Appendix A:

Scoping Decision

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Electric Power Generating Plant in Lyon County, Minnesota
(PUC Docket no. IP6941/GS-14-1052)

ENVIRONMENTAL ASSESSMENT SCOPING DECISION

The above matter has come before the Deputy Commissioner of the Department of Commerce (Department) for a decision on the scope of the Environmental Assessment (EA) to be prepared for the Marshall Solar Energy Project proposed by Marshall Solar, LLC (Marshall Solar) in Lyon County.

Project Description

Marshall Solar, a wholly-owned subsidiary of NextEra Energy Resources, LLC, has applied to the Minnesota Public Utilities Commission (Commission) for a site permit to construct a 62.25 megawatt (MW) photovoltaic solar energy generating facility and associated facilities (Project). The Commission accepted the application as substantially complete in its Order of May 11, 2015. The Project is proposed to be located on 510 acres of land approximately four miles east of Marshall, Minnesota, in Stanley Township in Lyon County, Minnesota.

The primary components of the Project include photovoltaic modules mounted on south-facing fixed arrays, inverters and transformers, an electrical collection system and an on-site project substation. The associated facilities would connect to Xcel Energy's existing Lyon County Substation, located adjacent to the proposed site. The transmission line proposed to interconnect the Project does not meet the statutory definition of a high voltage transmission line found in Minnesota Statute 216E.01, subdivision 4.

Marshall Solar proposed the Project in response to Xcel Energy's Solar Request for Proposals (RFP) to help fulfill the Minnesota Solar Energy Standard, which requires the company to serve 1.5 percent of its retail load with solar energy by the end of 2020. As a result of the RFP, Xcel Energy negotiated Power Purchase Agreements (PPA) with three of the competing proposals for a total of 187 MW. In addition to the Project, PPAs were also negotiated with MN Solar, a 24.75 MW project located in Lyon County near Tracy and the North Star 100 MW Project located in Chisago County near North Branch. Xcel Energy's "Solar Portfolio" (see eDocket no. E002/M-14-162) was approved by the Commission in its order dated March 24, 2015.

Regulatory Background

The size of the proposed Project meets the definition of a large energy facility requiring a Certificate of Need under Minnesota Statute 216B.2421, subd. 2. However, the Commission's March 24, 2015, Order found the Project did not require a Certificate of Need because, consistent with Minn. Statute 216B.243, subd. 9, the Project is a solar electric

generating facility that is intended to be used to meet the obligations of Minn. Statute 216B.1691.

Minnesota Statute 216E.03, subd. 1 prohibits construction of a large electric generating plant without a Site Permit from the Commission. A large electric power generating plant is defined as electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts or more (Minnesota Statute 216E.01, subd. 5).

Session Law 254 amended the types of projects that qualify for review under the alternative permitting process under Minnesota Statute 216E.04 to include large electric power generating plants powered by solar energy.

Marshall Solar has submitted an Application for a Site Permit for review under the provisions of the Alternative Permitting Process as outlined in Minnesota Statute 216E.04 and Minn. Rule 7850.2800-3900.

Scoping Process

Scoping is the first step in the alternative permitting process after application acceptance. The scoping process has two primary purposes: (1) to ensure that the public has a chance to participate in determining what sites and issues are studied in the EA, and (2) to help focus the EA on impacts and issues important to a reasoned site permit decision. This scope identifies potential human and environmental issues that will be addressed in the EA. The scope also presents an anticipated schedule of the environmental review process.

Public Scoping Meeting

On April 10, 2015, Commission staff sent notice of the place, date and times of the Public Information and Scoping meetings to those persons on the General List maintained by the Commission, the agency technical representatives list and the project contact list.[1] Notice of the public meetings was also published in the *Marshall Independent* on April 21, 2015.[2]

Commission staff and EERA staff jointly held two public information and scoping meetings in Marshall, Minnesota. The purpose of the meetings was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest alternatives and impacts (i.e., scope) that should be considered during preparation of the environmental review document. The meetings were attended by approximately 80 people in total, and a total of 12 people spoke at the meetings. A court reporter was present at all of the meetings to document oral statements.[3]

Scoping Comments

A total of 14 written comments were received by the end of the scoping comment period on May 15, 2015.[4] Scoping comments addressed a variety of topics including: use of prime

[1] Notice of Public Information/Scoping Meeting, eDocket Document ID 20154-109177-01, 20154-109177-02
[2] Affidavit of Publication, eDocket Document ID: 20156-111025-01
[3] Oral Comments Received During Scoping, eDocket Document ID: 20155-110332-01, 20155-110332-02
[4] Public Scoping Comments Received by May 15, 2012, eDocket Document ID: 20155-110582-01, (Note – these comments include information previously entered into the record, but re-submitted during the public

farmland for a solar project; impacts of the proposed facilities on property values of nearby properties; costs and fees paid to local governments; human health impacts from the Project,; incremental impacts from the number of large energy facilities in the project area; potential to expand the proposed project or locate additional solar projects in the area; impacts to wildlife; overall appearance of the solar installations and the potential for glare; noise during construction and operation of the facilities; impacts to communication systems (land lines and cell phones, ham radios); impacts to agriculture; vegetation for the project established after construction; impacts to surface and ground waters and stormwater runoff; impacts to installed drainage systems on adjacent lands; impacts to wetlands; and the health, environmental and social benefits of solar power.

The Minnesota Department of Transportation (MnDOT) clarified that MnDOT does not consider a solar generating project to be a public utility for transportation purposes and consequently would not allow Marshall Solar to place connecting lines along trunk highways, although electric lines are permitted to cross trunk highways. MnDOT also identified the need for the Project to receive access permits from the appropriate road permitting agency once access point(s) for the Project are determined.[5]

Scoping comments are available for viewing on the Department's EERA website at http://mn.gov/commerce/energyfacilities/Docket.html?Id=34083 and on eDockets at https://www.edockets.state.mn.us/EFiling/search.jsp (enter "14" for year and "1052" for number).

Commission Review

On June 4, 2015, EERA staff provided the Commission with a summary of the EA scoping process. The summary indicated that EERA staff would be recommending to the Deputy Commissioner of the Department that the Scoping Decision for the Project include only the facility locations proposed by Marshall Solar in its site permit application for evaluation in the EA. On June 19, 2015, the Commission voted to take no action with respect to the site alternatives to be considered in the EA.

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comment period); Public Comment, eDocket Document ID: 20155-110515-01; MnDOT Comment, eDocket Document ID: 20155-110412-01; Clean Energy Organizations EA Scoping Comments, eDocket Document ID: 20155-110436-02

[5] MnDOT Scoping Comment, May 15, 2015, eDocket ID: 20155-110412-01.

HAVING REVIEWED THE MATTER, consulted with Department staff, and in accordance with Minnesota Rule 7850.3700, I hereby make the following Scoping Decision:

MATTERS TO BE ADDRESSED

The issues outlined below will be identified and described in the EA for the proposed Marshall Solar Energy Project. The EA will describe the Project and the human and environmental resources at the site proposed by Marshall Solar. The EA will also provide information on the potential impacts of the proposed Project as they relate to the topics outlined in this scoping decision, including possible mitigation for identified impacts, impacts that cannot be avoided identification of irretrievable commitment of resources, and permits from other government entities that may be required.

The EA on the Marshall Solar Energy Project will address and provide information on the following matters:

I. PROJECT DESCRIPTION AND OVERVIEW

a. Project Description
b. Project Purpose
c. Project Costs
d. Anticipated Schedule

II. REGULATORY FRAMEWORK

a. Certificate of Need
b. Site Permit
c. Scoping Process
d. Public Hearing
e. Other Permits
f. Issues outside the EA

III. PROPOSED PROJECT – DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

a. Proposed Facility Location
b. Alternative Sites Considered and Rejected
c. Site Requirements
d. Project Design
e. Project Construction
f. Project Operation and Maintenance

IV. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

The EA will include a discussion of the following human and environmental resources potentially impacted by the proposed project. Potential impacts, both positive and negative, of the project and each alternative will be described. Based on the impacts identified, the EA will describe mitigation measures that could reasonably be implemented to reduce or eliminate the identified impacts. The EA will describe any unavoidable impacts resulting from implementation of the proposed project.

Data and analyses in the EA will be commensurate with the importance of potential impacts and the relevance of the information to a reasoned choice among

alternatives and to the consideration of the need for mitigation measures.[6] EERA staff will consider the relationship between the cost of data and analyses and the relevance and importance of the information in determining the level of detail of information to be prepared for the EA. Less important material may be summarized, consolidated or simply referenced.

If relevant information cannot be obtained within timelines prescribed by statute and rule, or if the costs of obtaining such information is excessive, or the means to obtain it is not known, EERA staff will include in the EA a statement that such information is incomplete or unavailable and the relevance of the information in evaluating potential impacts or alternatives.[7]

a. Human Settlement
    i. Public Health and Safety
    ii. Displacement
    iii. Noise
    iv. Aesthetics
    v. Socioeconomics (including property values)
    vi. Cultural Values
    vii. Recreation
    viii. Public Services and Infrastructure
    ix. Land Use and Zoning
b. Land Based Economies
    i. Agriculture
    ii. Forestry
    iii. Tourism
    iv. Mining
c. Archaeological and Cultural Resources
d. Natural Environment
    i. Air
    ii. Geology, Soils and Groundwater
    iii. Surface Water
    iv. Wetlands
    v. Vegetation
    vi. Wildlife
    vii. Rare and Unique Natural Resources

V. ADVERSE IMPACTS THAT CANNOT BE AVOIDED

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VII. APPLICATION OF SITING FACTORS

[6] Minnesota Rule 4410.2300.
[7] Minnesota Rule 4410.2500.

SITES TO BE EVALUATED IN THE ENVIRONMENTAL ASSESSMENT

The EA will evaluate the facility location proposed by Marshall Solar in its Site Permit Application (see attached map). No other locations will be evaluated in the EA.

IDENTIFICATION OF PERMITS

The EA will include a list and description of permits or approvals from other government entities that may be required for the proposed project.

