Application for Certificate of Public Convenience and Necessity

Paris Solar Energy Center

Docket #9801-CE-100

Kenosha County, WI

February 19, 2020

Paris Solar

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TABLES

FIGURES

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
CPCN	Certificate of Public Convenience and Necessity
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
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
NLEB	Northern Long-Eared Bat
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
PCS	Public Service Commission
psf	Pounds per square foot
PV	Photovoltaic
REC	Renewable Energy Certificate
ROW	Right of Way
RPBB	Rusty Patched Bumble Bee
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
WPS	Wisconsin Public Service Corporation
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 in the Town of Paris, Kenosha County, Wisconsin, north of and adjacent to State Highway 142 and west of Interstate Highway 94. The Project covers Sections 2-11, 14, 15, 17, and 23 all located within Township 2N, Range 21E (**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 on approximately 2,700 acres of land within a 5,350-acre Project Area (8.36 square miles). Of the 2,700 acres under contract by the Project, approximately 2,620 acres will be leased and placed under easement and 80 acres will be purchased. The area under purchase option will be utilized for the Project substation, operations and maintenance building, and potentially battery storage facilities.

The 2,700 acres under contract represents all of the land that would be required to accommodate the solar panels for the 200MW capacity plus the 25 percent additional capacity requirement for alternative panel siting. Within the 2,700 number of acres, approximately 1,500 acres would be developed and host 200 MW of solar generating facilities to include solar arrays. 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 **Figures** such as **4.1.1** and **4.1.2** includes 25% additional capacity.

If all areas presented in the 250MW layout are deemed acceptable by the Commission for use by the Project, the final permitted 200MW layout could use up to the same acreage footprint as the presented 250MW layout, for the following reasons:

1) The highest performance of the tracking system requires adequate spacing of aisles within each power block to avoid shading from one row to the next. Ample availability of constructible surface area allows for better spacing and a higher capacity factor - 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 the CPCN application, the primary array area includes uniform power blocks wherever possible to reduce cost and impact. A higher level of acceptable and approved property increases the number of uniform power blocks 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 200 MWAC. Power is generated by the panels as direct current. This is then converted to alternating current by inverters. Total power production by the panels may be up to 300 MWDC (direct current).

PV panels (modules) produced by a wide range of 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 550,000 to 750,000 high-efficiency solar PV panels with a capacity to generate approximately 350-550 watts (W) of DC power each. 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. 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 a wide range of 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 470 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 470 Watts DC, Paris 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 250 MW (primary plus alternate) array layout has been divided into eighteen fence boundary areas for discussion purposes as shown in **Figures 4.1.1** and **4.1.2**. The Example Power Block Configuration in **Appendix D** illustrates how the site could be divided into approximately 60 4.2MW power blocks for representative purposes. Of the 60 4.2MW power blocks, approximately 42 would comprise primary panel sites and approximately 18 would comprise alternate panel sites. Due to the contiguity, location, and quality of land illustrated in the 250 MW array layout, **Figures 4.1.1** and **4.1.2** showcases both primary and alternative sites together. Paris Solar requests authorization to have the discretion to place facilities on all of the designated sites.

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

The following facilities have been determined necessary by MISO and ATC for the interconnection of the Paris Project as part of the MISO AUG-2017-EAST(WI) study group. Some of these upgrades are shared between Paris and other project member of the same MISO study group.

- One new 138kV position at the Paris 138kV Substation
- A new 345kV substation adjacent to the existing Paris Substation, with a new 138/345kV transformer and sectionalize the existing 345kV Arcadian - Zion line into new 345kV substation.
- Short circuit upgrades at Arcadian, Berryville and Elkhorn substations.

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 Area and surrounding area incorporating the requested information.

1.2 Ownership

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

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

and operate the Project and sell the electrical output of the Project to customers pursuant to one or more agreements. Alternatively, Paris Solar will sell some or all of the Project to one or more public utilities, with Paris Solar remaining as the builder and operator of the Project.

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 and Light and Madison Gas and 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, and recently sold Forward to the customers [Docket 05-BS-226] and 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 proposed to be 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.

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.*

Paris 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, Paris 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, Paris 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, Paris Solar presented a layout of 250MWAC, which is 25% greater than the desired project size of 200MW. By offering the Commission the ability to select locations of solar panels within the greater project area that will comprise an approved project, Paris Solar is placing before the Commission a wide variety of feasible alternative locations, limited only by the requirement that Paris Solar be able to optimize the electrical and structural arrangement as certain areas are removed for consideration.

The boundaries of the Paris Solar Project Area encompass approximately 5,350 acres. This is a far larger footprint than Paris 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 allows the Commission to consider multiple configurations for the Project with unique benefits and choices. The impacts described in this document are based on a 250MWAC layout, which is 25% in excess of the capacity of the proposed Project. The 250MW layout is shown in **Figure 4.1.1 and 4.1.2**.

The proposed sites for placement of solar generating equipment were evaluated for their topography, land rights, compliance with a uniform "power block" 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 initially considered development of a utility-scale solar energy project 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 Area 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 Paris Solar Project Area.

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. The average size of these properties was less than five acres, and further searching at the state level showed the largest brownfield property as 369 acres in Oneida, WI. Kenosha County maintains 26 brownfield locations; none of these locations were large enough to host a 200MW project with a 1,700-acre footprint nor were any deemed suitable for solar development using our 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 the state 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. Paris 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, Paris 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

Paris 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, Paris 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 Area. 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, Paris 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 Kenosha County 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 Area is located near an existing electric transmission line thought to be suitable for interconnection. Paris Solar prioritized access not only to transmission lines, but existing substations to minimize construction costs. Thus, Paris Solar filed an interconnection request and the MISO study process has made a determination of necessary network upgrades for the project. In 2018, the announcement of the siting of the Foxconn plant relatively nearby in Racine County led Paris Solar to believe that there could be even more demand locally for new electricity generation.
- Initial and ongoing community and landowner outreach indicated community support and acceptance of the Project in the proposed area.
- Local landowners recognized the value to their farm operations and land ownership by harvesting the sun's energy instead of traditional agricultural crops and entered into voluntary solar easements.
- Paris Solar performed preliminary environmental reviews to determine sensitive environmental resources in the Project Area so as to avoid or minimize any potential adverse environmental impacts. The results of this preliminary review show that adverse impacts to the environment are avoidable or unlikely.

Tier Three Evaluation – Project Area Level

Once the Project Area was identified from the second tier study, Paris 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 250MWAC layout, which is 25% in excess of the capacity of the proposed Project. Paris Solar is seeking approval of all participating project land as shown in **Figure 4.1.1** to provide flexibility and efficiency in the placement of project facilities.

Within the Project Area, 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 power blocks
- Public Outreach and feedback from Project neighbors

Paris 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 25 acres being used for modules on the tracking system that feed electricity to that inverter. If the inverter ultimately chosen for the Project is smaller than 4.2 MW, the power block area would be correspondingly smaller, and vice versa for larger inverters. Paris Solar requests that the Commission recognize the merits of constructing in uniform power block shapes, and if certain portions of the designated primary areas are determined to be unsuitable, Paris Solar will look to reconfigure the remaining, approved areas to retain whole power blocks, rather than shaving off certain areas of a power block.

To the extent any given area is decided to be non-optimal by the Commission, Paris Solar asks the Commission to consider the effects of such a decision on the "power block" building block concept. 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 work, logistical considerations and construction complications. Paris Solar is contemplating building identical 4.2 MW power blocks, and the closer the Project can adhere to that ideal, the more efficient construction will be and, thus, the more economical the project's output will be.

Paris Solar respectfully requests that the Commission review all of the indicated solar array areas and approve all locations deemed suitable for use by Paris Solar. Paris 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 Area, 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" construction, 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 Area required to reach the desired capacity. To minimize environmental impact, The Project utilizes relatively flat, open terrain, which should require minimal grading, and minimal 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 and 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. Land in the Project Area is primarily zoned "Agricultural Preservation". Solar infrastructure will be restricted to property that is currently zoned A-1 Agricultural Preservation, A-2 General Agriculture, C-1 Lowland Resource Conservancy, and C-2 Upland Resource Conservancy districts. All potentially applicable Kenosha County yard requirements (setbacks) have been incorporated in the design, even though a zoning permit is not required. In addition, additional setbacks from electrical transmission lines and pipelines were incorporated into the site layout. These setbacks are summarized in **Table 1.5.3.1** below.

Table 1.5.3.1– Paris Solar Setback Matrix		
Type	**Distance to Solar Panels (feet)**	**Distance to Boundary Fence (feet)**
Kenosha County A-1 & A-2 Agricultural and C-2 Upland Resource Conservancy District Setbacks (C-1 does not specify setback distances)		
Yards/Property Line (participating and non-part.)	Not less than 50 feet from rear yard and not less than 25 feet from side yard	Not less than 50 feet from rear yard and not less than 25 feet from side yard
Shoreland	Not less than 75 feet from the ordinary high water mark of any navigable waterway	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	65 feet from the right-of-way of all Federal, State and County Trunk highways
All other road ROW	Not less than 40 feet	Not less than 40 feet
Pipeline	Not less than 50 feet (based on 50 ft operating ROW with additional 25 ft on either side during construction)	Not less than 50 feet (based on 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)	Not less than 50 feet (based on assumed 100 ft ROW)
Wetlands	Target of 50 feet where feasible	Target of 50 feet where feasible
Non-participating residences	Not less than 150 feet	Not less than 150 feet
Participating residences	Not less than 100 feet	Not less than 100 feet
Other buildings	Not less than 20 feet	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, Paris 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, no good neighbor agreements have been executed. However, Paris Solar has made offers of good neighbor agreements to all landowners of residential property immediately adjacent to proposed arrays and will continue communication 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.*

Table 1.5.3.3 Landowner Easement Type and Status			
Number	**Landowner Name**	**Type**	**Status**
1	Jay R. Sorensen	Solar Easement	Signed
2	Jerome N. and Cheryl A. Fliess	Solar Easement	Signed
3	Richard L. and Bonita A. Moschell	Solar Easement	Signed
4	Jeffrey and Yolanda Schaefer	Solar Easement	Signed
5	Richard F. and Kathleen M. Frederick Family Trust	Solar Easement	Signed
6	Gregory J. and Nancy J. Bose	Solar Easement	Signed
7	Jeffrey L. and Clarice M. Zellmer	Solar Easement	Signed
8	Michael L. and Linda M. Debrabander	Solar Easement	Signed
9	Elmer R. Weis and Lois A. Weis	Solar Easement	Signed
10	Elmer R. Weis and Lois A. Weis	Purchase Option	Signed
11	Eugene L. Weis and Trina M. Weis Revocable Trust	Solar Easement	Signed
12	Howell Farms LLC	Solar Easement	Signed
13	Hrupka Family Asset Trust	Solar Easement	Signed
14	Kuiper Family Enterprises, LLC	Solar Easement	Signed
15	Hakimi Farms LLC	Solar Easement	Signed
16	Sharon S. Schmeckel	Solar Easement	Signed
17	Badtke holdings	Solar Easement	Signed
18	David B. Drissel	Solar Easement	Signed
19	Dean E. Skrzypchak and Patricia A. Skrzyphak	Solar Easement	Signed
20	The William and Carole Revocable Trust	Solar Easement	Signed
21	Thomas W. Coughlin and Catherine A. Coughlin	Solar Easement	Signed
22	The Dale T. Spoerlein Revocable Trust	Solar Easement	Signed
23	Ward R. Richter and Joanne R. Richter	Solar Easement	Signed
24	Warren C. and Maris E. Holloway Family Trust	Solar Easement	Signed
25	Wayne R. Coughlin and Marjorie H. Coughlin Revocable Trust	Solar Easement	Signed
26	Lorin Myers Sr & the Marvin D. Myers Trust	Solar Easement	Signed
27	Alvin R. and Jean R. Wilks Revocable Trust	Transmission Easement	Signed

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. Paris Solar has applied to MISO for NRIS for the full 200MW of installed 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. Resources 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 solar modules are typically warranted by the manufacturer to perform at 80% of installed capacity at year 25 of operations. Based on internal analysis and operating experience by Invenergy, Paris Solar anticipates actual residual capacity to be 85% after 30 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, Paris Solar will be responsible for removing all of the solar arrays and associated facilities to a depth of four feet below grade. Paris Solar reserves the right to extend Commercial Operations by applying for an extension of any required permits. Should Paris Solar decide to continue operation, a decision would be made as to whether the Project would continue with the existing equipment or to upgrade the facility with newer technologies.

Decommissioning of the Project at the end of its anticipated 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 Area. Standard decommissioning practices will be utilized, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, followed by restoration of the site.

Though Paris 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.

Paris Solar expects to implement the following decommissioning plan:

Timeline
Decommissioning is estimated to take approximately 12 months to complete and the decommissioning crew will ensure that all equipment is recycled or disposed of properly.

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 four 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 Area 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. 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 use 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 50 years of use as a solar generating facility.

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

Paris Solar will be responsible for decommissioning the Project and associated facilities. Paris Solar has included an obligation to decommission the Project components in the Project's solar lease and easement agreements with participating landowners. Because of the uncertainty in predicting the value of equipment reuse and salvage, Paris Solar will create a decommissioning plan at the 15th anniversary of the commencement of operations. At that time Paris 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, Paris Solar will prepare a site-specific decommissioning cost estimate. In advance of this, Paris Solar has conducted further research of third-party projects and expects the total cost of decommissioning of Paris Solar at the end of its useful life would be in the range of $0 to $8.9 million net of salvage value.

The lower range dollar figure is based on the evaluation of salvage value prices of the relevant equipment and facilities, and it is possible that decommissioning could produce a net positive cash flow. The upper range dollar figure is based on consideration of third-party projects prorated to the 200 MW Paris Solar project size.

Paris Solar believes that establishing a decommissioning funding source coinciding with the commencement of commercial operation is wasteful and unnecessary. Unlike traditional forms of electricity generation, the Paris Solar will have very low and stable operating costs – consisting of facility maintenance (including staff salaries), landowner payments and tax payment. These are all relatively low compared to the variable costs of fuel for traditional fossil plants, and either predictable (maintenance expenses) or guaranteed by law (taxes) or contract (landowner payments). Thus, establishing a decommissioning fund at day one of operations is not necessary.

Further into the future there are more unknowns about the status of energy markets, solar energy's place in those markets, and generating equipment condition.

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.

