching, cable installation and backfill all in one pass.

DC cables will connect the strings of panels. These cables may be affixed or hung in line with the racking system to the end of each row, then sent to combiner boxes where larger gauge cables will exit and run to an inverter. To create a conservative, worst-case estimate, this analysis assumes all DC cables will be trenched at a depth of 2.5 feet in a trench 10 feet wide. For the 250 MW Project, this DC cabling excavation sums to just over 100,000 cubic yards, pending final engineering.

No materials are expected to be dredged from beds and banks of waterways and wetlands throughout the Project Boundary. Details of waterway crossing impacts are provided in Sections 8.1.4 and 8.3.

- *Re-used In-Channel and Upland Excavated Materials*
  - *Estimate the total volume.*
  - *Identify the location where dredged materials would be used on either project plans or provide off-site address, property owner, and site map (drawn to scale).*
  - *Describe the purpose of dredged materials (e.g. grading, trench backfill, etc.).*

No channel dredging is proposed for the Project, so the Re-used In-Channel and Upland Excavated Materials section and accompanying subsections are not applicable.

- *Reuse of Upland Materials*
  - *Estimate the total volume.*
  - *Identify the location where dredged materials would be used on either project plans or provide off-site address, property owner, and site map (drawn to scale).*
  - *Describe the purpose of dredged materials (i.e., grading, trench backfill, etc.).*

All material excavated as discussed in Section *Excavation Methods*, is expected to be reused on site, either as fill within the array or trench backfill. Topsoil stripped within the Project Boundary will be reused as topsoil within the Project Boundary. The Project plan set will include topsoil stripping specifications to ensure proper topsoil management.

- *Off-site Disposal Plans for Contaminated Materials and Non-contaminated Materials*
  - *Estimate the cubic yards of dredged materials and the cubic yards of upland material that would be disposed.*
  - *Detail disposal site information for both dredged materials and upland materials including material to be disposed, type of disposal site (such as disposal facility, landfill, etc.), disposal site name, disposal site location.*

No off-site disposal of material is expected for the Project. All non-contaminated materials are expected to be re-used within the Project Boundary. If suspected contaminated soils or other materials are identified they will be tested and disposed of as described in the above portion of Section 8.5 titled *Field Screening Protocol for Contaminant Testing*.

8.6 Dewatering Plans

Provide details for dewatering work areas, including excavation for structure foundations or poles. Applicants may opt to refer to the company's standard Dewatering Plan to meet most of these requirements, though some form of supplemental information on project-specific elements may be required. Consider the following items in the Dewatering Plan.

- *Dewatering*

For pit/trench dewatering discharges covered under the Wisconsin DNR Construction Site Stormwater Runoff General Permit, additional requirements include:

- *Follow the Wisconsin DNR technical standard 1061 for dewatering (https://dnr.wi.gov/topic/stormwater/standards/const_standards.html) or equivalent methodology.*
- *Design and construct dewatering settling basins, if used, in accordance with good engineering practices and design standards and:*
  - *Design basins to discharge to a vegetated or otherwise stabilized area protected from erosion.*
  - *Remove accumulated sediment when it reaches one-half the height of the sediment control structure or one-half the depth of the permanent pool.*
  - *Dispose of materials removed from basins in a manner that would not pollute waters of the state.*
  - *Consider installing fences around settling basins for human safety.*

  Dewatering of turbid water (water that is visibly cloudy or brown in color) should be discharged via pump and hose or overland flow (via temporary ditch or grade cuts) to a temporary sediment basin for pretreatment. Riprap aprons (energy dissipation) should be used for discharge locations. If riprap is not used, an alternative form of energy dissipation should be used to prevent scour and re-suspension of soil at the discharge point of the hose. If discharge to a temporary sediment basin is not feasible, the use of dewatering dumpsters, dewatering bags, or other prefabricated product should be used. The use of rock checks, erosion control blanket, and sumps or traps shall be considered for overland flow dewatering. After the use of BMPs, the water could be discharged through a vegetated buffer and energy dissipation. The discharge of water from the site should be visibly clear in appearance. The discharge of accumulated water should not: contain oil, grease, a sheen, odor, or concrete washout (use an oil-water separator or suitable filtration device if material is found); adversely impact adjacent properties with water or sediment; adversely impact waters of the state; cause erosion of slopes and channels; cause nuisance conditions; or contribute to inundation of wetlands.