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA for the Marshall Solar Project will not consider the following:

A. No-build alternative.
B. Issues related to project need, size, type, or timing.
C. Any site alternative not specifically identified in this scoping decision.
D. The manner in which land owners are compensated for the sites, as that is outside the jurisdiction of the Commission.

SCHEDULE

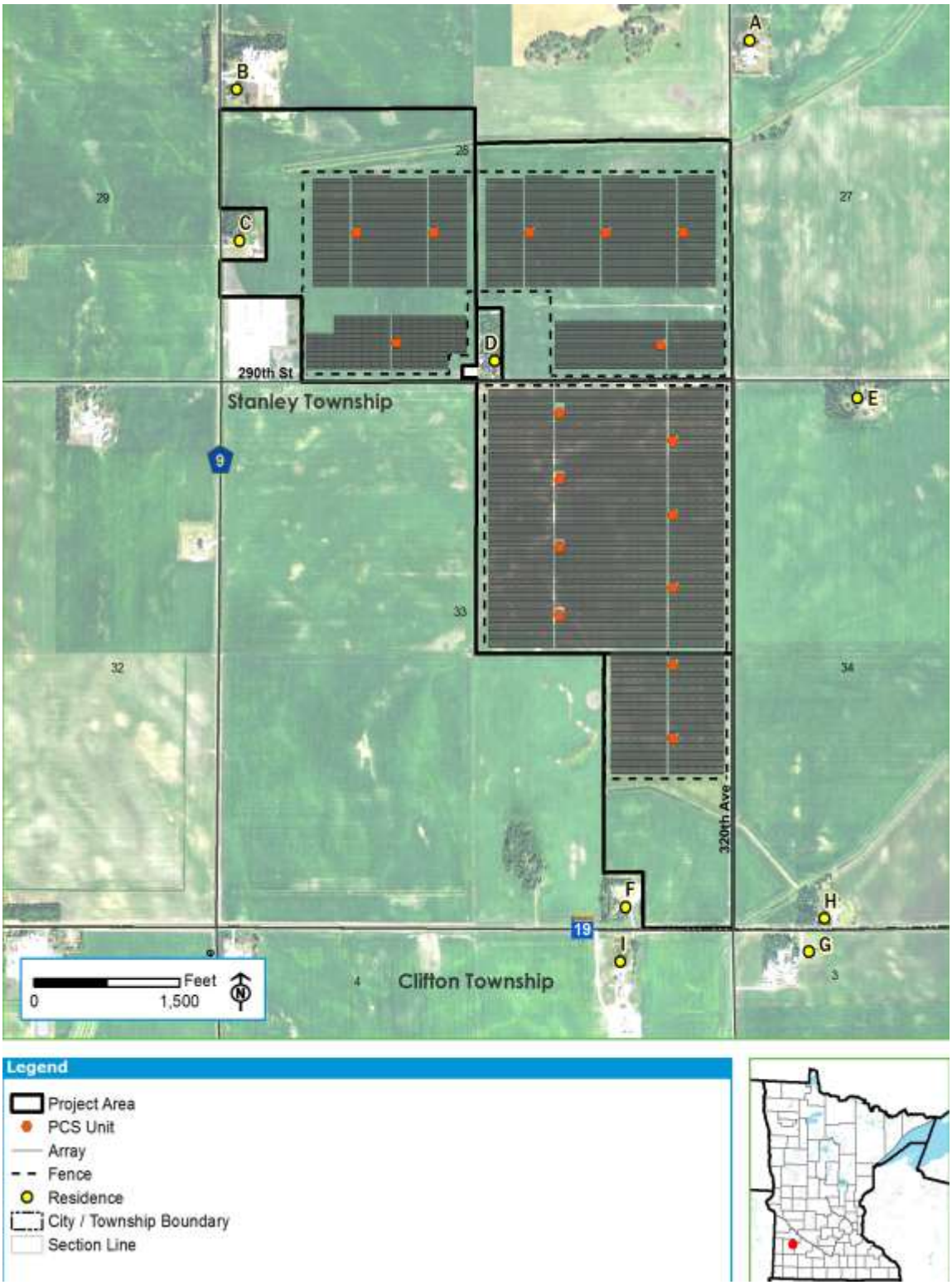
The Environmental Assessment is anticipated to be completed and available by September 2015. A public hearing will be held in the Project area after the Environmental Assessment has been issued and notice served.

Signed this 24th day of June, 2015

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE

William Grant, Deputy Commissioner

PRELIMINARY MARSHALL SOLAR LOCATION AND DESIGN



Appendix B:

Site Permit Template

Attachment A - **Revised** Generic Template

This version replaces the template attached to staff's briefing paper submitted on June 11. This revised version is the version attached to the North Star Solar briefing paper.

Minor corrections have been made to the solar site permit template to fix incorrect language, typos, and omit a repetitive statement. No substantive changes have been made.

ATTACHMENT A

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

SITE PERMIT FOR A
SOLAR ENERGY GENERATING SYSTEM

IN
[*COUNTY*]

ISSUED TO
[*PERMITTEE*]

PUC DOCKET NO. [*Docket Number*]

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850 this site permit is hereby issued to:

[*PERMITTEE*]

The Permittee is authorized by this site permit to construct and operate [*Provide a description of the project authorized by the Minnesota Public Utilities Commission*].

The solar energy generating system and associated facilities shall be built within the site identified in this permit and as portrayed in the official site map(s) and in compliance with the conditions specified in this permit.

This site permit shall expire [*xx*] years from the date of this approval.

Approved and adopted this ____ day of [*Month, Year*]

BY ORDER OF THE COMMISSION

_____

Daniel P. Wolf,
Executive Secretary

This document can be made available in alternative formats (e.g., large print or audio) by calling 651-296-0406 (voice). Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service.

ATTACHMENT A

CONTENTS

FIGURES

ATTACHMENTS

ATTACHMENT A

1.0 SITE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this site permit to [*Permittee Name*] (Permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. This permit authorizes the [*Permittee Name*] to construct [*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*], and as identified in the attached site permit map(s), hereby incorporated into this document as Attachment [*X*].

1.1 Pre-emption

Pursuant to Minn. Stat. § 216E.10, this site permit shall be the sole approval required for the construction of the solar energy generating system and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

2.0 PROJECT DESCRIPTION

[*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*]

3.0 DESIGNATED SITE

The site designated by the Commission in this permit is the site described below and shown on the site maps attached to this permit (Attachment [*X*]).

[*As applicable, provide a detailed description of the authorized site.*]

3.1 Project Location

The project is located in the following:

County	Township Name	Township	Range	Section

3.2 Project Boundary

The preliminary project layout is shown on the official site map(s). The preliminary layout represents the approximate location of photovoltaic tracker rows and associated facilities within the project boundary and identifies a layout that seeks to minimize the overall potential human and environmental impacts of the project, which were evaluated in the permitting process. The

project boundary serves to provide the Permittee with the flexibility to make minor adjustments to the preliminary layout to accommodate requests by affected landowners, local government units, unforeseen conditions encountered during the detailed engineering and design process, and federal and state agency requirements. Any modification to the location of a photovoltaic tracker row and associated facility depicted in the preliminary layout shall be done in such a manner to have comparable overall human and environmental impacts and shall be specifically identified in the site plan pursuant to Section 8.3.

4.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during construction and operation of the solar energy generating system and associated facilities over the life of this permit.

4.1 Notification

Within 14 days of issuance of this permit, the Permittee shall send a copy of the permit to any regional development commission, county, city, and township in which any part of the site is located.

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of the first contact with the affected landowners after issuance of this permit. The Permittee shall contact landowners prior to entering the property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

4.2 Construction and Operation Practices

The Permittee shall follow those specific construction practices, operation practices, and material specifications described in [*Permittee Name and Title of Application*] to the Commission for a site permit for the [*Project Name*], dated [*Date*], unless this permit establishes a different requirement in which case this permit shall prevail.

4.2.1 Field Representative

The Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this permit during construction of the project. This person shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons. The Permittee may change the site manager at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

4.2.2 Site Manager

The Permittee shall designate a site manager responsible for overseeing compliance with the conditions of this permit during the commercial operation and decommissioning phases of the project. This person shall be accessible by telephone or other means during normal business hours for the life of this permit.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the site manager 14 days prior to placing the facility into commercial operation. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons. The Permittee may change the site manager at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

4.2.3 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in the construction and ongoing operation of the solar facility of the terms and conditions of this permit.

4.2.4 Temporary Work Space

Temporary work space and equipment staging areas shall be selected to limit the removal and impacts to vegetation. Temporary work space shall not be sited in wetlands or native prairie as defined in sections 4.2.9 and 4.2.10. Temporary work space shall be sited to comply with standards for development of the shorelands of public waters as defined in Section 4.2.9. Temporary easements outside of the authorized site boundary will be obtained from affected landowners through rental agreements and are not provided for in this permit.

4.2.5 Noise

Construction and routine maintenance activities shall be limited to daytime working hours, as defined in Minn. R. 7030.0020, to ensure nighttime noise level standards will not be exceeded.

4.2.6 Aesthetics

The Permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures with the potential for visual disturbance.

4.2.7 Soil Erosion and Sediment Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

Where larger areas of one acre or more are disturbed or other areas designated by the MPCA, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA that provides for development of a stormwater pollution prevention plan (SWPPP) that describes methods to control erosion and runoff.

4.2.8 Public Lands

In no case shall photovoltaic tracker rows and associated facilities including foundations, access roads, underground cable, and transformers, be located in the public lands identified in Minn. R. 7850.4400, subp. 1, or in federal waterfowl production areas. Photovoltaic tracker rows and associated facilities shall not be located in the public lands identified in Minn. R. 7850.4400, subp. 3, unless there is no feasible and prudent alternative.