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
Section 404 Wetland Permit	*U.S. Army Corps of Engineers* *St. Paul District* *180 5th St East,* *Ste. 700* *St. Paul, MN 55101* *651-290-5807* *Brookfield Field Office: 651-290-5733*	*Wetland / Waterway impact. Project impacts to Waters of the U.S. will likely be authorized via a non-reporting Utility Regional General Permit*	*TBD*	*Pending*
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*	*February 2020*	*Application Filed*
Engineering Plan	*WDNR* *Office of Energy* *Geri Radermacher – Wetland Regulatory/Zoning Specialist* *262-574-2153* *Geri.Radermacher@wisconsin.gov*	*CPCN*	*3/1/19*	*Received 3/27/19 response from DNR.*
Wisconsin Pollutant Discharge Elimination System (WPDES) Construction Site Permit	*WDNR* *Water Quality Bureau* *Adrian Stocks* *Natural Resources Manager* *608-266-2666*	*Required due to Project size.*	*Anticipated Q2 2021*	*SWPPP in* ***Appendix L***

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
	Adrian.Stocks@wisconsin.gov			
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* *Bureau of Highway Maintenance* *Chue Hang* *Permit Engineer* *262-548-5671* *chue.hang@dot.wi.govdotdtsdseutilitypermits@dot.wi.gov*	*Utility crossing permits to construct or maintain a utility facility.*	*Anticipated Q3 2020*	*To be completed*
Driveway Permit	*WisDOT-SE Region* *Kevin Koehnke* *Bureau of Highway Maintenance* *262-521-5344* *dotdtsdsepermits@dot.wi.gov*	*For new driveway entrances on state roads.*	*Anticipated Q3 2020*	*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 Q3 2020*	*To be completed*
Stipulated Shoreland Permit	*Kenosha County* *Department of Planning and Development* *Mark Jenks* *County Conservationist* *Mark.Jenks@kenoshacounty.org*	*Earth Movement/Grading activities in Shoreland Areas*	*Anticipated Q3 2020*	*To be completed*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
	(262) 587-1900			
Utility Permit	*Kenosha County Highway Division* *Clement Abongwa, PE* *Director* *(262) 857-1872* *Clement.Abongwa@kenoshaCounty.org* *DPWPermits@kenoshacounty.org*	*Utility crossing permits to construct or maintain a utility facility*	*Anticipated Q3 2022*	*To be completed*
Erosion and Sediment Control Plan Site Permit and Post-Construction Runoff Permit	*Kenosha County* *Department of Planning and Development* *Mark Jenks* *County Conservationist* *Mark.Jenks@kenoshacounty.org* *(262) 587-1900*	*Preliminary Plat Review Procedure*	*Anticipated Q3 2020*	*To be completed*
Sanitary Permit	*Kenosha County* *Department of Planning and Development* *Alex S. Priesgen, R.s.* *Sanitarian* *(262) 857-1910* *Alex.Priesgen@kenoshacounty.org*	*Septic system construction permit.*	*Anticipated Q3 2020*	*To be completed*
Driveway Permit	*Kenosha County Highway Division* *Clement Abongwa, PE* *Director* *(262) 857-1872* *Clement.Abongwa@kenoshaCounty.org* *DPWPermits@kenoshacounty.org*	*For new driveway entrances on county and township roads.*	*Anticipated Q3 2020*	*To be completed*
Building Permit	*Kenosha County* *Department of Planning and Development* *Ben Fiebelkorn*	*New construction*	*Anticipated Q3 2020*	*To be completed*

Table 1.8.1 – Regulatory Permits and Approvals				
Permit	*Regulatory Agency and Contact*	*Trigger/Notes*	*Filing Date*	*Status*
	Uninc. Townships Senior Land Use Planner *(262) 857-1901* *Ben.Fiebelkorn@kenoshacounty.org*			
Building Permit	*Town of Paris* *Building and Zoning Department* *Don Fox* *Building Inspector* *262-878-3358*	*New Construction*	*Anticipated Q3 2020*	*To be completed*

Any wetland impacts are expected to be limited in nature and permitted under USACE Section 404 and Wisconsin DNR General Permits. As such, a Section 401 permit is not anticipated. Field wetland delineations were performed in 2019 and provided to DNR review to confirm this assumption. Any required permits will be applied for following PSC approval of the Project footprint.

No endangered species impacts are anticipated that would require permits from the US Fish and Wildlife Service (USFWS).

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 Paris 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 7/27/2018 Updated 4/10/2019 and 12/20/2019	2/13/19, 4/1/19	Completed (Confidential **Appendix K**)
Engineering Plan	DNR	CPCN	3/1/19	2/13/17	Response Received 3/6/19 (**Appendix A**)
Federal Threatened and Endangered Species Consultation	USFWS	CPCN	IPaC 12/11/2018 Updated 2/11/2019 and 12/20/2019	Invited; Declined to attend 4/1/19	Completed (**Appendix A**)
Noise Receptors and Visual Simulation Location Review	PSC	CPCN	NA	3/25/19	Completed review of proposed noise monitoring and visual simulation locations.

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. Paris 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 Paris Solar commissioned a Solar Monitoring System (SMS) in Q4 2019, which will help to further refine energy estimates once sufficient data is received.

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

Paris Solar will have an estimated gross capacity factor of between 24 and 36 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. An industry-wide estimate of energy losses ranges from fifteen to twenty percent (15 to 20 percent) of maximum output.

2.1.3.2 *Estimated net energy production.*

Paris Solar estimates an average annual output of between approximately 300,000 and 500,000 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 wide range 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 will most likely use bifacial technology, which, unlike a monofacial module, contains a back side of glass instead of white plastic, 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 any 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.

Paris Solar will take into account 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 550 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 and racking systems 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. In addition, because the physical characteristics are very similar across technologies, the differences in impact from one specific product to another are very minor.

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 2021. 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 550,000 to 750,000 high efficiency solar PV panels.

2.2.4 *Technical characteristics of panels.*

2.2.4.1 *Panel physical dimensions.*

2.2.4.2 *Panel material/type.*

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**. If solar panels are purchased from a company other than the ones previously mentioned, the panel dimensions will fall within or 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.

2.2.4.3 *Highest and lowest points during daily rotation.*

At zero degrees, the PV modules will be 4-10 feet off the ground, depending on final design. At 60 degrees (tilted to the highest position), the top edge of the modules will be no more than 15 feet above ground at their highest point.

2.2.4.4 *Any surface treatment of panels.*

During the manufacturing process, all solar panel manufactures listed in the preceding sections treat the surface of each panel with an anti-reflective coating to minimize glare and increase efficiency. On-going 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. Paris Solar will provide the power curve of the final, selected module.

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

Paris Solar has reviewed the closest weather station's climate history, as verified by the Solar America Board for Codes and Standards. Final tracking system components and pile sizes and depths will be designed to meet local building codes for extreme wind speeds. 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 modules and underlying structures from high directional winds. Paris Solar intends to purchase panels with the stowing feature included. Likewise, the modules can be rotated to avoid snow loading if warranted. For example, if the modules are normally stowed flat in the evenings and a snowstorm is predicted, if wind conditions are conducive (that is to say, calm), the modules could be tilted to a maximum angle to reduce snow accumulation. Paris Solar intends to purchase modules that have the ability to rotate as described. The final selection will assume an operating scenario where equipment can operate in the most extreme heat and cold, or potentially pause tracking operation until these conditions pass. Any module selected will meet international standards for hail ratings.

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.*
2.2.6.2 *Tracking system used.*
2.2.6.3 *Dimensions and number of sections required.*
2.2.6.4 *Typical distances between rows, access roads, and fences.*

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 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 inverter loading ratio selected during final electrical design. The solar arrays are mounted on a single-axis tracking system, which will entail the installation of mechanisms that track the daily movement of the sun. 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; ATI uses a linked row system with one motor per multiple racks.

To track the position of the sun, the tracking systems use either pre-defined algorithms or machine learning. Motors are controlled via ethernet and/or WiFi signals. The sound impact of all technologies being considered is negligible and is covered in more detail in Section 5.17 and **Appendix P**.

Based on the information provided in the Technical Data Sheets for the mounting systems under consideration, the tracker dimensions ranges from a width of 6.4 feet to 12.8 ft. 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.

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 power block 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. 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 National Electrical Safety Code (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 National Electrical Code (NEC)[2] addresses the requirements for PV solar arrays in Section 691 for projects greater than 5 MW. Fencing requirements are in Section 110.31.

[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

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 areas are shown on **Figures 4.1.1** and **4.1.2**. 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. The expectation is to use leased areas which do not include array locations.

2.3.1.3 *Parking area.*

Construction parking will be contained within the construction laydown areas 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 32 miles of underground collection will be required for the Project. Depending on the final design, approximately 10 collector circuits are expected to be needed to connect the solar arrays to the Project Collector Substation.

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). 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 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 be direct buried in native soil arranged in a triangular configuration with 48" of cover in a 12" wide trench. Parallel trenches will be separated by 15' 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)[2]. 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.).*

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

Per the preliminary geotechnical report (**Appendix T**), Paris Solar expects to use steel, driven piles, with a minimum embedment depth of 8 feet for both panel foundations and inverter foundations. Piles will vary in size and embedment depth and may or may not be galvanized. Typical driven pile foundations are approximately W6x8 to W6x10 steel sections with 6 to 20 ft embedment and 3 to 10 ft of reveal height. 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. Construction details for driven, cast-in-place, and helical piles as well as pile refusal plans are provided in **Appendix D**.

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.

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

Paris 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 within the Project Area. Excess/excavated soil will only be spread within the Project Area in accordance with terms of the solar lease agreements with landowners. Spreading subsoil on cropland/pasture will be avoided.

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 foundation.

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.

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 twelve (12) borings within the Project Area.

Per the 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 1,500 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.

Terracon recommends a pile embedment depth of 12 feet for all PV array piles, and a minimum drilled shaft embedment of 15 feet for the substation area. Paris Solar expects that driven piles would have between 12 and 16 foot embedment depths, and helical piles would have embedment depths of less than 12 feet. A final geotechnical study, including pile load testing, will be completed prior to construction which will confirm exact pile requirements; embedment depths as low as 7 feet may be acceptable upon completion of these studies. The final decision 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 to 20 feet wide, will be constructed within the Project boundary and are shown in in **Appendix B**. Approximately 14 miles of access roads are anticipated for the Project based on current design estimates, predominantly within the array fence boundaries; the projected amount of temporary access roads is 6 miles. Final project inputs and engineering will determine the final

mileage number and location for both temporary and permanent access roads and may vary from the numbers or locations projected. 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. Paris 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. Temporary widening of roads to approximately 24 feet may be required in certain areas if necessary for construction traffic/deliveries

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

Both permanent and temporary 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.

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.*

As noted in previous sections, suitable permanent access roads are typically 12 to 20 feet wide. Suitable temporary access roads may be 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. Small temporary laydown yards may also be installed adjacent to permanent access roads to support construction equipment.

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. 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.*

The general construction laydown areas are described in Section 2.3.1.2 and shown on **Figures 4.1.1** and **4.1.2**. 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**. No additional laydown areas or materials storage outside of the array sites are planned for the Project and the anticipated footprint of laydown areas is up to 50 acres.

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

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

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

After construction is complete, the gravel surface would be removed, the soil would be de-compacted, and the site would either be seeded or immediately returned to agricultural use, depending upon the season.

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.

Potentially hazardous materials in fire suppression agents used for the battery system are listed below. The fire suppression agents proposed by Paris 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 Paris 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. Secondary containment will be provided for fuel tanks and for the substation transformers. Spill kits will be available on site, and training, inspection protocols, and response procedures will be established in the SPCC Plan.

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, Paris 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 on-coming traffic.

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

An excerpt from the Kenosha County General Zoning and Shoreland/Floodplain Zoning Ordinance regarding Exterior Lighting Standards (12.18.8-1) is located 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 National Electric Safety Code[1].

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

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

Paris Solar has an option to purchase approximately 77 acres for the combined use of the O&M Building, Project substation, potential BESS and some array areas, as the O&M, project substation and BESS will not occupy all 77 acres. The number of acres expected to be used for the new substation is approximately 2 acres as depicted in **Figures 4.1.4** and **4.1.5**. The ultimate location of the substation on the stated 77 acres 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 200 x 250 feet. The proposed layout on the parcel is depicted on **Figure 4.1.4**. The substation likely will be located in the northeast corner of the parcel in a flat area of the field. A line of trees along Highway D will partially obscure the substation from the road.

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 Paris Solar has an option to purchase up to 77 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 involve, in the following likely 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 National Electric Safety Code[1]. 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 Paris Project as part of the MISO AUG-2017-EAST(WI) study group. Some of these upgrades are shared between Paris and other projects in the same MISO study group.

- One new 138kV position at the Paris 138kV Substation
- A new 345kV substation adjacent to the existing Paris Substation, with a new 138/345kV transformer and sectionalize the existing 345kV Arcadian - Zion line into new 345kV substation.
- Short circuit upgrades at Arcadian, Berryville and Elkhorn substations.

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 shall be located between the Paris Solar project substation and the interconnection substation to span the 0.1 miles (≈530 feet). The gen-tie line shall 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 shall be designed and built in compliance with the National Electric Safety Code[1].

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 Paris Solar intends to purchase for the Project collection substation and land owned by Wepco where the Paris substation currently is. Paris Solar does not yet have an easement with Wepco but anticipates being able to negotiate it with Wepco upon successfully obtaining a CPCN.

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

Paris has requested interconnection to MISO. As part of 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. Paris Solar is part of MISO AUG-2017-EAST(WI) study group. Paris has participated in Kick-Off calls for the each of the DPP Phases (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 2/5/2019.

Paris, 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. Paris Solar has had a telephone conference and exchanged emails with ATC representatives to discuss the proposed Paris 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 positions J878 requesting the Interconnection of 200 MW of solar generation to the Paris 138kV Substation. The queue position is

in MISO Definitive Planning Phase (DDP)-2017-AUG-East (ATC) study cluster. DPP1, and DPP2, DPP 3 and Facilities Studies have been published and reports are attached as **Appendix A**.

Projects in MISO Definitive Planning Phase (DDP)-2017-AUG-East (ATC) study cluster have concluded their GIA and MPFCA negotiations.

As of the writing of this Application, Paris is awaiting MISO to tender an executable Generator Interconnection Agreement (GIA) and related Multi Party Facility Construction Agreements (MPFCA) for shared upgrades. Once tendered Paris will have up to 60 days to execute. ATC and MISO will execute after.

As described below in section 2.7, Paris Solar also owns queue position J1316 for 50 MW of battery storage in the MISO Definitive Planning Phase (DDP)-2019-East (ATC) study cluster.

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.

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

The Project expects the facility will house 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.*

Paris Solar expects that the 77-acre land purchase described in section 2.4.2 will be adequate for site access, substation, O&M, BESS, parking and storage areas with extra space area available for siting of solar arrays. 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.

2.6.4 *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 4.1.5**.

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 4.1.5**. As Paris 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 Kenosha 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 would have an adjacent parking area of approximately ten parking spots to anticipate a maximum load of five permanent employees' vehicles and five 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 permeant storage area expected.