- *Dewatering/Diversion of Flow*

Provide detailed plans for the dewatering/diversion of flow/standing water removal. Include typical dewatering/diversion measure plans.

- *Provide specifications for the dewatering/diversion of flow/ standing water removal.*
- *Specify the methods to be employed to dewater/divert flow/treat water, if applicable.*
- *Detail the methods that would be employed.*

- *Specify where the methods would be employed.*
- *Detail the proposed methods, capacities, and capabilities.*

- *Downstream Impact Minimization*

List and describe methods of minimizing downstream impacts during high flow conditions.

- *Analysis of Possible System Overload Scenarios*

Provide the following information if the stream is overloaded.

- *Estimate the volume of system overload (i.e., what rainfall overloads the system).*
- *Estimate frequency of system overload (i.e., how often would the system be overloaded).*
- *Specify actions that would be taken if stream is overloaded.*

- *Impacts of System Overload on Construction Activities and Water Quality*

If the system overloads, list and describe:

- *The anticipated number of lost work days.*
- *The possible water quality impacts.*
- *The methods that would be used to deter adverse changes in water quality.*

- *Water Discharge Locations*

Provide the following:

- *Where water would be discharged.*
- *How water would be discharged.*
- *A site map indicating discharge locations.*

The Project Boundary drains into five primary watersheds: Spring Brook-Turtle Creek, Trout Lake-Turtle Creek, Little Turtle Creek, City of Darien, and Delavan Lake. The Project Boundary drainage maps are available in the ECSWMP (**Appendix L**).

Due to the proposed low impact design (LID), no major changes to the existing grades or flow direction will occur during construction. The water will leave the Project Boundary in the same manner as existing conditions, although flows will be reduced within the proposed meadow areas.

- *Details of a Back-up System*

If a back-up system becomes necessary, indicate:

- *The type of back-up system that would be used (include backup and standby equipment/power supply).*
- *The conditions when the system would be needed.*
- *How the back-up system would operate.*
- *Where the back-up system would be located.*
-

- *High Flow Plan*

When flooding is likely to occur, list and describe the following:

- *How the water would be removed from the site.*
- *Methods of water removal (e.g. pumping).*
- *Methods of minimizing water contamination (e.g. treatment methods).*
- *Protocols for evacuating materials from the flood conveyance channel including:*
  - *A list of materials that would require evacuation during high flow periods.*
  - *How the materials would be evacuated from the flood conveyance channel.*
  - *The location where the materials would be temporarily placed on-site.*
  - *How materials would be transported.*
  - *The methods for protecting the materials.*
  - *A site map indicating the location of temporary placement.*
- *Protocols for evacuating machinery from the flood conveyance channel including:*
  - *The type of machinery that would require evacuation during high flow periods.*
  - *How the machinery would be evacuated from the flood conveyance channel.*
  - *Where the machinery would be temporarily placed on-site.*
  - *A site map indicating possible locations of temporary machinery placement.*

- *Contaminated Water*

List and describe what measures would be taken if contaminated water is found on site including:

- *Methods of isolating the contaminated water.*
- *Methods of analyzing the contaminated water.*
- *Where the water would be tested.*
- *Methods of removing contaminated water from site.*
- *How the water would be treated and disposed.*

Due to the shallow depth and short-term nature of the proposed excavations on site, no site-specific dewatering plan is proposed. Collector system trenches will be backfilled within approximately a day of when they are opened, so any dewatering would require a temporary setup. If dewatering is required due to intrusion of rainwater, surface runoff, or groundwater into trenches or other excavations, dewatering will use small pumps and discharge locally applying sediment control as described in the draft ECSWMP. It is expected that these dewatering activities would be covered under the Project's General Construction Stormwater Permit.