4.2.9 Wetlands and Shoreland

Photovoltaic tracker rows and associated facilities, including access roads, underground cable and transformers shall not be placed in public waters and public waters wetlands, as shown on the public water inventory maps prescribed by Minn. Stat. § 103G, except that electric collector or feeder lines may cross or be placed in public waters or public waters wetlands subject to permits and approvals by the Minnesota Department of Natural Resources (DNR) and the United States Army Corps of Engineers (USACE), and local units of government as implementers of the Minnesota Wetlands Conservation Act. Photovoltaic tracker rows and associated facilities including foundations, access roads, underground cable and transformers, shall be located in compliance with the standards for development of the shorelands of public waters as identified in Minn. R. 6120.3300, and as adopted, Minn. R. 6120.2800, unless there is no feasible and prudent alternative.

Construction in wetland areas shall occur during frozen ground conditions to minimize impacts. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area. Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts.

Wetland and water resource areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

4.2.10 Native Prairie

The Permittee shall prepare a prairie protection and management plan in consultation with the DNR if native prairie, as defined in Minn. Stat. § 84.02, subd. 5, is identified within the site boundaries. The Permittee shall file the plan 30 days prior to submitting the Site Plan required by Section 8.3 of this permit. The plan shall address steps that will be taken to avoid impacts to native prairie and mitigation to unavoidable impacts to native prairie by restoration or management of other native prairie areas that are in degraded condition, by conveyance of conservation easements, or by other means agreed to by the Permittee, DNR and the Commission.

Solar panels and associated facilities including foundations, access roads, collector and feeder lines, underground cable, and transformers shall not be placed in native prairie unless addressed in a prairie protection and management plan and shall not be located in

areas enrolled in the Native Prairie Bank Program. Construction activities, as defined in Minn. Stat. § 216E.01, shall not impact native prairie unless addressed in a prairie protection and management plan.

4.2.11 Vegetation Management

The Permittee shall disturb or clear the site only to the extent necessary to assure suitable access for construction, safe operation and maintenance of the project.

The Permittee shall minimize the number of trees to be removed in selecting the site layout specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation, to the extent that such actions do not violate sound engineering principles.

The Permittee shall work with the DNR to establish and manage vegetation that will benefit pollinators and other wildlife, to the extent that the vegetation will not interfere with the operation of the facility.

4.2.12 Application of Herbicides

The Permittee shall restrict herbicide use to those herbicides and methods of application approved by the Minnesota Department of Agriculture and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. All herbicides shall be applied in a safe and cautious manner so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. The Permittee shall contact the landowner or designee to obtain approval for the use of herbicide at least 14 days prior to any application on their property. The landowner may request that there be no application of herbicides on any part of the site within the landowner's property. The Permittee shall provide notice of herbicide application to known beekeepers operating apiaries within one mile of the project site at least 14 days prior to such application.

4.2.13 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

4.2.14 Invasive Species

The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities.

4.2.15 Roads

The Permittee shall advise the appropriate governing bodies having jurisdiction over all state, county, city or township roads that will be used during the construction phase of the project. Where practical, existing roadways shall be used for all activities associated with construction of the solar facility. Oversize or overweight loads associated with the facility shall not be hauled across public roads without required permits and approvals.

The Permittee shall locate all perimeter fencing and vegetative screening in a manner that does not interfere with routine maintenance activities and allows for continued safe travel on public roads.

The Permittee shall construct the least number of site access roads it can. Access roads shall not be constructed across streams and drainage ways without the required permits and approvals. Access roads shall be constructed in accordance with all necessary township, county or state road requirements and permits.

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when obtaining access to the site, unless otherwise negotiated with the affected landowner.

4.2.16 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the solar facility. The Permittee shall consult the State Historic Preservation Office (SHPO) on the need to conduct a survey of the project site. If a survey is required, the results shall be submitted to the Commission with the site plan pursuant to Section 8.3.

In the event that a resource is encountered, the Permittee shall contact and consult with SHPO and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with SHPO and State Archaeologist requirements.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement or the State Archaeologist.

4.2.17 Interference with Communication Devices

If interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the project, the Permittee shall take whatever action is feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the project.

4.2.18 Restoration

The Permittee shall restore the areas affected by construction of the solar facility to the condition that existed immediately before construction began to the extent possible. The time period to complete restoration may be no longer than 12 months after completion of the construction, unless otherwise negotiated with the affected landowner. Restoration shall be compatible with the safe operation, maintenance and inspection of the project. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

4.2.19 Cleanup

All waste and scrap that is the product of construction shall be removed from the site and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

4.2.20 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment shall be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during construction and restoration of the site.

4.2.21 Damages

The Permittee shall promptly repair or fairly compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction and operation unless otherwise negotiated with the affected landowner.

4.2.22 Public Safety

The Permittee shall provide educational materials to landowners adjacent to the site and, upon request, to interested persons about the project and any restrictions or dangers associated with the project. The Permittee shall also provide any necessary safety measures such as warning signs and gates for traffic control or to restrict public access. The Permittee shall submit the location of all underground facilities, as defined in Minn. Stat. § 216D.01, subd. 11, to Gopher State One Call following the completion of construction at the site.

4.2.23 Site Identification

The solar site shall be marked with a visible identification number and or street address.

4.3 Feeder Lines

Feeder lines that carry power from an internal project interconnection point to the project substation or interconnection point on the electrical grid may be overhead or underground. Overhead and underground feeder lines that parallel public roads shall be placed within the public right-of-way or on private land immediately adjacent to the road. The Permittee shall obtain approval from the private landowner or government unit responsible for the affected right-of-way.

Feeder line locations shall be located in such a manner as to minimize interference with agricultural operations including, but not limited, to existing drainage patterns, drain tile, future tiling plans, and ditches. Safety shields shall be placed on all guy wires associated with overhead feeder lines. The Permittee shall submit the engineering drawings of all collector and feeder lines with the site plan pursuant to Section 8.3.

4.4 Other Requirements

4.4.1 Safety Codes and Design Requirements

The solar energy generating system and associated facilities shall be designed to meet or exceed all relevant local and state codes, Institute of Electrical and Electronics Engineers, Inc. (IEEE) standards, the National Electric Safety Code (NESC), and North American Electric Reliability Corporation (NERC) requirements.

4.4.2 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of these permits. A list of the permits known to be required is included in the permit application. The Permittee shall submit a copy of such permits to the Commission upon request.

5.0 SPECIAL CONDITIONS

The Permittee shall provide a report to the Commission as part of the site plan submission required under Section 8.3 that describes the actions taken and mitigative measures developed regarding the project and the following special conditions. Special conditions shall take precedence over other conditions of this permit should there be a conflict.

[*Describe any special conditions*]

Examples of special conditions included in permits:

- *Avian Mitigation Plan*
- *Environmental Control Plan*
- *Agriculture Mitigation Plan*
- *Vegetation Management Plan*
- *Property Restrictions*
- *Minnesota Department of Natural Resources Requirements*
- *Minnesota Pollution Control Requirements*
- *Minnesota State Historical Preservation Office Requirements*
- *Minnesota Department of Transportation Requirements*

For example:

Demonstration of Compliance with Shoreland Standards
The Permittee shall demonstrate compliance with the minimum standards for development of shoreland areas as specified in Section 4.2.9 of this permit.

Security Fence Design

The security fence surrounding the site shall be comprised of a chain link fence of up to seven feet topped by a 1- to 2-foot extension tilted 45 degrees outward from the vertical plane of the chain link portion and carrying monofilament cables or barbless wire.

6.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the site within four years after the date of issuance of this permit the Permittee shall file a report on the failure to construct and the Commission shall consider suspension of the permit in accordance with Minn. R. 7850.4700.

7.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the complaint procedures attached to this permit.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

8.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

8.1 Pre-Construction Meeting

Prior to the start of any construction, the Permittee shall participate in a pre-construction meeting with the Department of Commerce and Commission staff to review pre-construction filing requirements, scheduling, and to coordinate monitoring of construction and site restoration activities. Within 14 days following the pre-construction meeting, the Permittee shall file with the Commission, a summary of the topics reviewed and discussed and a list of attendees. The Permittee shall indicate in the filing the construction start date.

8.2 Pre-Operation Compliance Meeting

At least 14 days prior to commercial operation of the facility, the Permittee shall participate in a pre-operation compliance meeting with the Department of Commerce and Commission staff to coordinate field monitoring of operation activities for the project. Within 14 days following the pre-operation meeting, the Permittee shall file with the Commission, a summary of the topics reviewed and discussed and a list of attendees.

8.3 Site Plan

At least 14 days prior to the pre-construction meeting, the Permittee shall provide the Commission with a site plan that includes specifications and drawings for site preparation and grading; specifications and locations of photovoltaic panels and other structures to be constructed including all electrical equipment, pollution control equipment, fencing, roads, and other associated facilities; and procedures for cleanup and restoration. The documentation shall include maps depicting the site boundary and layout in relation to that approved by this permit.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes to its site plan or the specifications and drawings after submission to the Commission, the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

8.4 Periodic Status Reports

The Permittee shall report to the Commission on progress regarding site construction. The Permittee need not report more frequently than monthly.

8.5 Notification to Commission

At least three days before the solar facility is to be placed into service, the Permittee shall notify the Commission of the date on which the facility will be placed into service and the date on which construction was complete.

8.6 As-Builts

Within 60 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

8.7 GPS Data

Within 60 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for all structures associated with the solar energy generating system.

8.8 Project Energy Production

The Permittee shall, by February 1st following each complete or partial year of project operation, file a report with the Commission on the monthly energy production of the facility including:

(a) the installed nameplate capacity of the permitted facility;

(b) the total daily energy generated by the facility in MW hours;

(c) the total monthly energy generated by the facility in MW hours;

(d) the monthly capacity factor of the facility;

(e) yearly energy production and capacity factor for the facility;

(f) the average monthly and average annual solar strength gradient measured in kWh/m²/Day observed at the facility;

(g) the operational status of the facility and any major outages, major repairs, or performance improvements occurring in the previous year; and

(h) any other information reasonably requested by the Commission.

This information shall be considered public and must be filed electronically.