2.6.6.3 *Supplies of water.*

Paris 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. 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 second scenario, one or more steel buildings, totaling approximately 350' long and 170' wide would house the batteries. Likely in between the battery building and the project substation would be a graveled area 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 switchgear, next to a common bus, which will finally connect directly to the project substation. Structures would be mounted on concrete slab or pier foundations. For safety and security, the same fencing surrounding the solar arrays would be installed around the battery facility. **Figure 4.1.4** 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 Paris 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. 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.

Paris Solar is the owner of MISO queue position J1316 for 50 MW of battery storage capacity. This position was filed after the initial generation position and is in the DPP-2019-APRIL cycle. No studies have been completed to date. Paris Solar will update the Commission with studies as they become available and will adhere to any and all requirements the study process produces.

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 a DC-coupled system, the power delivered at the point of transmission interconnect, resulting from generation and battery storage, would not increase beyond 200 MW with the inclusion of the batteries, as the batteries will serve to compliment the solar facility by smoothing, shifting, or firming the solar generation. Presuming the ongoing MISO studies result in a viable set of upgrades, in an AC-coupled system, peak power delivered at the point of transmission interconnect, resulting from generation and battery storage, could rise by up to 50 MW.

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 Paris Generating Station’s large water towers, existing substation and existing transmission lines, the BESS’s steel building and external electrical yard would not be 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. Finally, the BESS components will contribute relatively minor additional noise, which Paris Solar believes will still enable the Project to abide by applicable noise regulations.

The storage enclosures or containers will have a self-sufficient 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, Paris 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, Paris 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 remote 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.

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. Construct laydown yard(s) and office trailers.

3. Access road construction and grading of the array areas, including delivery of aggregate for roads
4. Racking pile deliveries behind the grading crews as they progress through site
5. Delivery and installation of inverters
6. Delivery of medium voltage cable
7. Installation of medium voltage cable underground
8. Installation of the racking piles
9. Delivery of the racking system components
10. Installation of the racking system
11. Delivery of the solar panels
12. Installation of the solar panels
13. Installation of miscellaneous equipment such as DC collection
14. Commissioning the plant
15. Commercial operation

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. The anticipated timing to complete construction on the entire site is 24-30 months.

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 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, Paris 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 Kenosha and Racine Counties, labor workforce for the Projects is 25% as there are a limited number of employees in the construction segment of Kenosha and Racine Counties. During the Project's operational life, four full-time employees are expected are expected to reside locally.

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.*

Paris 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. 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, Paris 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, Paris 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, Paris 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'.

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.

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 Area will likely be on County Line Rd, Co A, 12th Street, and US-45. County and Township roads within the Project Area 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 County Line Rd and Co D. Applicable oversize/overweight permits will be obtained for the final route prior to delivery.

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

Paris Solar has had preliminary conversations with the Kenosha County Executive and top staff, the Kenosha County land development staff, Paris Town Board Chair, and Paris Plan Commission Chair to discuss local agreements and will negotiate in good faith with Kenosha County and the Town of Paris to reach appropriate arrangements regarding road use. Paris Solar will have an obligation to repair any road damaged caused by Project construction. Paris 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.*

As noted in the preceding section, Paris Solar has already been in communication with local authorities to discuss coordination prior to construction where a determination of any road improvements necessary to accommodate construction traffic are required. Paris Solar does not expect that local existing roads need to be modified, expanded, or reinforced to accommodate delivery of equipment.

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** for preliminary Project haul routes. A majority of the local roads in the Project Area will be used. Every town or county road that is planned for a solar array access road entrance will be affected by construction.

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 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 is provided in **Appendix B** and includes the information identified in 4.1.5.1. **Figure 4.1.5** is provided in **Appendix B** and includes the information identified in 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 Area.

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 4.1.6.7 is 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 Area 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. Line locations have been provided based on aerial photos and are depicted in **Figure 4.1.2**.

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. Line locations have been provided based on aerial photos and are depicted in **Figure 4.1.2**.

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, Paris 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, Paris 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 previous prompts, aerial photos of the project area and surrounding landscape are provided for a 2-mile radius from the project boundary.

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.

4.3 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 area and surrounding landscape are provided with the other requested shapefiles in **Appendix V.**

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 Area are included in **Appendix E**.

Photo locations were selected to represent areas frequented by the public, and include the edges of the nearby villages, well-traveled highways, and a school 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 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) Preliminary Bedrock Geologic Map of Kenosha County[3] maps the bedrock of the entire Project Area as Silurian Dolomite, including the Waukesha Formation (medium grained, light to medium gray, locally cherty), the Brandon Bridge Formation (very argillaceous, pale green to pink), and the Racine Formation (medium to coarse grained, very light to light gray, fossiliferous). Based on a WGNHS Depth to Bedrock Map of Kenosha County, Wisconsin[4] the expected depth to bedrock at the Project site is generally between 50 and 200 feet below ground surface (bgs), except for the area between the city of Paris and the Racine County Line, where bedrock may be less than 50 feet bgs. A historic fault is mapped within the Project site, however, southeastern Wisconsin is generally considered an area without notable risk of seismic activity.

According to the Natural Resources Conservation Service[5], the major soil units in the Project Area are Markham silt loam (thin loess over calcareous silty and clayey till, 1070 acres), Montgomery silty clay (calcareous silty and clayey lacustrine deposits, 830 acres), Ashkum silty clay loam (clayey colluvium over till, 725 acres), Elliott silty clay loam (loess over calcareous silty till, 725 acres), and Varna silt loam (loess over silty loamy calcareous till, 470 acres). Controlling depositional environments are wind-blown and stream-deposited fine grain soils over well-graded glacial till and outwash. The majority of the site is classified as both high and low plasticity silts (ML, MH) and clays (CL, CH) by the Unified Soil Classification System (USCS), with approximately 250 acres of soils with high organic content (PT).

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.*

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.*

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[3] Peters, R. M. Wisconsin Geological and Natural History Survey. 2004. Preliminary bedrock geologic map of Kenosha County, Wisconsin. WGNHS Open-File Report 2004-13A.
[4] Peters, R. M. Wisconsin Geological and Natural History Survey. 2004. Preliminary depth to bedrock map of Kenosha County, Wisconsin. WGNHS Open-File Report 2004-13C.
[5] National Resources Conservation Service. Web Soil Survey. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed 2020.

- *Discuss the likelihood or potential that construction on bedrock formations may negatively impact private wells within two miles of solar array sites.*

A preliminary geotechnical engineering report was performed by Terracon, dated March 1, 2019 (**Appendix T**). Twelve (12) borings were performed within the Project Area. Borings were advanced via hollow stem augers to 20 feet within the proposed PV array and 50 feet at the substation without auger refusal. Traces of shale fragments are noted in several borings at or beneath 6 feet bgs. Bedrock is not expected to affect pile design or construction considerations at this Project. Private wells should not be impacted by foundation construction.

Subsurface conditions encountered generally consist of 13 inches 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. Sand seams, 2-3 feet thick were encountered twice from 13 to 15 ft below ground surface (bgs). Groundwater was encountered in 4 of 12 borings (all in the NE portion of the site) at depths of 6, 13.5, 13.5, and 13.5 ft bgs. It should not be assumed that the absence of observable water in the other borings means the boring was terminated above groundwater. Due to the low permeability of fine-grained soils, it may require a relatively long period of time after drilling for groundwater levels to equilibrate.

5.2 Topography

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

The existing topography within the Project Area can be described as rolling hills, though the developed and agriculture areas have a relatively flat grade. Surface elevations range from 854 to 680 feet above mean sea level (**Figure 4.1.3**). The lowest elevations are along the few streams and drainages present, particularly the Des Plaines River through the western part of the Project Area. 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 within the Project Area are anticipated, but expected to be minimal. Panel arrays will be designed and constructed to follow the existing topography when possible. Access roads would generally be designed at existing grade to minimize significant grading.

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 common row crops within the Project Area are corn (*Zea mays*) and soybeans (*Glycine max*). Hay and pasture land are typically dominated by alfalfa (*Medicago sativa*) or orchard grass (*Dactylis glomerata*) respectively. See **Table 5.3.2** for acreages of the Agricultural land cover categories.

5.3.1.2 *Non-Agricultural upland*

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

Grasslands within the Project Area are typically dominated by big bluestem (*Andropogon gerardii*), Aster (*Aster* spp.), and smooth brome (*Bromus inermis*) in drier areas and reed canary grass (*Phalaris arundinacea*) in wetter areas (**Table 5.3.2**).

Upland woodlands are typically comprised of maple/basswood/ash/aspen *(Acer saccharum*/*Tilia americana*/*Fraxinus pennsylvanica/Populus tremuloides*) or bur (*Quercus macrocarpa*) and white oak (*Quercus alba*). The woodland communities are defined by the Natural Communities of Wisconsin[6] as Southern Mesic Forests, Southern Dry-Mesic Forests, or Southern Dry Forests. Some red (*Pinus resinosa*) and white pine (*Pinus strobus*) plantations are also located within the Project Area (**Table 5.3.2**).

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

Wetlands within the Project Area include seasonally flooded basins, floodplain forest, shallow marsh, wet meadow and shallow open water type wetlands[7]. 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].

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[6] 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.

[7] 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.

Seasonally flooded basin wetlands are typically located within agricultural fields and are often bare ground or dominated by agricultural weeds. Wet meadow and shallow marsh wetlands within the Project Area are dominated by graminoids such as reed canary grass and cattails (Typha spp). Because much of the Project Area is used for agricultural purposes, the herbaceous wetlands are typically disturbed and contain non-native plant species.

There are likely no bog or fen features within the Project Area as these wetlands are typically not found in this area of the state and land cover within the Project Area is mostly agricultural (**Table 5.3.2**). Results of the field wetland delineation identified no bog or fen features (**Appendix U**).

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 Area was originally mapped and described using data and descriptions from the Wiscland 2.0 Land Cover Data (WLCD)[8], 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 January 2019 in order to conduct a high-level evaluation of the accuracy of the land cover types. The WLCD was also compared to 2018 NAIP photography to further evaluate current land cover conditions within the Project Area. 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 Area

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

and have used those numbers in **Table 5.3.2** below. It is worth noting that wetland land cover and wetland land cover impact quantities identified in this section are based on the land cover digitizing effort. Actual wetland impact quantities based on field delineation are provided in Section 8.3, **Appendix U** and depicted in **Figures 8.3.1** and **8.3.2**.

Ten land cover types were recognized and mapped within the Project Area based on the land cover digitizing effort described above. Row/traditional crops, prairie/grassland/pasture/fallow field, upland forest, shallow marsh, seasonally flooded basin, floodplain forest, wet meadow, shallow open water, residential and commercial/industrial comprise the land cover types within the Project Area (**Table 5.3.2**).

Table 5.3.2– Estimated Land Cover Type Within Project Area

Land Cover Category*	Land Cover Type *	Acreage	Percentage
Agriculture	Row/traditional crops	3,961.30	74.0
Non-Agriculture Upland	Prairie/grasslands/pasture/fallow field	523.23	9.8
	Upland forest	120.87	2.3
Wetlands* *	Seasonally flooded basin	141.64	2.7
	Floodplain forest	103.98	1.9
	Shallow marsh	81.31	1.5
	Wet meadow	34.55	0.7
	Shallow open water	1.88	1.5
Developed Land	Commercial/industrial	250.17	4.7
	Residential	130.60	2.4
	Total	**5,349.58**	**100.0**

*Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.
See **Section 8.3, Appendix U and **Figures 8.3.1** and **8.3.2** for actual wetland quantities and impact amounts.

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 **	Permanent Impacts	
	Area (Acres)	Percent of Total Project Area
Row/traditional crops	1,477.26	27.61
Prairie/grasslands/pasture/fallow field	137.57	2.57
Upland forest	10.18	0.19
Seasonally flooded basin	5.30	0.10
Floodplain forest	4.58	0.09
Shallow marsh	0.34	0.01
Wet meadow	4.72	0.09

Table 5.3.3.1 – Array Area Land Cover Impacts*		
Land Cover Type **	**Permanent Impacts**	
	Area (Acres)	**Percent of Total Project Area**
Shallow open water	0.00	0.00
Commercial/industrial	5.59	0.10
Residential	0.71	0.01
Total	**1,646.27**	**30.77**

*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 our vegetation management strategy. 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.*

Table 5.3.3.2 – Collection System Land Cover Impacts*		
Land Cover Type **	**Temporary Impacts**	
Row/traditional crops	19.09	0.37
Prairie/grasslands/pasture/fallow field	0.29	0.01
Upland forest	0.00	0.00
Seasonally flooded basin	0.48	0.01
Floodplain forest	0.00	0.00
Shallow marsh	0.47	0.01
Wet meadow	0.13	0.01>
Shallow open water	0.00	0.00
Commercial/industrial	0.39	0.01
Residential	0.00	0.00
Total	**20.84**	**0.39**

*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.

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.

5.3.3.3 *Access roads*

Table 5.3.3.3 – Access Road Land Cover Impacts*				
Land Cover Type **	**Permanent Impacts**		**Temporary Impacts**	
	Area (Acres)	**Percent of Total**	**Area (Acres)**	**Percent of Total**
Row/traditional crops	3.31	0.06	1.68	0.03
Prairie/grasslands/pasture/fallow field	0.05	0.01>	0.04	0.01>
Upland forest	0.00	0.00	0.00	0.00
Seasonally flooded basin	0.00	0.00	0.00	0.00
Floodplain forest	0.00	0.00	0.01>	0.01>
Shallow marsh	0.00	0.00	0.03	0.01>
Wet meadow	0.00	0.00	0.00	0.00
Shallow open water	0.00	0.00	0.00	0.00
Commercial/industrial	0.13	0.01>	0.11	0.01>
Residential	0.00	0.00	0.00	0.00
Total	**3.49**	**0.07**	**1.85**	**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.				

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 20 feet. 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).

5.3.3.4 *Substation and BESS*

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	1.80	0.01>	3.72	0.01>
Prairie/grasslands/pasture/fallow field	0.00	0.00	0.00	0.00
Upland forest	0.00	0.00	0.00	0.00
Seasonally flooded basin	0.00	0.00	0.00	0.00
Floodplain forest	0.00	0.00	0.00	0.00
Shallow marsh	0.00	0.00	0.00	0.00
Wet meadow	0.00	0.00	0.00	0.00
Shallow open water	0.00	0.00	0.00	0.00
Commercial/industrial	0.00	0.00	0.00	0.00
Residential	0.00	0.00	0.00	0.00

Total	**1.80**	**0.01>**	**3.72**	**0.00**
*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.				

The land purchased for the combined use of the O&M Building, Project substation and BESS is approximately 77 acres. The preliminary substation design assumes the footprint will be approximately 275 x 275ft. The BESS footprint is estimated at 3.72 acres; land cover impacts are summarized in **Table 5.3.3.4.** The proposed layout of the parcel is depicted in **Figure 4.1.4/4.1.5** in **Appendix B**.