8.9 Emergency Response

The Permittee shall prepare an Emergency Response Plan in consultation with the emergency responders having jurisdiction over the facility prior to project construction. The Permittee shall submit a copy of the plan, along with any comments from emergency responders, to the Commission at least 14 days prior to the pre-construction meeting and a revised plan, if any, at least 14 days prior to the pre-operation compliance meeting. The Permittee shall provide as a compliance filing confirmation that the Emergency Response Plan was provided to the emergency responders and Public Safety Answering Points (PSAP) with jurisdiction over the

facility prior to commencement of construction. The Permittee shall obtain and register the facility address or other location indicators acceptable to the emergency responders and PSAP having jurisdiction over the facility.

8.10 Extraordinary Events

Within 24 hours of discovery of an occurrence, the Permittee shall notify the Commission of any extraordinary event. Extraordinary events include but shall not be limited to: fires, solar panel collapse, acts of sabotage, collector or feeder line failure, and injured worker or private person. The Permittee shall, within 30 days of the occurrence, file a report with the Commission describing the cause of the occurrence and the steps taken to avoid future occurrences.

8.11 Wildlife Injuries and Fatalities

The Permittee shall report any wildlife injuries and fatalities to the Commission quarterly.

9.0 DECOMMISSIONING AND RESTORATION

9.1 Decommissioning Plan

The Permittee shall submit a decommissioning plan to the Commission at least fourteen 14 days prior to the pre-operation compliance meeting documenting the manner in which the Permittee anticipates decommissioning the project. The Permittee shall also submit the decommissioning plan to the local unit of government having direct zoning authority over the project. The Permittee shall ensure that it carries out its obligations to provide for the resources necessary to fulfill its requirements to properly decommission the project at the appropriate time. The Commission may at any time request the Permittee to file a status report with the Commission describing how the Permittee is fulfilling this obligation.

9.2 Site Restoration

Upon expiration of this permit or upon termination of operation of the project, the Permittee shall have the obligation to dismantle and remove from the site all solar panels, mounting steel posts and beams, inverters, transformers, overhead and underground cables and lines, foundations, buildings, and ancillary equipment. To the extent feasible, the Permittee shall restore and reclaim the site to pre-project topography and topsoil quality. All access roads shall be removed unless written approval is given by the affected landowner requesting that one or more roads, or portions thereof, be retained. All such agreements between the Permittee and the affected landowner shall be submitted to the Commission prior to completion of restoration activities.

The site shall be restored in accordance with the requirements of this condition within 18 months of termination.

9.3 Abandoned Solar Installations

The Permittee shall advise the Commission of any solar facilities that are abandoned prior to termination of operation of the project. The project, or any equipment within the project, shall be considered abandoned after one year without energy production and the land restored pursuant to Section 9.2 unless a plan is developed and submitted to the Commission outlining the steps and schedule for returning the project, or any equipment within the project, to service.

10.0 COMMISSION AUTHORITY AFTER PERMIT ISSUANCE

10.1 Final Boundaries

After completion of construction the Commission shall determine the need to adjust the final site boundaries required for the project. This permit may be modified, after notice and opportunity for public hearing, to represent the actual site boundary required by the Permittee to operate the project authorized by this permit.

10.2 Expansion of Site Boundaries

No expansion of the site boundary described in this permit shall be authorized without the approval of the Commission. The Permittee may submit to the Commission a request for a change in the boundary of the site for the project. The Commission will respond to the requested change in accordance with applicable statutes and rules.

10.3 Periodic Review

The Commission shall initiate a review of this permit and the applicable conditions at least once every five years. The purpose of the periodic review is to allow the Commission, the Permittee, and other interested persons an opportunity to consider modifications in the conditions of this permit. No modification may be made except in accordance with applicable statutes and rules.

10.4 Modification of Conditions

After notice and opportunity for hearing this permit may be modified or amended for cause, including but not limited to the following:

(a) violation of any condition in this permit;

(b) endangerment of human health or the environment by operation of the Project; or

(c) existence of other grounds established by rule.

10.5 More Stringent Rules

The issuance of this permit does not prevent the future adoption by the Commission of rules or orders more stringent than those now in existence and does not prevent the enforcement of these more stringent rules and orders against the Permittee.

11.0 PERMIT AMENDMENT

This permit may be amended at any time by the Commission. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the Permittee. The Commission may amend the conditions after affording the Permittee and interested persons such process as is required.

12.0 TRANSFER OF PERMIT

The Permittee may request at any time that the Commission transfer this permit to another person or entity. The Permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer.

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required.

13.0 REVOCATION OR SUSPENSION OF THE PERMIT

The Commission may initiate action to revoke or suspend this permit at any time. The Commission shall act in accordance with the requirements of Minn. R. 7850.5100, to revoke or suspend the permit.

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLAINT HANDLING PROCEDURES FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of reporting complaints received by the permittee concerning permit conditions for site preparation, construction, cleanup and restoration, operation, and resolution of such complaints.

B. Scope

This document describes complaint reporting procedures and frequency.

C. Applicability

The procedures shall be used for all complaints received by the permittee and all complaints received by the Minnesota Public Utilities Commission (Commission) under Minn. R. 7829.1500 or Minn. R. 7829.1700 relevant to this permit.

D. Definitions

Complaint: A verbal or written statement presented to the permittees by a person expressing dissatisfaction or concern regarding site preparation, cleanup or restoration or other route and associated facilities permit conditions. Complaints do not include requests, inquiries, questions or general comments.

Substantial Complaint: A written complaint alleging a violation of a specific permit condition that, if substantiated, could result in permit modification or suspension pursuant to the applicable regulations.

Unresolved Complaint: A complaint which, despite the good faith efforts of the permittee and a person, remains to both or one of the parties unresolved or unsatisfactorily resolved.

Person: An individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized.

E. Complaint Documentation and Processing

1. The permittee shall designate an individual to summarize complaints for the Commission. This person's name, phone number and email address shall accompany all complaint submittals.

2. A person presenting the complaint should to the extent possible, include the following information in their communications:

    a. name, address, phone number, and email address;
    b. date of complaint;
    c. tract or parcel number; and
    d. whether the complaint relates to a permit matter or a compliance issue.

3. The permittee shall document all complaints by maintaining a record of all applicable information concerning the complaint, including the following:

    a. docket number and project name;
    b. name of complainant, address, phone number and email address;
    c. precise description of property or parcel number;
    d. name of permittee representative receiving complaint and date of receipt;
    e. nature of complaint and the applicable permit condition(s);
    f. activities undertaken to resolve the complaint; and
    g. final disposition of the complaint.

F. Reporting Requirements

The permittee shall commence complaint reporting at the beginning of project construction and continue through the term of the permit. The permittee shall report all complaints to the Commission according to the following schedule:

Immediate Reports: All substantial complaints shall be reported to the Commission the same day received, or on the following working day for complaints received after working hours. Such reports are to be directed to the Commission's Consumer Affairs Office at 1-800-657-3782 (voice messages are acceptable) or consumer.puc@state.mn.us. For e-mail reporting, the email subject line should read "PUC EFP Complaint" and include the appropriate project docket number.

Monthly Reports: By the 15th of each month, a summary of all complaints, including substantial complaints received or resolved during the preceding month, shall be filed to Daniel P. Wolf, Executive Secretary, Public Utilities Commission, using the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

If no complaints were received during the preceding month, the permittee shall file a summary indicating that no complaints were received.

G. Complaints Received by the Commission

Complaints received directly by the Commission from aggrieved persons regarding site preparation, construction, cleanup, restoration, operation and maintenance shall be promptly sent to the permittee.

H. Commission Process for Unresolved Complaints

Commission staff shall perform an initial evaluation of unresolved complaints submitted to the Commission. Complaints raising substantial permit issues shall be processed and resolved by the Commission. Staff shall notify the permittee and appropriate persons if it determines that the complaint is a substantial complaint. With respect to such complaints, each party shall submit a written summary of its position to the Commission no later than ten (10) days after receipt of the staff notification. The complaint will be presented to the Commission for a decision as soon as practicable.

I. Permittee Contacts for Complaints and Complaint Reporting

Complaints may filed by mail or email to:

[*Name*]
[*Mailing Address*]
[*Phone*]
[*Email*]

This information shall be maintained current by informing the Commission of any changes by eFiling, as they become effective.

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLIANCE FILING PROCEDURE FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of submitting information required by the Commission energy facility permits.

B. Scope and Applicability

This procedure encompasses all compliance filings required by permit.

C. Definitions

Compliance Filing: A filing of information to the Commission, where the information is required by a Commission site or route permit.

D. Responsibilities

1. The permittee shall eFile all compliance filings with Daniel P. Wolf, Executive Secretary, Public Utilities Commission, through the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

General instructions are provided on the eDockets website. Permittees must register on the website to eFile documents.

2. All filings must have a cover sheet that includes:

    a. Date
    b. Name of submitter/permittee
    c. Type of permit (site or route)
    d. Project location
    e. Project docket number
    f. Permit section under which the filing is made
    g. Short description of the filing

3. Filings that are graphic intensive (e.g., maps, engineered drawings) must, in addition to being eFiled, be submitted as paper copies and on CD. Paper copies and CDs should be sent to: 1) Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, 121 7th Place East, Suite 350, St. Paul, MN 55101-2147, and 2) Department of Commerce, Energy Environmental Review and Analysis, 85 7th Place East, Suite 500, St. Paul, MN 55101-2198.

The Commission may request a paper copy of any eFiled document.

PERMIT COMPLIANCE FILINGS[1]

PERMITTEE:
PERMIT TYPE:
PROJECT LOCATION:
PUC DOCKET NUMBER:

Filing Number	Permit Section	Description of Compliance Filing	Due Date

[1] This compilation of permit compliance filings is provided for the convenience of the permittee and the Commission. It is not a substitute for the permit; the language of the permit controls.

Appendix C:

Marshall Solar Responses to EERA Environmental Review Questions

September 2, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Questions 1-12**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the August 27, 2015 requests for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached responses to EERA Questions 1-12 contained in EERA's August 27, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC
TO
ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTIONS 1-12

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following responses to Questions 1-12 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Questions 1-12 are repeated below, with Marshall Solar's response immediately following.

1. Developed Area

Question: *Marshall Solar's Reply Comments filed March 27, 2015 (at p. 3), identify an "inside the fence area" of up to 474 acres. Does Marshall Solar have any changes or modifications to the up to 474 acre estimate?*

Response: Yes, the latest version of the site layout contemplates that all project components will be located inside a perimeter fence and that this area would encompass approximately 364 acres within the 515-acre Marshall Solar Project ("Project") area. This "inside the fence area" may be further revised as the Project layout is refined during final site development and engineering.

2. Solar Module Design

a. ***Question:*** *Please describe the approximate dimensions of the solar modules (approximate width and length).*

Response: Each individual solar module will be approximately 78.5-inches long by 39.4-inches wide.

b. ***Question:*** *Please provide a range of the distances between strings of modules.*

Response: There are 13-feet, 1.25-inches of open space between each row of racked modules. This distance is measured from the back edge of a panel to the front edge of a panel.

c. ***Question:*** *The Application, at p. 13 refers to a "foundation" upon which the arrays are mounted, but the composition of a foundation beyond the racking and steel posts is not discussed. Please describe the foundation.*

Response: The racking will be mounted to galvanized steel H-piles that will be individually driven into the ground. These driven piles will form the racking system's foundation. No other foundations, such concrete piers, will be constructed.

3. Operations and Maintenance Facility

Please clarify Marshall Solar's plans for an Operations and Maintenance Facility. The Application, at pp. 14-15, states "The Project may include a pre-fabricated metal building to serve the operational needs of the Project." It is unclear whether the "may" in this statement refers to the O&M facility generally or the use of a pre-fabricated building.

a. ***Question:*** *Does Marshall Solar anticipate construction of an O&M facility as part of the Project?*

Response: An O&M building is no longer planned for installation at the Project site.

b. ***Question:*** *If no O&M facility is constructed as part of the Project, where would the O&M equipment and materials be kept?*

Response: Marshall Solar has concluded that it would be more cost effective to utilize alternate locations for the Project's O&M facility. Two different options are currently being evaluated. The first option would involve the rental of office/storage space within the city of Marshall, MN given the Project's proximity to Marshall. The second option is to locate the Project's O&M facility at an existing wind facility located near the Buffalo Ridge (approximately 30 miles from the Project site), which is owned and operated by an affiliate of Marshall Solar. Also, limited quantities of materials may also be stored in the Project's substation control house.

c. ***Question:*** *If an O&M facility is constructed as part of the Project,*

1. *Would a building necessarily be part of the facility? If so, would Marshall Solar seek a local permit, or would it seek to have the O&M facility permitted through the Site Permit?*

2. *Would Marshall Solar seek to install a well or septic system as part of the O&M facility?*

3. *Would the O&M facility include any above-ground or below-ground storage tanks? If so, please describe the contents of the tanks and procedures to minimize the potential damages resulting from leaks or spills from any tanks.*

Response: No longer applicable. See response to Question 3.a.

4. Land Cover

Question: *Please describe the crop cover of the proposed site in the summer of 2015 (e.g. approximately 35 percent corn, 60 percent soybeans, 5 percent alfalfa). Is there much variation in the crop cover from year to year?*

Response: The proposed Project site is currently planted with a combination of corn (36%), soybeans (63%), and wheat (1%) for the 2015 summer growing season. With respect to variations in the crop, based on crop remnants from the 2014 growing season, it appears that corn and soybeans are the typical crop types grown within the proposed Project site.

5. Electrical System

a. ***Question:*** *It is unclear from the description on p. 13 of the Application whether each inverter in a PCS is coupled with an individual transformer, or whether a single transformer on each pad will serve several inverters. Please clarify.*

Response: Each PCS container will have a single transformer which is located immediately adjacent. This single transformer will serve each inverter within the PCS.

b. ***Question:*** *The Application, at p. 14, states "Marshall Solar expects nearly all of the AC collection systems to be placed underground." Please describe the situations which would dictate the use of overhead collector lines.*

Response: The current plan is for all AC collection to be installed underground. The only situation in which overhead would be required is in those areas in which the collection line would cross an existing transmission easement, ditch, or road right-of-way. In general, the preference in these locations is to bore underneath the item and install the collection line underground. To date, Marshall Solar has not received

feedback from any party owning an easement or right-of-way that must be crossed requesting that the lines be overhead. Thus, Marshall Solar expects to install the entire AC collection system underground.

6. Home Removal

Question: *Please provide an overview of the process for removing the home and outbuildings on the additional 4.3 acre parcel.*

Response: A full assessment of the property will be conducted prior to the start of any demolition. This assessment will include an analysis for the presence of asbestos, lead, or any other hazardous materials which would require special consideration or treatment. If the building contains hazardous materials that need to be removed, proper procedures for abatement will be followed. House demolition will involve large equipment, such as a hydraulic excavator, to tear down the structure and foundations as well as trucks and dumpsters for material removal. The removal of all demolition debris from the site and all materials will be dumped at local garbage debris disposal stations.

a. ***Question:*** *Is water to the existing home provided through a well or water service? If a well is present, please describe the measures to seal the well and prevent groundwater contamination?*

Response: A single domestic well is located on the property. During construction, the well and pump will be left in place to support any construction water use requirements (domestic uses, dust control, compaction, etc). Following construction, the well may be left in-service to support any continuing water requirements at the Project site, or, if not left in-service, the well would be filled with concrete, capped, and abandoned. Marshall Solar will assess its options and preferences for well abandonment in the future.

b. ***Question:*** *Please describe how the septic system at the existing home will be handled.*

Response: After removal of construction debris from around the property, Marshall Solar will arrange for the septic tank to be completely pumped out. The inlet and outlet of the tank will be capped and sealed and the tank itself will be left in place. Marshall Solar will arrange for the excavation and removal of the drain field, back fill the hole with the excavated spoil, and re-spread topsoil, as appropriate. It is Marshall Solar's understanding that the septic tank removal procedures will require a permit from Lyon County and the work would be conducted in accordance with all permit stipulations.

7. Hazardous Materials

a. ***Question:*** *Please discuss any known environmental hazards (e.g. abandoned wells, chemical storage, dumps, etc.) on the site.*

Response: Two Phase I Environmental Site Assessments ("ESAs") were performed for this Project site to examine the site for potential environmental hazards (or Recognized Environmental Conditions as per ASTM Practice E 1527-13). No Recognized Environmental Conditions were noted within the Project site. Small areas of soil staining and stressed vegetation were noted on the property; however, these conditions were all considered *de minimis* in nature. A burn pit containing remnants of burned material (likely household trash) was also noted on the property.

b. ***Question:*** *Has an Environmental Site Assessment or any other type of site characterization been done for the site? If so, does the site characterization include the additional parcel?*

Response: Yes, as noted above, two Phase I ESAs were performed for this Project site: one that included the general Project site and another that was specific to the additional 4.3-acre parcel. No Recognized Environmental Conditions were identified in the ESAs.

8. Construction Timeline

Question: *Are there any changes or updates to the Construction Activity Timeline represented in Table 4 of the Site Permit Application?*

Response: No.

9. Project Substation

a. ***Question:*** *Will the entire 1-2 acres inside the fence be covered with rock?*

Response: Yes, the entire area inside the substation fence will be covered with rock.

b. ***Question:*** *Will there be a parking area at the Project Substation?*

Response: No parking area specific to the substation is planned. Any vehicle parking can be accommodated by the open space within the completed substation.

c. ***Question:*** *Will there be a separate gate to the Project Substation, as opposed to the fencing of the entire facility?*

Response: The Project substation will have its own fence and its own access gates which are separate from the solar facilities perimeter fence. This substation security fence/access gate will be internal to the main perimeter fence and gates. Access to the substation is through the main site entrance.

10. Laydown Area

a. ***Question:*** *Please describe the criteria for selecting a construction staging/laydown area.*

Response: Marshall Solar selects staging/laydown areas by evaluating ease of access to suitable roadways near the primary access points to the Project site. Laydown areas are also located with the intention of minimizing the number of times materials and equipment are handled between delivery and ultimate installation, so central location is preferable. In all cases, laydown areas are temporary and removed/reclaimed during the final stages of construction.

b. ***Question:*** *Would this area be fenced separately from the perimeter fencing?*

Response: No, if the laydown is established on-site, because the staging/laydown area will be established within the site's perimeter fencing. Yes, if an off-site area is used for staging/laydown. Marshall Solar's preference is to utilize an on-site staging/laydown area.

c. ***Question:*** *Please describe the procedures for restoration of the laydown area.*

Response: At the completion of construction, any rock used on the surface or spread on interior roads will be removed. The subgrade materials would be de-compacted using a tractor and disc, and topsoils would be re-spread over the entire area.

11. Project Roads

Question: *The Preliminary Design Specifications in Appendix A of the Application indicates approximately 33,450 feet of access roads. Please provide an estimate of the total length of internal access roads. A range of lengths is acceptable.*

Response: The latest estimated length of the internal access road system totals approximately 25,000 – 28,000 linear feet.

12. Fences

a. ***Question:*** *The Application, at p. 36, describes the perimeter fencing as an eight-foot chain link fence without barbed wire. Are there any design options under consideration to minimize the potential for unauthorized entrance into the facility by either humans or animals?*

Response: The perimeter fencing type described on page 36 of the Application - an 8-foot chain link fence without barbed wire – is planned for the Project site at the request of the Minnesota Department of Natural Resources. Access gates will involve a combination of swinging or roller gates, secured by locks. The construction of an 8-foot fence and locked gates will enclose the perimeter and prevent the unauthorized entrance

into the facility by humans and large animals, such as deer. Marshall Solar is considering the use of other passive security systems (cameras, etc) to minimize the potential for human intrusion and has also consulted with the Lyon County Sheriff's office on security measures.

b. ***Question:*** *At what point in the construction process would the perimeter fencing be installed?*

Response: The perimeter fence would be installed early in the construction process. Installation typically happens after grading is complete and the site's final grade is established, but before the start of installation of any cables or racking piles.

c. ***Question:*** *Does Marshall Solar anticipate that a single perimeter fence will surround the perimeter of the entire developed area, or might there be multiple fences? There is some discussion of the main gate, will there be other entrances?*

Response: There will be multiple fences. Since the Project is essentially bisected by 290th Street, there are two main sections of the overall Project. Each of these main areas will have their own continuous perimeter fence. Also, in the northern segment, the existing transmission easements might require further segmentation of a continuous perimeter fence, but these details will be finalized in the future as Marshall Solar concludes the process of negotiating with these easement owners.