5.3.3.5 *O&M Building*

Table 5.3.3.5 – O&M Building Landcover Impacts*		
**Land Cover Type ** **	**Area (Acres)**	**Percent of Total**
Row/traditional crops	2.30	0.04
Prairie/grasslands/pasture/fallow field	0.00	0.00
Upland forest	0.00	0.00
Seasonally flooded basin	0.00	0.00
Floodplain forest	0.00	0.00
Shallow marsh	0.00	0.00
Wet meadow	0.00	0.00
Shallow open water	0.00	0.00
Commercial/industrial	0.00	0.00
Residential	0.00	0.00
Total	**2.30**	**0.04**
*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.		

The land purchased for the combined use of the O&M Building, Project substation and BESS is approximately 77 acres. The preliminary O&M Building design is expected to require 4,000 to 5,000 square feet. The proposed layout of the parcel with the O&M Building is depicted in **Figure 4.1.4/4.1.5** in **Appendix B**.

5.3.3.6 *Generator tie line*

Table 5.3.3.6 – Generator Tie Line Land Cover Impacts				
Land Cover Type *	**Permanent Impacts**		**Temporary Impacts**	
	Area (Acres)	**Percent of Total Project Area**	**Area (Acres)**	**Percent of Total Project Area**
Row/traditional crops	0.00	0.00	0.10	0.01>
Prairie/grasslands/pasture/fallow field	0.01>	0.01>	0.59	0.01
Upland forest	0.00	0.00	0.00	0.00
Seasonally flooded basin	0.00	0.00	0.00	0.00

Table 5.3.3.6 – Generator Tie Line Land Cover Impacts				
Land Cover Type *	**Permanent Impacts**		**Temporary Impacts**	
	Area (Acres)	**Percent of Total Project Area**	**Area (Acres)**	**Percent of Total Project Area**
Floodplain forest	0.00	0.00	0.00	0.00
Shallow marsh	0.00	0.00	0.00	0.00
Wet meadow	0.00	0.00	0.00	0.00
Shallow open water	0.00	0.00	0.00	0.00
Commercial/industrial	0.00	0.00	0.11	0.01>
Residential	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.80**	**0.01**
*Land cover categories based on Wiscland 2.0 Land Cover Data; See Section 5.3.2.1 for methods of calculation.				

Land cover impacts resulting from the 100-foot wide ROW for the 0.10-mile gen-tie line are summarized in **Table 5.3.3.6** above.

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 2019 survey conducted by AES ecologists 34 non-native or invasive species were observed (**Appendix W**). Invasive species were mainly concentrated around field edges and roadside ditches in small localized populations. Commonly encountered invasive species included smooth brome (*Bromus inermis*), dandelion (*Taraxacum officinale*), Kentucky bluegrass (*Poa pratensis*), white campion (*Silene latifolia*), white mulberry (*Morus alba*), Canada thistle (*Cirsium arvense*), common burdock (*Arctium minus*), common buckthorn (*Rhamnus cathartica*), hybrid cattail (*Typha* X *glauca*), reed canary grass (*Phalaris arundinacea*) and narrow-leaved cattail (*Typha angustifolia*). Emerald ash borer, gypsy moth, and oak wilt, although not encountered in the Project Area, have the potential to occur in Kenosha County.

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.*

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

Mitigation measures will include the use of topsoil and fill from the Project Site or a local source in order to prevent the spread of or introduction of invasive species. 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. Weedy herbaceous and woody plant species will likely enter the solar farm from Right of Ways (ROWs) and treelines crossing through the Site. ROWs and treelines will be a top priority for monitoring high potential of invading species through seed dispersal, with spot-herbicide treatments to be performed as-needed. For full details refer to the Ground

Cover Strategy in **Appendix W** for information in response to Sections 5.4.2 and 5.4.3. Additional information regarding Paris 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.*

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

5.5.1.3 *Invasive species monitoring and management.*

The Strategy's phased approach begins with site soil preparation (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. For full details, refer to the Ground Cover Strategy in **Appendix W** for information in response to Sections 5.5.1.1 through 5.5.1.3.

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 Paris 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 Area.

As detailed in Section 5.3.2 (or **Table 5.3.2** and **Figure 4.1.6.4**), the land cover within the Project Area is dominated by cultivated crops (74%), such as corn and soybean. Corn and soybean 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 red -tailed hawk

(*Buteo jamaicensis*). After crops are harvested, the fields may offer short term foraging areas for common waterfowl including Canada geese (*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.

Hay and pastureland offer a similar disturbed habitat as that found in the agricultural areas and make up less than 10% of the Project Area. 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.

Forested habitat within the Project Area, which comprises less than 3% of the Project Area, is fragmented and predominately located adjacent to agricultural fields as tree lines, along waterways and associated with farmsteads. Species that may use these forested areas are those adapted to small woodlots including 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 in the project (~6%), thus disturbance should not negatively impact the populations of these forest-dwelling species.

Developed areas, which comprise 7% of the Project Area, 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[9,10,11]. 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.

The wetland habitat within the Project Area may be used by species such as the red-winged blackbird (*Agelaius phoeniceus*), mallard, blue-winged teal (*Anas discors*), great blue heron (*Ardea herodias*), as well as other bird species. 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.

Paris Solar will limit impacts to non-agricultural lands and use best management practices to avoid, minimize and mitigate impacts to suitable wildlife habitat and populations.

Federally protected species

A USFWS[12] Information for Planning and Consultation (IPaC) request (**Appendix A**) identified three federally protected species as potentially occurring within the Project Area or the two-mile buffer. Two of the species identified were animals, including the [redacted] is not identified in the IPaC, it is included here due to being federally protected and its potential to occur within the Project Area or surrounding region. Also, although no longer federally listed, the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) protects bald eagles (*Haliaeetus leucocephalus*), their parts, nests, and eggs. The remaining federally listed species identified in the IPaC is a plant, [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

[9] 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.
[10] 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.
[11] 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.
[12] Unites States Fish and Wildlife Service. 2019. Information for Planning and Consultation – Paris Solar.

agricultural fields, old fields, and pastures. As Project-related impacts to forested areas (roosting habitat) are largely limited and impacts to foraging areas (i.e., agricultural, pastureland, wetlands) will not reduce the quality of non-forested foraging areas beyond temporarily during construction, [redacted] habitat and populations will not be negatively affected.

[redacted] typically use large wetland complexes to forage, nest, and roost. The Richard Bong State Recreation Area, located 2.1 miles east of the Project Area, could provide suitable habitat for [redacted] However, no impacts to large wetland complexes are expected from Project construction or operation, and therefore [redacted] populations will not be negatively affected.

The [redacted] occurs in a variety of habitats, including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens[13]. 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 [redacted] Project-related impacts to suitable [redacted] habitats will not negatively affect [redacted] populations as implementation of the vegetation management strategy (see **Appendix W**) will create habitat similar to those used by the species.

Bald eagles select sites near lakes and rivers in forested areas where tall, large diameter trees are available for nesting and roosting[15]. Bald eagle wintering grounds typically contain open water, ample food, and roosting sites. Bald eagle stopover habitat is similar to wintering habitat, with food supply being the most important factor. The majority of wintering eagles are found near open water where they feed on fish and waterfowl. As Project-related impacts to forested roosting/nesting habitat or aquatic foraging habitat is limited, it is unlikely that bald eagle habitat or population will be negatively affected.

[redacted] inhabit wet, undisturbed native prairies. Sometimes [redacted] occur in calcareous prairies and tamarack fens. Given there are no undisturbed prairies or tamarack fens within the Project Area, no impacts [redacted] populations or habitats are anticipated.

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[13] Colla, S.R. and S. Dumesh. 2010. The bumble bees of southern Ontario: Notes on natural history and distribution. Journal of the Ecological Society of Southern Ontario 141:39–68.

[14] Goulson, D., E. Nicholls, C. Bouias, and E.L. Rotheray. 2015. Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. Science 347: 1255957-1–1255957-9.

[15] Grier, J.W. and J.E. Guinn. 2003. Bald eagle habitats and responses to human disturbance in Minnesota. Final report to the Minnesota Department of Natural Resources Natural Heritage and Nongame Wildlife Program – Division of Ecological Sciences. 44 pp.

State-listed threatened or endangered species and species of concern

The four federally listed species described above have also been awarded state-level conservation statuses. The [redacted] is state-listed as threatened, the [redacted] are considered species of concern, and the [redacted] is state-listed as endangered. Ten other species with state-level statuses have potential to occur within the Project Area including the [redacted] The seven additional bird species were identified based on results from nearby USGS Breeding Bird Survey routes and National Audubon Society Christmas Bird Counts. The three bat species, all state-listed as threatened, were identified as potentially occurring within the Project Area based on range maps and habitat availability.

The state threatened [redacted] is an uncommon raptor in Wisconsin that typically is found near major rivers. 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[16]. [redacted] typically nest in large trees and forage over open shallow water environments. 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 also includes woodland edge habitat, highway right-of-ways, parks, and residential areas[17]. As Project-related impacts to woodland and wetland habitats is limited, it is unlikely that the Project will negatively affect [redacted] populations.

The state threatened [redacted] forages in wetlands and breeds colonially in trees. 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. [redacted] overwinter in Central America and the coastal United States. Project-related impacts

[16] Dykstra, C.R., J.L. Hays, and S.T. Crocoll. 2008[redacted] The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North American Online: <http://bna.birds.cornell.edu/bna/species/107doi:10.2173/bna.107>

[17] Jacobs, J.P. and E.A. Jacobs. 2002. Conservation assessment for [redacted] National Forest of north central states. USDA Forest Service Eastern Region, Milwaukee, WI, USA.

to suitable woodland and wetland habitats are limited, therefore it is unlikely that [redacted] populations will be negatively affected.

During the breeding season, the [redacted] grassland habitats such as hayfields, pastures, wet meadows, old fields, and Conservation Reserve Program (CRP) land[18]. Though, it should be noted that hayfields and pastures are typically not suitable habitat due to their being disturbed for agricultural purposes. [redacted] overwinter in the southeastern United States. Although Project-related temporary impacts to potentially [redacted] may occur during construction, implementation of the vegetation management strategy, where project lands will be restored in herbaceous vegetation, will create large-scale grassland-type habitats across the Project (see **Appendix W**). Therefore [redacted] populations are unlikely to be negatively affected.

The state threatened [redacted] prefers short grasslands with little forb and woody vegetation cover. [redacted] use lightly grazed pastures, old fields, hayfields, and grasslands for nesting and heavily grazed pasture, hayfields, and row crops for foraging [redacted] overwinter in South America. Similar to [redacted] temporary Project-related impacts to potentially suitable [redacted] habitat may occur during construction. After which herbaceous vegetation will be restored and maintained for the life of the project (see **Appendix W**). Therefore, [redacted] populations are unlikely to be negatively affected.

The state endangered [redacted] 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 such as cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), or burreed (*Sparganium* spp.). [redacted] overwinter in South America. Project-related impacts to suitable [redacted] habitat, expansive open water/emergent wetland complexes, will be negligible [redacted] populations are unlikely to be affected.

The state threatened [redacted] breeds in mature upland and lowland hardwood forests in wet-mesic to dry-mesic habitats[20]. [redacted] in Wisconsin are more likely to occur in large (>200 acres) woodlots. [redacted]

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[18] Wisconsin Bird Conservation Initiative. 2013. Wisconsin All-Bird Conservation Plan: [redacted] Accessed at: http://www.wisconsinbirds.org/plan/species/hesp.htm

[19] Wisconsin DNR. 2018. Wisconsin wildlife action plan: [redacted] ecological landscape associations. https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF06010

[20] Wisconsin DNR. 2018. [redacted] species guidance PUB ER-677. Pp. 8

overwinter in South America. As the Project will not impact suitable [redacted] habitat, it is unlikely that their populations will be negatively affected.

Wisconsin is at the northern edge of the state threatened [redacted] breeding range, and as such they have likely been uncommon in the state historically. However, [redacted] do occasionally breed in the state, most often near large river systems. [redacted] prefer mature, moist deciduous forests with dense understories that are greater than 80 acres in size[21]. [redacted] overwinter in Central America. No Project-related impacts to suitable [redacted] habitat are expected, therefore, [redacted] populations should not be negatively affected.

During the summer months, the state threatened [redacted] uses farmland, urban areas, and edge habitats near water [redacted] roost in trees, caves, attics, [redacted] and the eaves of buildings[22]. [redacted] prefer to forage in urban landscapes along habitat edges, over open water, and along shorelines. During the winter months, [redacted] hibernate in caves, mines, buildings, culverts, and basements. Project-related impacts to natural roosting habitat (i.e., woodlands) is limited and non-forested foraging habitat (i.e., edge habitats and farmland) is temporary during construction (**Appendix W**). Therefore, [redacted] populations are unlikely to be negatively affected.

The state threatened [redacted] in man-made structures during the summer months but will occasionally use trees or rock crevices. [redacted] choose roost sites based on proximity to water, as they prefer to forage over open water, shorelines, or along edge habitat[23]. During the winter months, [redacted] hibernate in caves or mines. Project-related impacts to natural roosting (i.e., woodlands) and foraging habitat (i.e., forest edge habitats, aquatic features) is limited, [redacted] populations are not expected to be negatively affected.

During the summer months, the state threatened [redacted] roost in the foliage of deciduous trees and will often switch roost sites over the course of the summer. Occasionally, [redacted] will use barns for maternity roosts but prefer to use oak or maple trees. [redacted] forage along waterways, forest edges, and in forest canopies. During the winter months, they hibernate in caves or abandoned mines[24]. Project-related impacts to natural roosting and foraging habitat (i.e., woodlands) is limited; therefore, [redacted] populations are not expected to be negatively affected.

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[21] Wisconsin DNR. 2018. [redacted]

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 within the Project Area. Impacts are unlikely for forest-dwelling species such as [redacted] as these species avoid agricultural habitats. Although it is possible that species such as upland sandpiper, big brown bat, and little brown bat may occasionally use the agricultural land that will be developed into the solar facility, it is unlikely Project development will negatively affect these species. 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 Area 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 Area will be disturbed less frequently than it was during row-crop farming practices. Also, the herbaceous habitat available under the panels and in the general Project Area 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 Area; 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 Paris Solar from January 21 to 23, 2019, as a rudimentary habitat survey. The field reconnaissance followed a desktop assessment of the biological resources within the Project Area that was presented as a Site Characterization Study (**Appendix F**). However, no pre-construction wildlife surveys were conducted in the field.