The main Project entrance will be located north of the Lyon County Substation along County Highway 9, but there will also be secondary access gates to allow access from other main roads (290th Street and 320th Avenue). Each of the Project's two main areas will have at least two access points.

d. ***Question:*** *Figures 3.1 and 4.1 in Marshall Solar's July 27, 2015 update appear to show the Otter Tail Power Substation within the fence line. If the Otter Tail Power Substation is within the fence line, what are the provisions for Otter Tail Power to access the substation?*

Response: The Otter Tail Power Substation will be located outside the Project's perimeter fence line. Marshall Solar cannot fence in this substation as it is located on property not under the control of Marshall Solar. The map scale in Figures 3.1 and 4.1 make it difficult to clearly indicate the fence location in relation to the other facilities in that particular area.

September 17, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Questions 13-15**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the September 11, 2015 requests for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached responses to EERA Questions 13-15 contained in EERA's September 11, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC
TO
ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTIONS 13-15

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following responses to Questions 13-15 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Questions 13-15 are repeated below, with Marshall Solar's response immediately following.

Question 13:

Project Decommissioning:
(a) Please describe the factors Marshall Solar will consider in determining the useful life of the plant.

(b) Please describe the factors Marshall Solar will assess when determining whether to cease operations at the site or seek to replace equipment and seek a new Power Purchase Agreement.

Response (a): A minimum useful life of 20 to 25 years is expected for the photovoltaic ("PV") facility and the other major facility components (power inverters, combiner boxes, transformers) based on the expected degradation and physical durability of the individual PV modules and other major facility components. The expected useful life is supported by manufacturers' solar facility equipment warranties that match this 20-25 year time period, as well as by numerous successful project financings that were based on this useful life expectation and validated by independent engineers in those deals.

Response (b): At the conclusion of the existing Power Purchase Agreement ("PPA") with Northern States Power ("NSP"), Marshall Solar will assess the condition and performance of the solar facility and weigh the advantages and disadvantages of continuing operations. If the PV equipment is performing well and it makes economic sense to continue operations (with the installed equipment or with replacement equipment), Marshall Solar will likely continue operations. With that said, it is difficult at this time to foresee what types of generating technologies will be commercially available and cost competitive 25 years from now.

Another factor in the decision to continue commercial operations of the Marshall Solar site will be the availability of an interested customer. Ideally, Marshall Solar would prefer to extend or negotiate a new PPA with NSP or another interested party. Alternatively, Marshall Solar will consider sales at the locational marginal pricing available in the Midcontinent Independent System Operator wholesale energy-market. In either case, the decision whether to continue operations of Marshall Solar will be based on the economics of continued operations.

Question 14:

Subsurface Drainage

(a) Are the existing subsurface drainage systems on the site connected with any subsurface drainage systems that are not part of the site?

(b) Please describe how Marshall Solar will avoid impacts to existing subsurface drainage at the site and near the site.

Response (a): The site's existing subsurface drainage systems are connected to the county drainage system at three known locations. The first location is at the northern edge of the site across the borderline of the property at a county drainage ditch. The second location is southwest of the site where the county drain tile crosses the Lyon County Substation and 290th Street. The third location is south of the site near the borderline at a second county drainage ditch. All three areas where the site drainage system is connected to the county drainage system are not planned to be utilized for equipment installation, including photovoltaic ("PV") modules or racking, which will avoid potential impacts. Therefore, the

county drainage system will be operational as it exists today without any impact or interference from Marshall Solar Project.

Response (b): Marshall Solar has hired a professional drainage tile company to locate all drainage tiles on the site in the fall of 2015, as soon as possible after harvesting is complete. With this mapping data, Marshall Solar will be able to determine any unknown subsurface connections to and from the site. Once these tile lines are located and logged using Global Positioning System ("GPS") coordinates, Marshall Solar will utilize the data to refine the site layout to avoid impacts to the existing drainage system. The placement of the PV racking, roads, and underground conductors will be planned to avoid disturbance to subsurface drainage patterns both at the site and near the site.

Also, several construction measures will be implemented to prevent impacts on the site drainage system:

i. Damaged or weak tiles that are discovered during the mapping phase will be repaired or replaced depending upon their structural condition.

ii. To the extent possible, major tile channels will be completely avoided. If impacts to a major tile line are unavoidable, the line will be re-routed.

iii. Marshall Solar expects that there may be limited impact to tile during the installation of AC collection lines. In this situation, the damaged tiles will be rerouted or repaired once the collection line is installed. Since only four major AC collection lines will are planned for the site, these impacts should be minimal.

iv. Underground DC conductors will not impact the drainage system. The DC lines will be installed at a depth of 3-feet, which should be above any drainage tile.

Question 15:

It is unclear from the information contained in Application (specifically Section 4.4 and Appendices D& F) whether SHPO has reviewed the Phase Ia Literature Survey provided in Appendix D of the application and whether or not a pre-construction archaeological field survey is recommended. Please provide any additional correspondence with the SHPO on this issue.[1]

Response: Attachments 1 and 2 to this response provide the additional correspondence with the Minnesota History Society, State Historic Preservation Office ("SHPO"). Attachment 1 is a letter from SHPO dated March 5, 2015, in which SHPO concludes that "there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project." Attachment 2 contains emails between Marshall Solar's environmental consultant and SHPO prior to the issuance of the March 5, 2015 letter discussing whether a meeting regarding the project is necessary.

1 In the second set of questions, this question was identified as question No. 16, but since question No. 14 was the same as Question No. 15, and the third set of questions starts with Question No. 16, this question has been renumbered for ease of review.

Minnesota Historical Society

Using the Power of History to Transform Lives
PRESERVING › SHARING › CONNECTING

STATE HISTORIC PRESERVATION OFFICE

March 5, 2015

Mr. Brandon Stankiewicz
NextEra Energy Resources
700 Universe Blvd
Juno Beach, FL 33408

RE: Marshal Solar Energy Project – construct a solar energy project on current agricultural land
Stanley Twp., Lyon County
T112 R40 S28, 33
SHPO Number: 2015-0543

Dear Mr. Stankiewicz:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Based on our review of the project information, we conclude that there are **no properties** listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36CFR800, Procedures of the Advisory Council on Historic Preservation for the protection of historic properties. If this project is considered for federal assistance, or requires a federal permit or license, it should be submitted to our office by the responsible federal agency.

Please contact our Compliance Section at (651) 259-3455 if you have any questions regarding our review of this project.

Sincerely,

Sarah J. Beimers

Sarah J. Beimers, Manager
Government Programs and Compliance

From: Kelly Gragg-Johnson [mailto:kelly.graggjohnson@mnhs.org]
Sent: Tuesday, December 02, 2014 2:01 PM
To: Justin, Michael
Cc: sarah.beimers@mnhs.org; Rolfes, Christina
Subject: Re: NextEra proposed Marshall solar facility

Hi Mike and Christina-
Thanks for the email. We don't believe a meeting is necessary at this time. This seems like a pretty straight forward project. We will review the results of the Phase IA lit search and any recommendations that come out of that, once it becomes available, and the results of any Phase I survey, if deemed warranted. If there are any big concerns as a result of the surveys and further consultation is needeed, we would be happy to meet at that time. Meanwhile, we look forward to reviewing the results of the Phase IA and any pending Phase I surveys as they become available.
Best,
Kelly

Kelly Gragg-Johnson, Review & Compliance Specialist
Government Programs & Compliance | State Historic Preservation Office
Minnesota Historical Society | 345 Kellogg Blvd W | St. Paul, MN 55102
tel: 651.259.3455 | fax: 651.282.2374 | e: kelly.graggjohnson@mnhs.org

On Tue, Dec 2, 2014 at 1:19 PM, Justin, Michael <Michael.Justin@hdrinc.com> wrote:

Kelly and/or Sarah;

NextEra and HDR are planning on meeting with the Department of Commerce on Wednesday, December 10, 2014 to discuss the status of the proposed solar energy facility near Marshall, Minnesota. We would also very much like to discuss the project with you on that date also. Would SHPO staff be available for a meeting at 3:30 pm on Dec. 10th? *Any time during the morning of the 10th would also work as the meeting with DOC is at 2:30 pm.* The purpose of the meeting will be to familiarize SHPO with the proposed project development and NextEra's plans for dealing with historic properties. We do not anticipate a lengthy meeting. An initial letter introducing the project was sent to SHPO in November (see attachment).

Please reply to either Ms. Christina Rolfes (christina.rolfes@hdrinc.com) or me (michael.justin@hdrinc.com).

Sincerely,

Michael Justin, RPA

Archaeology Project Manager

HDR

701 Xenia Ave South, Suite 600
Minneapolis, MN 55416

D 763.591.5423 **M** **612.615.2460**
michael.justin@hdrinc.com

September 23, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Questions 16-18**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the September 16, 2015 requests for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached responses to EERA Questions 16-18 contained in EERA's September 16, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC TO ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTIONS 16-18

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following responses to Questions 16-18 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Questions 16-18 are repeated below, with Marshall Solar's response immediately following.

Question 16:

Please describe the procedures for restoration of the site following construction.

Response: Marshall Solar will restore temporary disturbance areas through re-vegetation. Marshall Solar will contract with a local restoration company to create a native prairie landscape within the solar facility. The areas to be re-vegetated include the rows between the solar panels, areas between the solar arrays and perimeter fencing and any vacant laydown areas used during construction. Access roads that will need to be traveled during operation and maintenance will remain as simple compacted dirt roads.

To re-vegetate the site with native prairie vegetation, the exposed areas to be planted will first need to be fine graded and all existing weeds that may have sprouted during construction would need to be removed (either manually or by spaying with herbicide). Site preparation may also include disking and harrowing the soil to create viable seedbeds. Following site preparation, a mixture of native prairie grasses and wildflowers (developed in concert with Minnesota Department of Natural Resources and the Natural Resources Conservation Service) will be seeded using broadcasting and/or a seed drill designed for

native seeding. Seeding is heavily dependent on timing. Seeding dates for prairie grasses native to this specific region would likely need to occur in the spring or summer.

During early establishment of prairie grasses and wildflowers, maintenance will be important. Mowing will most likely be required to control growth of unwanted weed species. The species of grasses and wildflowers selected for the areas in the vicinity of the arrays will be those that do not grow higher than the lowest edge of the solar panels. Optimum mowing height to encourage establishment will be approximately 4-6 inches. A slightly different mix of prairie grasses and wildflowers with some taller species may be developed for areas away from the arrays. The native seed mixtures are still being developed at this time. Following the initial growing season, other maintenance to encourage successful establishment may involve spot spraying, herbicide wicking or hand weeding.

The procedures for the reestablishment of prairie habitat at the Project Site will be outlined in greater detail in the Agricultural Impact Mitigation Plan which Marshall Solar is currently developing.

Question 17:

Please provide an estimate of the annual electric production in MWh for the Project. A range is acceptable.

Response: Marshall Solar currently estimates the annual electric production for the Project will be in the range of 100,000 – 130,000 MWh.

Question 18:

a. *Has Marshall Solar modeled the potential for glint and glare from the Project? If so, please summarize the results.*

Response: Marshall Solar conducted a high-level screening using a process known as the Solar Glare Hazard Analysis Tool ("SGHAT") created by Sandia National Laboratories to assess the potential for glint and glare at the Project site. The results of the screening are attached as Attachment 1 to this response. The results of the SGHAT indicate that at certain times throughout the year there may be a low potential for glare at certain observation points. Marshall Solar has also prepared a number of visual simulations meant to model the future condition from various observation points around the Project site. Those simulations were previously provided in the Site Permit Application submitted on March 4, 2015. Based on these results, Marshall Solar does not believe a comprehensive glint and glare analysis is warranted for this proposed Project site.

b. If a glare analysis has not been performed, please describe why not.

Response: As noted above, a high-level glint and glare screening was completed for the Project site. Based on the results of that screening, and for the reasons described below, Marshall Solar does not believe a comprehensive modeling effort is warranted.

As discussed in the Site Permit Application, photovoltaic modules are specifically designed to avoid reflecting sunlight. The modules are manufactured with an anti-reflective coating to minimize the sunlight that is scattered and maximize the amount that is absorbed. The regional topographical character in this area of Minnesota is predominantly flat, which means there are no mountains, hills, or other prominent topographical features that would provide a viewer with an unobstructed view of the entire solar project. Instead, viewers traveling on the adjacent roads or living in residences are likely to have views of only portions of the Marshall Solar Project. These partial views are also mitigated by the micro-terrain of the Project site, which does have various undulations and small elevation changes that serve to obstruct views of the entire site. Also, tree groves, ditch embankments, vegetation, and row crops that will be growing all around the Project site will further disrupt unobstructed views and mitigate any potential impacts from glint and glare.

In addition to these site specific factors, there is a significant amount of publically available information, such as the information attached to this response as Attachment 2, suggesting that glint/glare from a photovoltaic project is not likely to cause significant impacts for ground based viewers, and, more importantly, for aircraft flying above or near the Project site. Given a combination of the available research and the observed character of the Project Site, Marshall Solar does not believe a comprehensive glare modeling effort is warranted.

c. What would Marshall Solar consider to be the most relevant inputs into modeling of potential glint and glare from the Project?

Response: The most relevant inputs into a glint/glare model would be the types of materials used in the construction of the solar facility (most importantly the panels), the mounting azimuth, and information about weather patterns and the sun's path across the sky at various times of day and times of year. Finally, the model must identify the points on the ground at which the analysis is to be conducted. Different points on the ground may experience completely different effects at the same time of day depending on the viewing angle, elevation differences, and other factors.

d. Please describe any existing site constraints that may affect the amount of glare experienced by those living and traveling near the Project.

Response: The effects observed by individuals living or travelling near the Marshall Solar Project would be heavily influenced by their location in relation to the Project. Terrain and

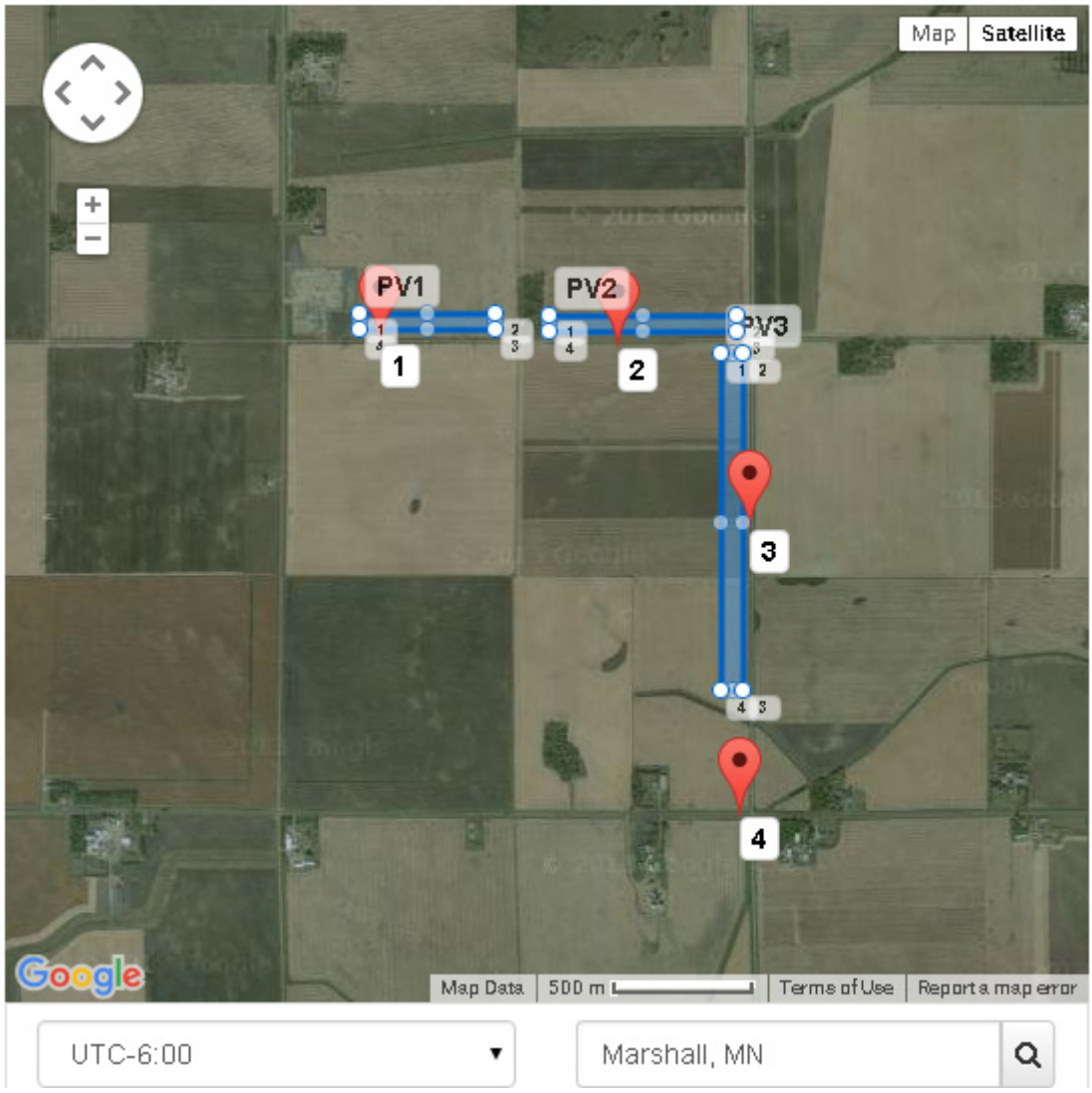
vegetation between the viewer and the Project would also influence any detected glint or glare. Finally, a viewer observing the Project from the north is only likely to observe the back side of the photovoltaic modules, which are generally white in color and shaded from the sun.

In general, the site and surrounding terrain has some small undulations which will make it difficult to view the entire Project at any given time from any location and a viewer is likely to see only a portion of the solar array. Despite these undulations, the overall topographical character of the area is predominantly flat, which means there are no areas of elevated terrain from which a viewer would be able to achieve a superior view of the Project site. Finally, tree groves and embankments in the area along the roads and near the homesteads in the vicinity of the Project will also reduce the ability of viewers to gain unobstructed views of the project.

Marshall Solar Energy Project

Solar Glare Hazard Analysis Tool Results

PV Array Blocks & Observation Points



Observation Point (OP)

PV Array Block

PV Array Info*

Axis tracking: None

Module surface material: Smooth glass with ARC

Panel tilt: 30 deg

Reflectivity varies with incidence angle (view data)

Orientation (Calculate declination): 180 deg

Correlate slope error to module surface type (view data)

Rated power: 0.325 kW

*PV Blocks created in this tool are representative and do not reflect final array locations.