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.*

During a meeting held on April 1st, 2019 with the DNR and USACE, Paris Solar stated they do not plan to mitigate for habitat impacts to any of the state-listed species Westwood identified that were not identified in the ERR. Based on Westwood's review for the several species with moderate to high likelihood of occurrence, there

was low likelihood of impacts to many of those species from construction (e.g., tree removal would be limited). The DNR clarified that they would not require any actions on species that were not included in the ERR report. DNR did ask about the rare bird identified in the ERR that overlapped with the proposed Project development and recommended the Project schedule earth disturbance work in or near suitable grassland habitats for outside the breeding season (April 20 to August 15), or conduct occupancy surveys to determine whether the species was present. The recommended measures for the rare bird would only be applicable where suitable habitat is present and does not include what is currently in row crop production. Last, DNR indicated Paris Solar should check back on the extent of potentially suitable rare bird habitat and consider their habitat requirements in the final Project vegetation management plan, as well as update the ERR consultation prior to breaking ground to ensure no new species or records have been added and extent of potential rare bird habitat is known.

Following a subsequent conversation between the Project and DNR on April 5th, 2019, the area for the rare bird identified in the ERR was further reduced (**Appendix K**). The boundary included row crops, so those areas were removed following the recommendations. During the subsequent field wetland delineation (May 7, 2019), the remaining potential rare bird habitat that was desktop-mapped in April 2019 was identified as unsuitable due to complete conversion to row crop production (**Appendix K**).

USACE commented that, in the CPCN application materials Paris Solar should be as descriptive as possible in the extent and quality of any habitat suitable for use by federally listed species, what avoidance and minimization measures the Project plans to implement, and what remaining impacts, if any, the Project may have.

In terms of USFWS consultation and Project review, Westwood requested an official response through the Information Planning and Consultation (IPaC) system, most recently received on 12/20/2019 (**Appendix A**). No additional surveys were recommended from USFWS. Paris Solar had also invited USFWS to participate in the April 1st, 2019 meeting with DNR and USACE; however, USFWS ultimately declined the invitation.

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).*

Not Applicable, after consultation with the DNR and USFWS no additional studies are required at this time. Paris Solar does not expect to impact suitable habitats for species identified in the ERR. If suitable habitats for the rare bird are identified within the limits of disturbance prior to construction, Paris Solar will coordinate with the DNR on survey needs and requirements.

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

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

During operation, Paris Solar will develop and implement a wildlife response and reporting system, which will allow the Project to assess its wildlife impacts and identify if there are any unanticipated impacts.

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*

5.7.1.2 *Fisheries Areas*

5.7.1.3 *State Parks and Forests*

There are no state-managed parks or wildlife management areas within the Project Area or within two miles of the Project Area.

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 Area or within two miles of the Project Area.

5.7.3 *County Parks*

There are no county parks located within the Project Area, however there are two county parks, Racine County Fairground and Old Settlers Park within two miles of the Project Area. Ryan Moe – Michael Young Memorial Park, is a city park within two miles of the Project Area (**Figure 4.1.6.3**).

5.7.4 *Recreation Trails*

There are no recreational trails on public land located within the Project Area or within two miles of the Project Area.

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 Area.

Table 5.8.1a BRRTS Listings Within the Project Boundary

Site Name	BRRTS #	Facility ID	Closure Status
Great Lakes Dragaway	0352108613	252215040	Closed
Osilius Property	0330003847	230140790	Closed

Table 5.8.1b BRRTS Listings Within 2-miles of the Project Boundary

Site Name	BRRTS #	Facility ID	Closure Status
Birchwood Transport	0330171281	230024850	Closed
Kenosha Beef International	0330000836	230024850	Closed
Paris Consolidated School	0330152981	230108670	Closed
Car Country	0352115401	230216250	Closed
Car Country AST Site	0252242317	230216250	Closed
Jay A & Laura K Menarek Property	0230563397	230212180	*Open*
Schmeckel Farm	0330557958	230204260	Closed
Strip Rite Inc	0230246365	230167740	*Open*
Vara, Frank Property	0352003191	252157400	Closed
Southern Wis Center/Power PLT	0352005005	252098990	Closed
Southern Wis Center/Cottage 17	0352004611	252098990	Closed
Southern Wisconsin Center	0352183667	252098990	Closed
Southern Wis Center/Food Service	0352004612	252098990	Closed
Southern Wis Center/Groundskeeping	0352004613	252098990	Closed
Union Grove High School	0352001064	252101850	Closed
Bob's Mobil Service	0352002195	252060490	Closed
Swatek Sales / S&S Express	0352001436	252156740	Closed
Farmer's Grain & Supply – Union Grove	0252547259	252179950	Closed
Landmark Services Coop PAH & RCRA Metal Investigation	0252578916	252179950	Closed
Farmer's Grain and Supply Coop	0352000913	252179950	Closed
Union Grove Vil	0352001427	252076110	Closed
Landmark Services Cooperative	0252559029	252179950	Closed
Atlantis Family Restaurant	0352548317	252248480	Closed
American Roller	0352002540	252013630	Closed

Table 5.8.1b BRRTS Listings Within 2-miles of the Project Boundary			
Site Name	**BRRTS #**	**Facility ID**	**Closure Status**
American Roller Co Wis Roller PLT	0252275723	252013630	Closed
Stokely USA	0252554238	252006150	Closed
Stokely USA	0352003676	252006150	Closed
Stokely USA – North Parcel	0252554246	252006150	Closed
Farmers Grain & Supply	0352116638	252064890	Closed
Mercury Waste Solutions Inc	0252305231	252195350	Closed
Gunderson Property (FMR Bardon Rubber)	0252562619	252274550	Closed
Bardon Rubber Former	0252561016	252005160	Closed
Grove Gear Div of Regal-Beloit Corp	0252235433	252172690	*Open*
Mikes Xpress	0252241538	252236930	Closed
Mikes Xpress	0352554897	252236930	Closed
Union Grove Elementary School	0352004654	252189410	Closed
Pugh Oil Former Martins Garage	0352215652	252060380	Closed
Pugh Oil	0352000999	252089970	Closed
Joe's Sales & Service	0352001915	252136610	Closed
Sun Enterprises	0352153238	252060270	Closed
Whitley Farms Inc	0352175281	252221200	Closed
Albert, Joseph Residence	0352114441	252216030	Closed
Tank Transport	0252000867	252166970	Closed
Jerry Willkomm Inc	0330250389	230048500	Closed
Ruffalo Painting Co	0330001672	230095800	Closed
Stuckeys (Former)	0330001905	230127040	Closed
Speedway Station #7268	0330003333	230134080	Closed
Agarwal Property (FMR Gas Station)	0330550652	230194690	*Open*
Fredrick, Robert Property	0330206887	230186000	Closed
Star Bar (FMR)	0220563432	230118680	Closed
Star Bar Restaurant	0330186423	230118680	Closed
Hanks Citgo Station Former – Former Fuel	0330551763	230169170	Closed
SS Express Ln	0330103161	230169170	Closed
Amoco Station #18539	0330002269	230122640	Closed
Seitz Residence	0330576439	230213720	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 Area. According to the WDNR Historic Registry of Waste Disposal Sites, there are no sites located within the Project Area.

Table 5.8.2 Environmental Repair and Solid Waste Listings Within 2-miles of the Project Boundary		
Site Name	**Object ID**	**Site ID**
Southern Wis Center	2351	1532900
Union Grove Village LF	2342	1669800
Union Grove Tile Co	2343	17534100
Blackmon Trucking	2359	4237600
Thomas Hancock	2373	1722800

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**.

Paris Solar has discussed zoning and other local issues with Town of Paris Officials and Kenosha County Department of Planning and Development Staff. In Kenosha County, zoning decision authority is exercised at the county level, unless the local municipality has adopted general zoning regulations under Section 62.23 of

Wisconsin State Statues[25]. Shoreland and floodplain zoning regulation enforcement is retained by the County. The Project Area is sited entirely within the Town of Paris, which is under the zoning authority of Kenosha County. Land in the Project Area is primarily zoned "Agricultural Preservation" pursuant to the conditions of Chapter 12.20-1 of the Kenosha County Zoning Ordinance[26]. Solar infrastructure will be restricted to the A-1 Agricultural Preservation, A-2 General Agriculture, C-1 Lowland Resource Conservancy, and C-2 Upland Resource Conservancy districts. The proposed transmission line will extend from the Project Substation (zoned A-1) to the Paris Substation, which is located in the I-1 Institutional District. Project infrastructure is proposed within lands designated as Shoreland Zoning, as lands are within 300 feet of the ordinary high water mark of a navigable river, stream or the landward side of the floodplain, or is within 1000 feet of a lake, pond, or flowage**Error! Bookmark not defined.**. A Stipulated Shoreland Permit will be acquired for land development activities in the areas designated as shoreland in accordance with Chapter 12 of the Kenosha County Code of Ordinances**Error! Bookmark not defined.**. Kenosha County has a Farmland Preservation Plan in compliance with Chapter 91 requirements[27,28].

Under Wis. Stat. 91.42(2) and 91.46(1)(f)[28], 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)[29], "'[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.

Paris Solar has stated a desire to work cooperatively with Town and County authorities to identify and address issues and concerns. Kenosha County zoning exists for land development and construction activities within the unincorporated Town of Paris. A Stipulated Shoreland Permit will be acquired for earth disturbing activities and placement of structures within areas designated under the Shoreland/Floodplain Ordinance. Communication is ongoing with County and Town Officials.

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[25] Wisconsin State Legislature. Wisconsin State Statutes Section 62.23 – City planning. https://docs.legis.wisconsin.gov/statutes/statutes/62/I/23. Accessed January 22, 2020.
[26] Kenosha County. August 7, 2018. Kenosha County General Zoning and Shoreland/Floodplain Ordinance. http://www.co.kenosha.wi.us/DocumentCenter/View/570/MCKC12?bidId=
[27] Kenosha County Department of Planning and Development. July 2013. A Farmland Preservation Plan for Kenosha County, Wisconsin. https://www.kenoshacounty.org/DocumentCenter/View/2542/A_FARMLAND_PRESERVATION_PLAN_FOR_KENOSHA_COUNTY_2ND-EDITION_JULY_2013?bidId=.
[28] Wisconsin State Legislature. Wisconsin State Statutes Chapter 91 – Farmland Preservation. https://docs.legis.wisconsin.gov/statutes/statutes/91. Accessed January 22, 2020.
[29] Wisconsin State Legislature. Wisconsin Administrative Code Chapter ATCP 49 – Farmland Preservation. https://docs.legis.wisconsin.gov/code/admin_code/atcp/020/49/I/01/19. Accessed January 22, 2020.

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 plans.
- 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.
- Drainage tile and wetlands.
- Archaeological resources within the site.

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

Paris Solar has proposed that a Memorandum of Understanding (MOU) 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 the CPCN approval process.

Paris 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, Paris Solar will work in good faith to reach a mutually agreeable resolution.

For example, two Project Area residents on 180th Avenue have shared with the Paris Solar team that they does not wish to see solar panels installed in a small field adjacent to their property in the foreground in front of an existing tree line along a creek. Paris Solar has modified the solar array area so that solar modules will not be installed in this particular area.

Paris Solar has worked with another existing landowner whose land is located along Co Hwy E (aka 12th St and Somers Rd). This landowner resides in a house very close to an existing gravel driveway that provides access to farmland to the north that is leased by Paris Solar. The resident stated that he is concerned about the health and wellbeing of his pets and children if construction and operations vehicles use that existing driveway. Paris Solar has agreed not to use the existing driveway for construction or operations.

Appendix G includes a study of Health and Safety Impacts of Solar Photovoltaics performed by North Carolina State University[30], 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 (NO x), 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.*

Existing infrastructure within the Project Area includes two natural gas pipelines traveling east to west through the central portion of the Project Area, two natural gas pipelines running north to south (one traveling due south from the Paris Generating Station and the other traveling through the western portion of the project area), and six overhead transmission lines, located throughout the Project Area. Solar infrastructure has been sited to avoid impacts to the identified natural gas pipelines and electric distribution lines to the greatest extent practicable; however, collection lines, access roads and security fences will require crossing existing infrastructure in several locations.

Prior to initiating construction, all crossings will be field-located and existing cover determined. At that time, construction crews will determine the appropriate cover required to provide adequate depth to protect existing infrastructure. Underground collection cables will connect to each individual collection circuit and transfer the produced electricity to the on-site substation. Collection lines will cross the natural gas pipelines underground, as close to a 90 degree angle as possible. Access roads are planned to cross existing natural gas pipelines as close to a 90 degree angle as possible and provide a minimum 48" of cover. Proposed fences that cross existing infrastructure will be field-located and existing cover determined to provide adequate depth to existing infrastructure and avoid negative impacts.

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

Crossing agreements will be sought out with applicable pipeline owners for the proposed access roads, collection lines, and fences.

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 are included in **Appendix I**. Correspondence with PSC Staff has determined that it is acceptable to exclude copies of the plans for jurisdictions that are located outside of the Project Area, as these materials are not relevant or helpful for context. 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**.

If any solar facilities are placed in locations ultimately determined to be archaeologically significant as part of the CPCN approval process, Paris Solar will either relocate those solar facilities or consult with PSC and WHS staff to determine possible studies that would allow for the potential placement of solar panels.

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).*

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

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

Westwood Professional Services requested an updated ERR from the WDNR for the Project on behalf of Paris and received a response on December 20, 2019 (ERR Log# 18-585) (**Appendix K**). The DNR did not identify any required permits or mitigation actions but did mention four recommended actions in their response.

The DNR made recommendations to avoid impacts to three uncommon species, including an avian, plant, and invertebrate species. Paris Solar does not expect to impact suitable habitats for the three species. If suitable habitats are identified, Paris Solar will conduct surveys to detect presence, and if one of the species are observed, Paris Solar will further coordinate with the DNR to avoid impact to said species.

The DNR also indicated that a high-quality natural community may be located within or near the Project Area. The area identified is located outside of the Project Area boundaries. A map of the locations of identified resources is also included in **Appendix K**.

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 pasture are used for grazing or for harvesting hay.

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

Due to the prevalence of poorly drained, very poorly drained, and somewhat poorly drained soils, it is expected that drain tiles will be impacted within the Project Area. Paris Solar engaged Ellingson Technology and Engineering, a qualified and experienced drain tile expert, to proactively enact a multi-faceted approach to identifying the locations of drain tile within the project area. First, Paris Solar reviewed historical satellite imagery of the project area to better identify drain tile locations. Next, Paris Solar reached out to all participating landowners to ask for their assistance in locating tile; requesting drain tile maps, personal general knowledge of their property, and knowledge of existing tile that was placed without written record. Paris Solar will continue communication with landowners on a parcel by parcel basis as construction approaches; possibly utilizing field location services when necessary. A preliminary map of drain tile locations based on satellite imagery is include in **Figure 5.13.2**.

A preliminary map of the drain tile locations based on the satellite imagery review is in **Figure 5.13.2**.

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.*

In accordance with the approach outlined in Section 5.13.2 Paris Solar will take a proactive approach to identify the location of drain tiles, in an effort to mitigate damage to existing tile. Paris Solar will make commercially reasonable efforts to prevent damage to drain tile mains through locating the mains and incorporating the identified locations into engineering designs. In the event damage to a drain tile main is unavoidable and such damage would create adverse drainage effects to participating or neighboring property, Paris Solar will re-route or repair the existing drain tile main during the construction process.

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

Paris Solar is not aware of any farmland preservation agreements inside of the proposed project area.

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

To the best of Paris Solar's knowledge, four 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.*

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. 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.

- Paris 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. Paris 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 who would host solar generation are choosing to do so purely voluntarily.
- As discussed in **Appendix W** ground cover strategy, Paris Solar is seeking to utilize some areas of the array for native seed production. Additionally, Paris Solar will employ commercially reasonable efforts to implement

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

- Paris Solar has prepared new information in **Appendix X** that describes some of the significant, but previously unheralded environmental benefits that come from the proposed Ground Cover Strategy, namely:
    - **Appendix X** predicts phosphorous reductions of 2,777 lbs/year and nitrogen reductions of 10,954 lbs/yr for a 1,646 acre site. This will improve water quality downstream of the Project.
    - **Appendix X** predicts water run-off rate reductions of 1,351 gal/s during a 1-year 24-hour rainfall event and 3,302 gal/s during a 100-year 24-hour rainfall event for a 1,646 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[31]. 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%[32].
    - 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[33]. Perennial native vegetation also creates complex soil food webs which can accommodate a larger population of

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[31] Ecological Society of America. 2006. Mclauchlan, K. K., Hobbie, S. E., & Post, W. M. https://pdfs.semanticscholar.org/bb58/9734841b09cf7e141b905c8d917462170842.pdf. Accessed August 20, 2019.

[32] United States Department of Agriculture. 2012. Conservation Effects Assessment Project. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1048710.pdf. Accessed August 20, 2019.

[33] 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.

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[34].

- 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 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**.

Paris Solar also believes that the Commission's alternative requirement can be part of a strategy to minimize the amount of land required for the development of solar energy projects. Using the Paris Solar project as an example, the concept of using the alternative requirement to minimize the agricultural land used for solar energy development could be described as follows: if the Commission deems all of the presented array areas acceptable for construction beyond the area necessary for 200 MW, then Paris Solar requests the CPCN be granted for the appropriate capacity in excess of 200 MW, but no more than 250 MW. For example, if portions of the array areas totaling approximately 15 MW are not acceptable for solar panel placement but the remaining areas are acceptable for construction, Paris Solar could be authorized to construct up to a 235 MW facility.

The following benefits support the alternative requirement to minimize the amount of agricultural land used for solar energy projects.

First, the modularity of solar panel construction allows panels to be added to an existing project in various amounts assuming all applicable environmental and regulatory requirements are met. By allowing the use of the 25% alternative areas for

[34] Plos One. 2014. Herzberger, A. J., Duncan, D. S., & Jackson, R. D. https://doi.org/10.1371/journal.pone.0115775. Accessed August 22, 2019.

additional solar project development, the Commission could permit an energy developer to use amounts of, for example, 50 MW concerning a 200 MW project or 75 MW pertaining to a 300 MW project to expand the existing project. In this way, using existing solar projects for the additions of more solar panels where feasible, might make unnecessary the development of additional agricultural land for another project.

Second, under existing practice, an unavoidable side effect of the alternative site process is that some participating and highly-supportive landowners can be left out of the economic opportunity of having solar generation installed on their property. In an area like Paris where a minor but meaningful project expansion seems feasible from a transmission perspective, it seems reasonable to try to seize that opportunity for a small project expansion that can extend local benefits like landowner rental payments and local tax revenues, as well as produce more clean energy for the project's customers, assuming the additional areas are deemed acceptable by the Commission.

Third, this approach recognizes the importance of and respects the alternative site requirement. If portions of the proposed arrays are not approved for construction, the alternative array for additional solar panels would be reduced. If alternative areas are approved, and all of those impacts have been considered and included in this CPCN process, such additional construction would comply with regulatory requirements.

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 in Kenosha County[35]. Paris Solar has attempted to map the locations of smaller confined animal operations based on publicly available data and aerial imagery (**Figure 4.1.2**). 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

[35] Wisconsin Department of Natural Resources. CAFO Permittees search. https://dnr.wi.gov/topic/AgBusiness/data/CAFO/. Accessed January 22, 2020.

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.*

No agricultural buildings are located within 300 feet of any proposed collection circuit, overhead collection line, or transmission line centerlines. Three confined animal operations were identified within 300 feet of the proposed solar array and DC lines in various locations around the property (**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 Paris Solar Project will be constructed to meet the standards of Chapter SPS 316 (Electrical)[36] and Chapter SPS 371 (Solar Energy Systems)[37] of the Administrative Code of the State of Wisconsin, PSC 114 – Wisconsin State Electrical Code[38], and the National Fire Protection Association's NFPA70 National Electric Code[2]. 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, Paris Solar will conduct both pre and post construction stray voltage testing, so long as any animal operation is located within 300 ft of the final Project layout. If the Project can setback over 300 ft from any identified animal operation, Paris Solar requests that stray voltage testing be waived.

5.14 Airports and Landing Strips

5.14.1 *Airport, Landing Strips, and Helipads*

[36] Wisconsin State Legislature. Administrative Code Chapter SPS 316. https://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/301_319/316. Accessed January 22, 2020.
[37] Wisconsin State Legislature. Administrative Code Chapter SPS 371. https://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/367_374/371. Accessed January 22, 2020.
[38] Wisconsin State Legislature. Administrative Code Chapter PSC 114. https://docs.legis.wisconsin.gov/code/admin_code/psc/114. Accessed January 22, 2020.

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.*

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.

Twenty-one public and private airports, airstrips, and heliports were identified within 10 miles of Project facilities. All identified facilities are located outside of the Project boundary. The following paragraphs provide a description of each identified facility:

Kenosha Regional Airport (Airport ID: ENW) is a public airport facility located approximately 3.3 miles southwest of the Project Area. ENW is the largest public airport identified within 10 miles of the Project. The airport has three paved runways and a helipad, serving general, freight, and corporate aviation needs for the region.

Aurora Medical Center Kenosha Heliport (Airport ID: WI01) is a private heliport facility located approximately 4.5 miles southeast of the Project Area. WI01 has one helipad located immediately northwest of the facility for medical emergency services.

Bristol Airport (Airport ID: WN63) is a private airport facility located approximately 6.3 miles south of the Project Area. WN63 has one turf runway for private uses.

Camp Lake Airport (Airport ID: 49C) is a privately-owned public airport facility located approximately 9.3 miles southwest of the Project Area. 49C has one turf runway serving general aviation needs.

Chilcott Farms Airport (Airport ID: WI95) is a private airport facility located approximately 3.3 miles south of the Project Area. WI95 has one turf runway for private uses.

Crash In International Airport (Airport ID: 0WI5) is a private airport facility located approximately 9.8 miles northeast of the Project Area. 0WI5 has one turf runway for private uses.

Dutch Gap Airstrip (Airport ID: 04WI) is a private airstrip located approximately 7.1 miles south of the Project Area. 04WI has one turf runway for private uses.

Flaglor Airport (Airport ID: WI86) is a private airport facility located approximately 3.4 miles west of the Project Area. WI86 has one turf runway for private uses.

Foxewood Airport (Airport ID: 77WI) is a private airport facility located approximately 8.7 miles southwest of the Project Area. 77WI has one turf runway for private uses.

Horner Farms Airport (Airport ID: WI03) is a private airport facility located approximately 9.5 miles northwest of the Project Area. WI03 has one turf runway for private uses.

Kenosha County Heliport (Airport ID: 3WN3) is a private heliport facility located approximately 4.4 miles south of the Project Area. 3WN3 has one helipad on top of the Kenosha County Planning and Development and Public Works building for County use.

Kenosha Hospital and Medical Center Heliport (Airport ID: WI82) is a private heliport facility located approximately 9.1 miles southeast of the Project Area. WI82 has one helipad located on top of the north-most building for medical emergency services.

Leach Farms Heliport (Airport ID: WN69) is a private heliport facility located approximately 6.1 miles west of the Project Area. WN69 has no visible helipad per Google Earth Aerial Imagery. It is likely that the Leach Farms Heliport is used for private and agricultural uses.

Olson's Airport (Airport ID: 3WI1) is a private airport facility located approximately 0.81 miles west of the Project Area. 3WI1 has one turf runway for private uses.

Pott's Field (Airport ID: 0WN5) is a private ultralight facility located approximately 9.0 miles north of the Project Area. 0WN5 has one turf runway for private ultralight uses.

St. Mary's Medical Center Heliport (Airport ID: WS53) is a private heliport located approximately 9.0 miles northeast of the Project Area. WS53 has one helipad on top of one of the central facility buildings for medical emergency services.

Sylvania Airport (Airport ID: C89) is a privately-owned public airport facility located approximately 2.5 miles northeast of the Project Area. C89 has one paved runway and an additional turf runway, serving general aviation needs.

Thompson Strawberry Farm Airport (Airport ID: 8WI5) is a private airport facility located approximately 3.7 miles south of the Project Area. 8WI5 has one turf runway for private uses.

Valhalla Airport (Airport ID: 84C) is a privately-owned public airport facility located approximately 6.4 miles north of the Project Area. 84C has one turf runway serving general aviation needs.

Westosha Emergency Center Heliport (Airport ID: WS57) is a private heliport facility located approximately 8.8 miles southwest of the Project Area. WS57 is a paved parking lot in the southern portion of the Village of Silver Lake, serving emergency uses.

Winfield Airport (Airport ID: WI58) is a private airport facility located approximately 7.2 miles south of the Project Area. WI58 has one turf runway for 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 Kenosha County were treated with aerial applications in 2019; aerial spraying mainly occurs in western Wisconsin[39].

No agricultural aerial application services (i.e., crop-dusting services) were identified within Kenosha 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.

[39] Wisconsin Department of Agriculture, Trade and Consumer Protection. Gypsy Moth Aerial Spray Program. https://datcp.wi.gov/Pages/Programs_Services/GMAerialSpray.aspx. Accessed January 22, 2020.

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.

This is supported by 14 CFR 91.119[40], 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[41] 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[42].

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 Area.

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.

[40] 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. https://www.law.cornell.edu/cfr/text/14/91.119

[41] 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

[42] Code of Federal Regulations. Amdt. 137-3, 33 FR 9601, July 2, 1968. https://www.law.cornell.edu/cfr/text/14/137.49

Evaluation of proposed infrastructure in conjunction with nearby airports was conducted using the FAA's Notice Criteria Tool[43]. Results of the investigation revealed that solar infrastructure in the southwest, southeast, eastern portions of the Project Area may exceed notice criteria in accordance with CFR Title 14, Part 77.9[44] due to proximity to navigation facilities and potential to impact the assurance of navigation signal reception.

CFR Title 14, Part 77.944[45] 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 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.

Two public airports were identified within 20,000 feet, but more than 10,000 feet of the Project boundary, ENW and C89. ENW's nearest runway is located approximately 16,900 feet southeast of the Project Boundary at the nearest location. The runway exceeds the 3,200 foot threshold and is approximately 708 feet above mean sea level (amsl) at the lowest point along the runway. The height of the proposed solar infrastructure will be a maximum 15 feet; the lowest elevations where infrastructure is proposed will be 702 feet amsl in the western portion of the property and the highest elevations for proposed infrastructure are 800 feet amsl in the eastern portion of the property. Overall heights of solar infrastructure will be between 717 feet and 815 ft amsl when including the maximum height of 15 feet for solar panels.

At a 100:1 surface ratio, every 100 feet away from the runway directs a controlling elevation increase of one foot. In other words, ENWs runway that is approximately 16,900 feet southeast at a 708 feet elevation would trigger Notice requirements for any structure that stands over 877 feet amsl (16,900 ft/100 + 708 ft). Note that the 877 feet amsl Notice requirement would be for any structure located exactly 16,900 feet away from the runway; a majority of Project infrastructure is sited greater than 16,900 feet away, allowing for an even higher structure height than the 877 feet amsl. Since the maximum proposed height of solar infrastructure is 815 feet amsl, no

[43] Federal Aviation Administration. Notice Criteria Tool. https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm. Accessed January 28, 2020.
[44] Federal Register. Docket No. FAA-2006-25002; Amendment No. 77-13. https://www.govinfo.gov/content/pkg/FR-2010-07-21/pdf/2010-17767.pdf
[45] Code of Federal Regulations. Docket No. FAA–2006–25002; Amendment No. 77–13.

proposed structures will exceed listed height thresholds, Notice of Construction is not required under 14 FR Part 77.9[45].

Based on Wisconsin Code 114.135(7)[46], 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.

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.

5.15.1.1 *Cell phone communications*

5.15.1.2 *Radio broadcasts*

5.15.1.3 *Internet (WiFi)*

5.15.1.4 *Television*

5.15.1.5 *Doppler radar network*

5.15.1.1 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 basis which are typically comprised of several counties. For the cellular towers located within the Project Area, 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 is 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

[46] Wisconsin State Legislature. State Statute Chapter 114 – Aeronautics and Astronautics. Accessed January 22, 2020.

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**.

5.15.1.2 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 Paris, 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 area. Full details are in **Appendix O**.

5.15.1.3 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 Paris 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 area. The solar panels have a maximum height of 15 feet. Therefore, all proposed solar array structures within the defined project area (AOI) have sufficient vertical clearance and avoid the risk of obstructing or causing harmful interference to the microwave paths in and around the project area. Full details are in **Appendix O.**

5.15.1.4 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**.

5.15.1.5 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), Paris believes there will be no impact from the development of a solar facility. Full details are in **Appendix O.**

5.15.2 *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, Paris Solar has commissioned an assessment of the emergency services in the Project Area 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. 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. The detailed Electric and Magnetic Field (EMF) Report is **Appendix N**.

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 section of overhead collection. 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 Paris 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 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 250 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 Area 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.*

Kenosha County Code of General Ordinances, 2019, - Kenosha, Wisconsin – Chapter XXIII Noise Control can be found attached in **Appendix I** along with the Town of Paris Code of Ordinances Section 10-8. *Loud and unnecessary noise* subsection (a).

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.*

Paris 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 Paris Solar will determine if the noise is the result of a mechanical issue that can be repaired. If not, Paris 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 40 dBA during daytime, Paris 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[47], 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.

Sixty-two (62) 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 Area.

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 green after-image glare at 51 of 62 KOP locations and 8 of 18 road segments; and instances for *potential for producing an after-image* (yellow) glare at 59 KOPs and 14 road segments for arrays having a resting angle of 0 degrees (Tables 5A-5B in **Appendix Q**). The remaining KOPs and road segments are not expected to experience glint or glare effects. Arrays were also modeled at 9 feet with essentially the same glare of arrays modeled at 6 feet.

The project was modeled with arrays at 6 feet above ground and a resting angle of 5 degrees. Glare was significantly reduced. Instances of low potential for producing an after-image green glare was identified in 4 KOP locations and zero road segments. Instances of potential for producing an after-image yellow glare was identified in 4 KOP locations and 2 road segments, and no KOPs or road segments produced potential for permanent eye damage (red).

[47] ForgeSolar. GlareGauge Comprehensive Solar Glare Analysis Software. Accessed 2020.

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, Paris may use fencing, vegetation, or other objects of obstructive nature to mitigate glint or glare effects, or possibly slightly adjust the resting angle.

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.*

Paris Solar is engaged with both Kenosha County and the Town of Paris in negotiations on a possible Joint Development Agreement (JDA), likely in the form of a Memorandum of Understanding (MOU – the term preferred by Kenosha County), 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 K – 12 school district, Technical College ambulance service or fire departments 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

- Drain tile
- Snow mobile paths

Paris Solar expects that the Paris Fire Department will provide fire and emergency services to the Project during construction. If needed, the Kenosha County Sheriff's Office is expected to provide traffic control, and security services.

Paris Solar has proposed in a draft MOU 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. Paris 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. Paris 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, Paris Solar will arrange for adequate professional training to deal with those concerns.

Regarding the BESS, safe operation of advanced energy storage systems begins with safe equipment and compliance with safety codes and regulations. Any potential equipment suppliers to Paris 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 Paris Solar.

Paris Solar will develop an 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 Paris 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 Paris Solar. This systems 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, are not yet finalized.

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).*

6.2.2 *Describe the effects of the proposed project on city, village, town and/or county budgets for these items.*

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.*

6.2.4 *Describe any other benefits to the community (e.g. employment, reduced production costs, goodwill gestures).*

No additional infrastructure or facility improvements are expected to be required for the construction and operation of the Project. 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.

Local revenue and other benefits to the community from the Project are presented at length in the Economic Impact Report (**Appendix M**). In summary, under Wisconsin's current Utility State Aid Shared Revenue formula, the state would provide $4,000 per MW per year, or $800,000 for the Project, with Kenosha County receiving 58% of the total and the Town of Paris 42%. Paris 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.

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 2017. Landowner dinners have been held on December 11, 2018, March 28, 2019 and October 10, 2019 with various participating and non-participating landowners invited. Paris Solar has employed a part-time (20 hours/week), Local Representative who has held multiple one-on-one meetings with participating and non-participating landowners while maintaining office hours at 1013 Main Street Union Grove WI, on Mondays from 8:00 to 12:00 PM and Tuesdays from 8:00 to 12:00 PM. Special appointments are also available as needed. Bi-monthly "Friends of Paris" meetings have been held for project supporters at the local Project office in Union Grove or at other local establishments such as the Mars Cheese Castle.

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 Kenosha County Representatives (County Administration, County Executive,

Supervisors, general counsel), Paris Township (Board Members and Chairman), and Village of Union Grove (Village President and Trustees).

General Public – The Local Representative has shared information with the general public via a monthly presence at the local farmers market in Union Grove for the 2019 season; this presence included an informational display with project specifics. Representatives from Paris Solar, as well as the Local Representative, shared information with the public at Farm Technology Days on July 23-25, 2019 in Jefferson County, Wisconsin. Paris Solar participated in the annual Fall Harvest Days at the Racine County Fairgrounds with a project specific informational display. The Local Representative was on site for the duration of the event, answering questions and handing out literature about the Project. At the Racine County Fair, Paris Solar participated as a sponsor for the Union Grove Area Chamber of Commerce food booth. This sponsorship was recognized on their building and in handouts given to attendees along the annual Independence Day parade route through Union Grove. At the request of the Town of Paris, Paris Solar staffed a table and participated in the Town of Paris Open House on October 17, 2019. An introduction letter was mailed to local residents within and surrounding the project area; to potential participants and neighbors alike.

Paris Solar has also established the aforementioned group of local landowners and citizens named the "Friends of Paris" group. Friends of Paris was created to educate the community about the project, while ensuring a continual and correct flow of project information and updates. The group also provides an opportunity for the Project and interested parties to discuss ideas, address questions and review information about the Project.

Local Business Community – Paris Solar Farm is a member of the Kenosha Area Chamber of Commerce, Greater Union Grove Area Chamber of Commerce, and the Kenosha Area Business Alliance.

Dates for Appendix S

Mailings – Below is a list of mailings sent to project participants and neighbors within the project area:

- Paris Landowner Informational Meeting Letter
  Date: November 16, 2018
- Holiday Postcard (All participating and non-participating landowners)
  Date: December 2018
- Adjacent Neighbor Mailing
  Date: February 21, 2019
- Introduction Letter (All participating landowners)

Date: March 1, 2019

- Local Government Letter
  Date: March 4, 2019
- CRP Landowner Letter (All participating landowners)
  Date: April 8, 2019
- Landowner Dinner Invitation
  Date: August 20, 2019
- Landowner Dinner Thank You Letter
  Date: October 18, 2020
- Holiday Postcard (All participating and non-participating landowners)
  Date: December 2019
- Good Neighbor Agreement Letter
  Date: January 21, 2020

Meetings/Events – Below is a list of meetings and events held throughout the local community:

- Landowner Dinner Meeting-December 11, 2018
- Town of Paris Planning Commission-December 17, 2018
- Landowner Dinner Meeting-March 28, 2019
- Town of Paris Board Meeting-April 23, 2019
- Town of Paris Special Board Meeting April 30, 2019
- Local Office Grand Opening and Chamber of Commerce Ribbon Cutting-May 20, 2019
- Friends of Paris Meeting-May 20, 2019
- Village of Union Grove Community Development Association-May 21, 2019
- Town of Paris Board Meeting-May 28, 2019
- Market on Main (Farmers Market)-June 18, 2019
- Town of Paris Board Meeting-June 25, 2019
- Local Office open during Independence Day Parade-July 4, 2019
- Market on Main (Farmers Market)-July 16, 2019
- Farm Technology Days-July 23-25, 2019
- Meeting with Representative from Kenosha Chamber of Commerce-August 13, 2019
- Market on Main (Farmers Market)-August 20, 2019
- Fall Harvest Days-September 12-14, 2019
- Friends of Paris Meeting-August 26, 2019
- Landowner Dinner Meeting-October 10, 2019
- Town of Paris Open House-October 17, 2019
- Meeting with Gateway Technical College President and Staff-November 19, 2019

- Meeting with Union Grove Graded School Administrator-November 19, 2019
- Meeting with Paris School Administrator-November 19, 2019
- Meeting with UW Extension Office Ag Educator-November 20, 2019
- Presentation at Union Grove Kiwanis Organization Meeting-November 20,2019
- Friends of Paris Meeting-December 10, 2019
- Presentation to Leadership Union Grove Class-December 11,2019
- Meeting with Central High School Administrator-January 15,2020
- Presentation to Kenosha Chamber of Commerce Networking Group-February 14, 2020
- Presentation to Kenosha Chamber of Commerce Networking Group-February 19, 2020
- Friends of Paris Meeting-February 25, 2020

Online - Paris Solar has established a Facebook page and maintains this social media presence for Project information sharing and management of inquiries (via Facebook Messenger and comments). As of January 2020, the Paris Solar Facebook migrated into a single, statewide page called "WisconSUN" and the existing followers of the Paris Solar Facebook page are being invited to follow it, but the Paris Solar Facebook page will not be maintained after February 2020. Paris Solar also has a website with Project-specific information available for public review, search, content and fact sheets. These will be updated over the lifespan of the Project to further communicate on Project status. The website and Facebook pages are shown below:

- www.parissolarfarm.com
- https://www.facebook.com/WisconSUN/

Print - The following publications have distribution and readership in the immediate and surrounding Project areas. Print advertisements and inserts have featured Project facts, information and resources in the Kenosha News newspaper and Hi-Liter.

- Print Advertisements in Kenosha News: Run twice a month (Bi-weekly) May 2019-Present
- Print Advertisements in Hi-Liter: Run once a month May 2019-Present
- Additional advertisement on 5/2019 for office grand opening in both Kenosha News and Hi-Liter
- Press Release: Local Representative press release sent May 3, 2019

Examples of project mailings and other community informational material is attached in **Appendix S**.

7.2.4 *Identify all local media that have been informed about the project.*

Local media informed about the Paris Solar Farm Project include the Kenosha News newspaper, and WGTD 99.1 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.*

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. More general questions can be directed to the previously mentioned project website, which will be updated and monitored through the operational life of the project.

As evidenced by the pre-application communication efforts put forth, Paris Solar recognizes the importance of community outreach and information sharing. The project team will continue communication objectives through construction via a continuation of advertisements, online presence (project website and WisconSUN Facebook page), mailings, public meetings, local governmental board meeting attendance, local service club presentations, and local office/local project representative presence.

In the initial reference to the project website (www.parissolarfarm.com), it is important to note that the website has a Contact Us page, allowing site visitors from anywhere in the world, at any time of day, to contact Paris Solar at their convenience with questions, comments, or concerns. These messages are received by the project team and responded to in a timely manner.

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 Project Area was completed using available public resources such as USGS topography, National Wetland

Inventory Mapping (NWI), National Hydrography Dataset flowlines and water basins (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 Kenosha County, and several years of aerial photography from FSA, Google Earth, and Kenosha County imagery. Wetlands and waterways were desktop-delineated using the level one routine determination method set forth in the USACE 1987 Manual[48] and the Midwest Regional Supplement[49].

A field delineation of wetlands and waterways was completed for a "delineation corridor" which was created around the proposed Project construction footprint and a 100-foot buffer around proposed Project infrastructure on land with access agreements at the time of the field work. The field delineation occurred on multiple dates between May 6-10, 2019 and October 21-25, 2019. The desktop delineated wetlands and waterways are reference for the portion of the Project Area outside of the field delineation corridor 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** show which delineation methods were used within the Project Area.

Some currently proposed Project infrastructure is located outside of the field delineation corridor described above. Additional field delineations will be conducted in spring of 2020 to verify the presence or absence of water features in these remaining areas and impact calculations will be updated accordingly.

A summary of the waterways within the Project Area is included in DNR Table 2 (**Appendix U**) and shown on **Figures 4.1.6.1**, **8.3.1** and **8.3.2**. A total of 25 waterways totaling 20.84 acres (9.71 miles) were mapped during field delineation efforts. 13 of the delineated features coincided with WDNR WBIC-mapped waterways. A total of 21 waterways outside the field delineation corridor were desktop delineated. 17 of the desktop-delineated features coincide with WDNR WBIC-mapped waterways.

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**, three access road crossings are proposed over field-identified waterways. Other solar Project infrastructure, which includes arrays, the array collection systems, inverter pads, fencing, laydown yard, O&M building, and a substation, are not expected to impact any field-delineated waterways. Permits for the access road crossings will be applied for through the Wisconsin DNR and

[48] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
[49] 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.

USACE. It is anticipated that culvert placement will be permitted via a WDNR General Permit and via a non-reporting USACE Utility Regional General Permit.

The proposed collection route includes 25 waterway crossings which include field-delineated waterways and portions of WBIC flowline 5040734 which was inaccessible at the time of survey. All of these crossings are included in the attached Table 1 Supplement to DNR Form 3500-53 (**Appendix U**). The crossings are proposed to be completed using HDD underground boring.

In addition to the crossings listed above, a total of 11 access road crossings, 9 collection line crossings, and 5 areas where construction matting would be placed are associated with 5 WBIC flowlines that were not field delineated. A navigability determination is being submitted for portions of these WBIC flowlines. These were not field delineated due to the lack of defined bed and banks, and the absence of Ordinary High Water Mark criteria as mentioned in the USACE Regulatory Guidance Letter No. 05-05[50]. Information for a navigability determination for portions of these WBIC flowlines is included in **Appendix U**.

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**, features designated as Outstanding or Exceptional Resource Waters, Trout Streams, or Wild or Scenic Rivers are not located within the Project Area.

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;*

[50] U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter No. 05-05: Ordinary High Water Mark Identification. 7 December 2005. http://www.saw.usace.army.mil/wetlands/Library/RGL/rgl05-05.pdf.

- *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).*

Information for five navigability determination requests are provided in **Appendix U**.

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.).*

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.).*

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.).*

8.1.4.4 *The number of waterways that would be impacted and/or crossed by fence installation and footings.*

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.).*

Permanent impacts to waterways are expected to be limited to three access road crossings (**Figures 8.3.1** and **8.3.2**). In addition to the 20-foot wide permanent impact width for roads, a 30-foot wide construction corridor will temporarily impact the three waterway crossings. 25 collection line crossings will be directionally bored under field-delineated waterways /WBIC flowlines. Culverts and clean fill are proposed for all access road crossings. All collection line crossings for waterways will be directionally bored. No impacts to field-delineated waterways are proposed

for temporary clear span bridges, fence crossings, or other construction activities or facilities; however, a stormwater pond will be placed within 500 feet of a waterway. The applicable permit will be applied for and the pond will be designed according to required standards.

An additional 25 crossings of 5 WBIC flowlines that were not field-delineated (because of a lack of OHW) are proposed. These crossings are associated with access roads, collection lines, and temporary construction matting. These areas are calculated as impacts in DNR Table 1 (**Appendix U**). There are also portions of the solar array that cross WBIC flowlines that were not field delineated (because of a lack of OHW) and these impacts were *not* included in DNR Table 1. The applicable navigability determination request information for these crossings is included in **Appendix U**. If these 5 waterways are determined to be navigable, crossings associated with the solar array will be moved to avoid impacts to waterways and crossings for access roads, collection lines, and construction matting will be permitted accordingly.

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 where possible. 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 any 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. The equipment will be manually cleaned of plant materials between work zones within the Project Site.

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.*

Perimeter fencing is not expected to cross any field-delineated waterways. Any WBIC flowlines that are determined to be navigable following the navigability determination will use the following construction procedures. Support pilings for these crossings will be placed at the top of waterway banks. Clearance between the bottom of the fence and the ordinary high water mark will be at least 1 foot.

Public use of these streams is generally infrequent as they are ephemeral streams located on private land which is primarily used for row crop agriculture. Potential impacts to the public use of streams would be considered low due to these factors.

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.*

All utility line crossings of waterways are expected to be directionally bored. No open-cut trenching 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.*

8.1.8.2 *The location and size of any temporary staging and equipment storage.*

8.1.8.3 *The location and size of bore pits.*

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).*

Entry points and exit points will be positioned at least ten feet outside of the established wetland and 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. Temporary staging and equipment storage will be located in upland. Bore pits will generally be 20 feet in length, 20 feet wide, and 4 feet deep. Installation depths will be at least five feet below the bottom of the wetland or waterway crossing. Construction notes regarding collector circuits are detailed in Section 8.4 and available in the ECSWMP (**Appendix L**). Appropriate erosion controls will be used between the bore pit and the resource. Typical crossing details and a standard frac-out plan is included in **Appendix D**.

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).*

Permanent vegetation clearing near waterways will be limited to a 20-foot wide permanent access road width for crossings. Temporary clearing will be done within a 30-foot wide construction corridor associated with access road construction. Hand clearing of vegetation is anticipated for the one fence crossing. Tree and shrub clearing is not anticipated for waterway crossings as cover in those areas is entirely herbaceous. An approximately 20x20 foot area will be temporarily cleared of vegetation for bore pits. Bore pits will be located in uplands at least ten feet from the top of bank of 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. Paris Solar expects that herbaceous vegetation will be removed temporarily, and will be replanted and/or allowed to regrow after construction.

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.

Any applicable permits for access road, culvert placements, and a stormwater pond within 500 feet of a waterway will be applied for through the Wisconsin DNR and USACE at a later date during final design. It is anticipated that culvert placement will be permitted via a WDNR General Permit and via a non-reporting USACE Utility Regional General Permit. If any in-stream work needs to be conducted during fish timing restrictions, a waiver will be requested through the Wisconsin DNR.

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 Project Area was completed using available public resources. A total of 189 desktop wetlands and an additional 120 suspect wetlands were desktop delineated. Desktop-delineated wetland features were classified by their probable Wetlands and Deepwater Habitats of the United States[51], Wetland Plants and Communities of Minnesota and Wisconsin[52], and Wetlands of the United States[53] wetland types for

[51] 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.

[52] 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.

[53] 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.

the wetland or wetland complex. Suspect wetlands were categorized separately from desktop wetlands as they were features located in cultivated fields that displayed aerial signatures in less than half of the years reviewed. Desktop wetlands and suspect wetlands were desktop-delineated following recommendations from the WDNR, and USACE/BWSR Guidance for Offsite Hydrology/Wetland Determinations (July 2016).

A field delineation of wetlands and waterways was completed for the "delineation corridor" which was created around the proposed Project construction footprint and a 100-foot buffer around proposed Project infrastructure on land with access agreements at the time of the work. Wetlands were field-delineated in accordance with the level two routine determination method set forth in the USACE 1987 Wetlands Delineation Manual[48] and the supplemental methods set forth in the regional supplement to the USACE Wetland Delineation Manual: Midwest Region[49]. A total of 89 wetlands totaling 120.14 acres were field-delineated within the delineation corridor. Desktop wetlands and suspect areas were confirmed in the field and mapped as wetlands with associated upland/wetland transects using USACE Midwest region datasheets. If the field conditions (hydrology, soils, and vegetation) indicated that the desktop wetland or suspect wetland was upland, a data point, USACE datasheet, and photos were taken.

Some currently proposed Project infrastructure is located outside of the field delineation corridor and in those cases the desktop delineation was used to site infrastructure. Additional field delineations will be conducted in spring of 2020 to verify the presence or absence of water features where Project infrastructure is proposed and solar Project infrastructure will be adjusted in response to these findings. A summary of field and desktop-delineated wetlands can be found in Table 2 (**Appendix U**). A mapbook of all desktop- and field-delineated features is shown on **Figure 4.1.6.1**.

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.*

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**.

The site layout avoids wetland impacts for all inverter pads, solar arrays, and buildings. Four permanent impacts to two wetlands are proposed Impacts would be within two wetlands classified as seasonally flooded basin (PEM1Af) and fresh wet meadow (PEMB). These permanent impacts are associated with one access road crossing and three areas where perimeter fencing crosses the delineated wetlands. Temporary impacts are expected to be limited to temporary construction matting and

a 30-foot wide temporary disturbance area associated with the permanent access road crossing.

The proposed collection route includes 19 wetland crossings. These crossings are included in the attached Table 1 Supplement to DNR Form 3500-53 (**Appendix U**) and are depicted in **Figures 8.3.1** and **8.3.2**. All of the collection line locations will be HDD bored under the wetlands/waterways. No impacts to wetlands or waterways for the collection lines are proposed.

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).*

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.*

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.*

Within the Project Area, 31 wetlands or wetland complexes were desktop-delineated that contained floodplain forest. These features totaled 154.12 acres. 46 wetlands or wetland complexes that contained fresh wet meadow were desktop-delineated. These features totaled 223.89 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 corridor, one wetland classified as floodplain forest was field-delineated and totaled 0.42 acres. This area will be avoided by all Project infrastructure. A total of 46 wetland or wetland complexes within the delineation corridor were field-delineated as fresh wet meadow. These areas totaled 30.31 acres. Fresh wet meadow communities within the delineation corridor 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.

Functional values for wetlands within the delineation corridor 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).*

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.*

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.*

8.2.4.4 *How many wetlands would be impacted and/or crossed by fence installation and footings.*

A total of 19 collections lines will cross wetlands using horizontal directional drilling. Trenching of wetlands is not proposed. A total of 13 wetlands will have temporary construction matting placed within them. The total square feet of proposed construction matting within wetlands is 2,068. Four permanent wetland impacts are expected for one access road crossing and three areas where perimeter fencing crosses wetlands. Culverts will not be installed for the wetland access road crossing, a reinforced at-grade crossing ("low water crossing") is proposed to maintain drainage patterns across the road. A LWC detail is included in **Appendix D**.

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.*

Ingress and egress to the wetlands will be avoided where possible and practical. Ingress and egress to wetlands will be done either during frozen ground or dry ground conditions when possible to avoid and minimize impacts to the wetlands. In addition, construction access will be limited to defined points to the wetland to further limit construction traffic within the wetland regardless of conditions. The defined access points, will be identified as final design is completed and prior to any activities in or near the wetland areas. If frozen or dry ground conditions are not possible during construction, construction mats will be temporarily placed across wetland areas where necessary for construction ingress and egress and remain in place until construction in a particular wetland area is complete. Any

matting not removed within 60 days after it is placed will have a documented wetland restoration plan prior to start of construction in these areas.

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 are 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.*

8.2.8.2 *The location and size of any temporary staging and equipment storage.*

8.2.8.3 *The location and size of bore pits.*

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).*

Proposed collection lines intersect wetlands in 19 locations. These crossings are available in the Table 1 Supplement to DNR Form 3500-53 (**Appendix U**). Medium voltage collector circuits crossing wetlands or waterways will be installed by means of horizontal directional drilling (HDD). Entry points and exit points will be positioned at least ten feet outside of the established wetland and waterway 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. Temporary staging and equipment storage will be located in upland. Bore pits will generally be 20 feet in length, 20 feet wide, and 4 feet deep. Installation depths will be at least five feet below the bottom of the wetland or waterway crossing. Construction notes regarding collector circuits are detailed in Section 2.3.2.4 and available in the ECSWMP (**Appendix L**). Appropriate erosion controls will be used between the bore pit and the resource. Typical crossing details and a standard frac-out plan is included in **Appendix D**.

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.*

There are three areas where perimeter fencing is proposed to cross wetlands. Conversations with the DNR have indicated that if these fences are constructed without poured foundations, using pounded posts, they will not be considered an

impact, and therefore a permit would not be required. As the Project design continues to be updated, it will be determined if the fences can be constructed without footings or if footings will be required. If the fences cannot be constructed without footings then Paris Solar will obtain the proper authorization from the DNR and the U.S. Army Corps of Engineers. For the purposes of the application, the use of concrete footings were assumed and impacts were included in **Appendix U**.

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.*

For access roads, land clearing will be accomplished with mechanical equipment. A 20-foot wide permanent access road within one wetland will be kept clear of vegetation. Temporary clearing of vegetation will be limited to a 30-foot wide construction corridor associated with the access road crossing. Clearing will be limited to herbaceous vegetation as there are no trees or shrubs at the crossing location and will be limited in time and duration to only those windows in which site activity is occurring. Because only herbaceous vegetation will be cleared, soil rutting and soil mixing is not anticipated.

Land clearing outside of access road is expected to be limited to hand clearing of herbaceous vegetation to facilitate fence post installation. Clearing of wetland vegetation is anticipated in one wet meadow (PEMB) community. No clearing of trees or shrubs is anticipated, nor are soil rutting or soil mixing.

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.*

Permanent wetland fill totaling 0.005 acres (250 sq. ft.) is proposed for one access road crossing and three perimeter fence crossings.

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 where possible. All collection line crossings of wetlands will be directionally bored to avoid impacts. Solar arrays and proposed buildings have been sited to completely avoid wetland impacts. Construction will be done during frozen or dry conditions when possible. Temporary construction mats will be used in cases where frozen or dry conditions are not present. Appropriate sediment and erosion control measures will be put in place to minimize sedimentation into any wetlands (**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. The equipment will be manually cleaned of plant materials between work zones within the Project Area.

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.*

No dedicated environmental monitors are proposed at this time. A stormwater inspector will be on site to ensure compliance with the construction stormwater permit.

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.*

Temporary wetland impacts we be restored to existing contours and re-seeded. Seeding of wetland areas will be comprised of native sedge, grass, rush, and forb species classified as FAC, FACW, or OBL. Spot herbicide treatments will be used to prevent invasive species propagation as needed before, during, and after construction. Periodic inspections of establishing and established vegetation will be made to detect native and non-native invasive species issues. As most of the wetlands within the solar array and fencing were surrounded by row crop production, vegetative diversity and improved wildlife habitat are expected. Deep-rooted native plant species to be installed in adjacent uplands should also provide erosion control through increased soil stabilization. Decreased nutrient runoff, fertilizer application, and herbicide and pesticide use should also improve water quality. Details on restoration of wetlands can be found in the Ground Cover Strategy (**Appendix W**) and the ECSWMP (**Appendix L**).

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.*

Paris 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[54]. 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:*

[54] Wisconsin State Legislature. Wisconsin Administrative Code Chapter NR 216 – Stormwater Discharge Permits. Register November 2018 No. 755.

- *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 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[55] 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 Area. 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 functioning on-site. Permanent erosion control BMPs may be a combination of vegetative and non-vegetative cover types.

A 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 and 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 Area is predominately comprised of agricultural row crops on C/D soils[5]. Based on the SCS Curve Number method, the overall curve number for the Project Area is 89. The proposed meadow conditions will have a curve number of 71 for HSG Type C and 78 for HSG Type D. Changing the landcover to the meadow condition will greatly reduce the amount of runoff from the Project Area.

Infiltration

[55] Wisconsin State Legislature. Wisconsin Administrative Code Chapter NR 151 - Runoff Management. Register November 2018 No. 755.

The proposed site has less than 10% impervious as a whole. Wisconsin Administrative Code NR 151.124[55] 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 area. 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, and an O&M facility. Due to the HSG Type C and C/D soils present on-site, infiltration rates of 0.2 inches/hour and 0.06 inches/hour, respectively, were input into the P8 model for both the existing and proposed conditions. 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 (%)
52,150.37	56,331.54	108.02

Runoff Rates

Wisconsin Administrative Code NR 151.123[55] 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 Area using HydroCAD software. The Atlas-14 1- and 2-year 24-hour precipitation values for the Project Area are 2.38 inches and 2.70 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 Area. 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, and an O&M facility. The tables below compare offsite flows between the existing and proposed conditions for the 1- and 2-year events, respectively:

1-Year 24-Hour Pre-and Post-construction Peak Discharge Rates

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	417.67	306.41
2	52.42	24.53
3	56.00	56.00
4	41.87	41.87
5	150.43	100.35

6	114.26	87.25
7	44.92	31.68

2-Year 24-Hour **Pre- and Post-construction Peak Discharge Rates**

Subwatershed ID	Existing Discharge (cfs)	Proposed Discharge (cfs)
1	525.71	395.15
2	64.45	32.47
3	77.11	77.11
4	51.77	51.77
5	184.78	127.19
6	140.70	110.12
7	54.91	39.86

Total Suspended Solids

The Wisconsin Administrative Code NR 151.122 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 disconnected impervious surfaces consisting of aggregate access roads, transformers, a substation, 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 (%)
185,773 lbs.	19,020 lbs.	90

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 into the Project Area will be County Line Road, US Highway 45, State Highway 142, County Highway D, County Highway A, County Highway E, County Highway MB, 144th Ave, and 9th St. County and Township roads within the Project Area will be used for inbound and outbound traffic as described in Sections 3.3.4 and 3.3.5. **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**.

Imported fill material is not expected to be required for Project construction, but if required it would follow the same haul routes as other materials. It is not anticipated that contaminated materials will be encountered during Project construction. If contaminated materials are discovered, they will be handled in compliance with state and local regulations.

- *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.*
  - *Provide a plan view diagram of stockpile area locations.*

Construction material stockpiles will be located at the construction laydown area as identified in Section 2.3.1.2.

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 prior to permanent seeding. Topsoil stripped from the 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.

- *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 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).*

This section addresses the requirements of Section *Contaminated Materials* of the Application Filing Requirements, including all subsections.

The Project Area is predominately comprised of agricultural land. Hazardous materials associated with farming operations, such as fuel and agricultural chemicals, may be stored on leased properties, but will be contained in and near farm buildings (e.g. fuel tanks), and will not be disturbed during Project construction. Other than materials used in farming operations, no hazardous materials are expected to be present in the construction area.

- *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.
- *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 440 acres of the proposed array areas will require some degree of grading to accommodate the single axis trackers. 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. In total, approximately 160,000 cubic yards of Cut and 150,000 cubic yards of Fill are expected as a result of grading activities to install the trackers. 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 13.87 miles of Project access roads. Based on the preliminary geotechnical report, topsoil averages 19 inches thick. This will result in approximately 86,000 cubic yards of topsoil to be stripped for Project access road construction. The topsoil will be thin spread near where it was removed.

Installation of the Project's estimated 31.2 miles of underground AC collection system at 3.5 feet of depth and 1.5 foot wide will involve approximately 32,000 cubic yards of excavation. The collection system 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 200 MW Project, this DC cabling excavation sums to 83,000 cubic yards.

No materials are expected to be dredged from beds and banks of waterways and wetlands throughout the project area. 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 in the vicinity of the excavation, either as fill within the array or trench backfill. Topsoil stripped from access roads and equipment pad areas will be thin spread in the Project Area. 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 Area. If suspected contaminated soils or other materials are identified they will be tested and disposed of as described in Section *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 Area drains into three primary watersheds: Headwaters Des Plaines River, Kilbourn Road Ditch, and East Branch Root River Canal. The Project Area drainage maps are available in the SWPPP (**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 Area 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, and will follow the recommendations below.

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.