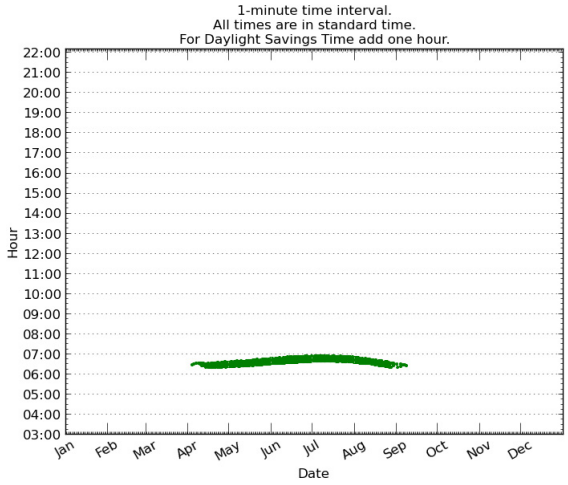
Observation Info

name	latitude	longitude	ground elevation	Eye-level height above ground	
	deg	deg	ft	ft	
1	44.47213	-95.67109	1104.37	5	✖
2	44.47201	-95.66088	1110.6	5	✖
3	44.46647	-95.65526	1110.73	5	✖
4	44.45765	-95.65568	1108.11	5	✖

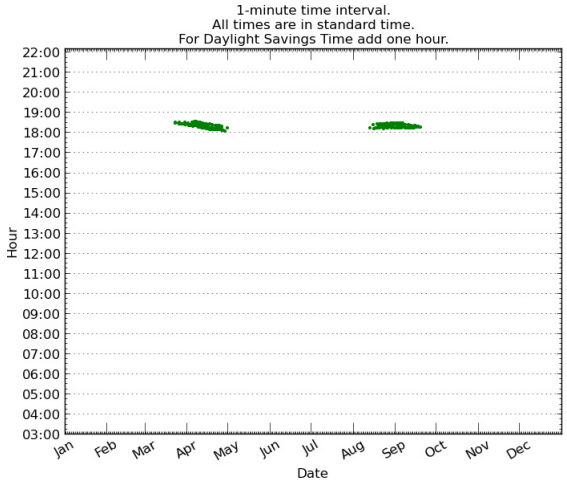
Glare Results

PV Array Block 1

Observation Point 1

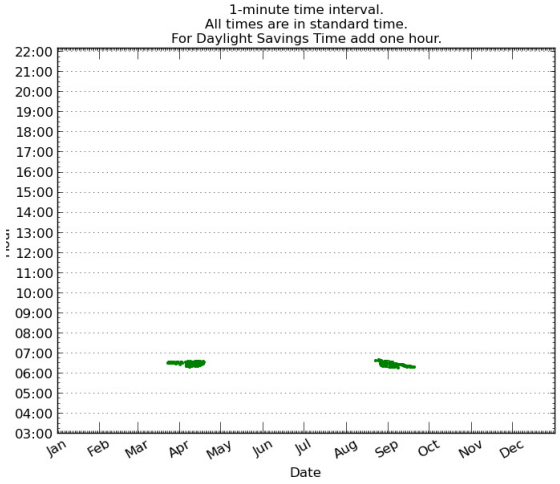


Observation Point 2

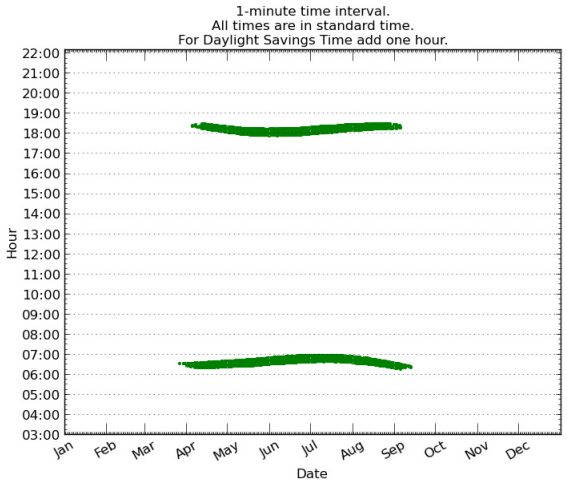


PV Array Block 2

Observation Point 1

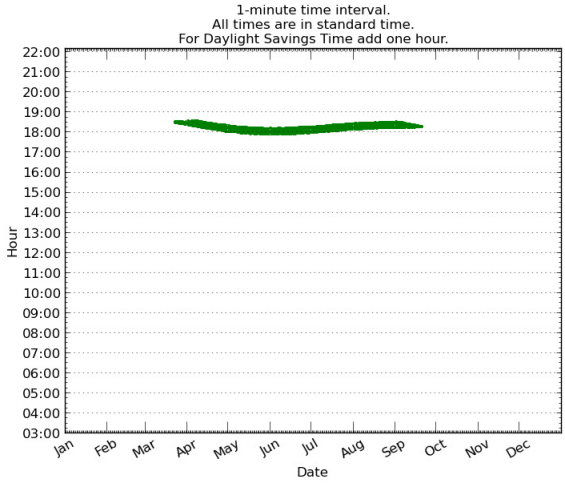


Observation Point 2



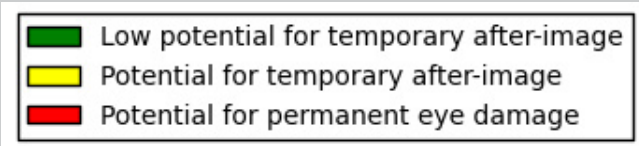
PV Array Block 3

Observation Point 3



NOTES

Glare analysis is based on sun data from 2014



Analysis run on September 19, 2015 via https://share.sandia.gov/phlux/sghat/

PV Systems: Low Levels of Glare and Reflectance vs. Surrounding Environment

by Mark Shields
2010

SUNPOWER™

EXECUTIVE SUMMARY

The glare and reflectance levels from a given PV system are decisively lower than the glare and reflectance generated by the standard glass and other common reflective surfaces in the environments surrounding the given PV system. Possibilities of random glare and reflectance observed from the air: the PV industry has multiple large projects installed near airports or on air force bases. Each of these large projects has passed FAA or Air Force standards and all projects have been determined as "No Hazard to Air Navigation". Although the possible glare and reflectance from PV systems are at safe levels and are decisively lower than other standard residential and commercial reflective surfaces, it is suggested that customers and installers discuss any possible concerns with the neighbors/cohabitants near the planned PV system installation.

EXPLANATION OF REFLECTANCE AND PV GLASS

SECTION 1

In general, since the whole concept of efficient solar power is to absorb as much light as possible while reflecting as little light as possible, standard solar panels produce less glare and reflectance than standard window glass. This is pointed out very well in US patent # 6359212 (Method for testing solar cell assemblies and second surface mirrors by ultraviolet reflectometry for susceptibility to ultraviolet degradation), which explains the differences in the refraction and reflection of solar panel glass versus standard window glass. Specifically, on a more technical level, solar panels use "high-transmission, low-iron" glass, which absorbs more light, producing smaller amounts of glare and reflectance than normal glass. In order to further explain these differences, we will need to explain some basic scientific terms that are used when discussing beams of light impacting the surfaces of other mediums, as the light beams leave air to enter the other mediums.

Reflection, Refraction and Angles-of-incidence

The imaginary line at 90° to a given reflective surface is called the Normal. The original beam of light is called the incident beam, and the angle at which it strikes the surface is called the incident angle. The quantity of reflected light is called the reflectance, and the angle at which it leaves the surface is the angle of reflectance. With transparent surfaces, the amount of light which bends slightly as it goes through the surface is called the refracted beam OR transmittance. These basic concepts of reflection (return of light from a surface) and refraction (bending and transmission of light through a surface) are pointed out in the first two figures on the next page. Both have a normal, an incident beam and an incident angle;

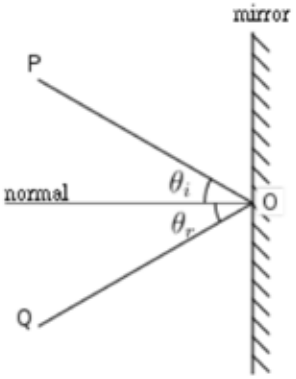


Figure 1.1; Reflection

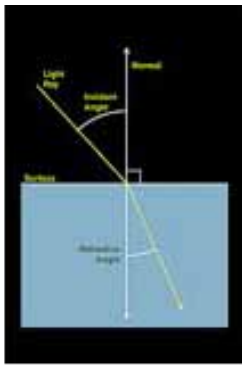


Figure 1.2: Refraction

Since our main discussion concerns types of glass and sunlight, we will further our explanation using glass as the example and speaking in terms of reflected energy percentages:

Incident light and Reflected Energy percentages. When a beam of light falls on a piece of glass, some of the light is reflected from the glass surface, some of the light passes through the glass (transmitted), and some (very little) is absorbed by the glass.

- The measure of the proportion of light reflected from the surface is called reflectance (reflection).
- The measure of the proportion transmitted is the transmittance (This is where the term high light-transmission glass comes from because the glass is formulated to allow more light to pass through its surface than would pass through a standard glass surface).
- The measure of the proportion absorbed is the absorptance (absorption (this amount is very small for clear glass – much, much smaller proportionately, than the other two components).
- Each quantity is expressed as a fraction of the total quantity of light in the beam. If the intensity of the beam is represented by the numerical 1, reflectance by R, absorptance by A and transmittance by T, intensity may be expressed as follows: R + A + T = 1, where glass is the glazing material pointed out in figure 2-2 in the next column (Figure 2-1 is a rough depiction of the percentages of light for each component of the equation).

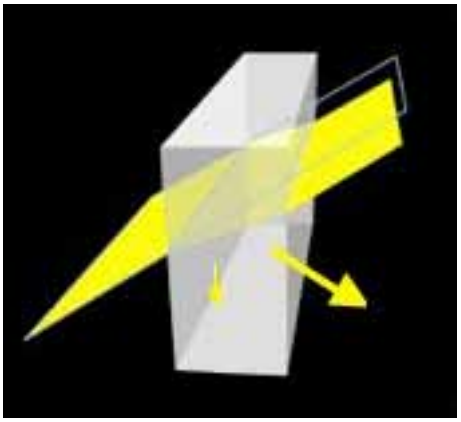


Figure 2.1: Depiction of resultant percentages for incident components

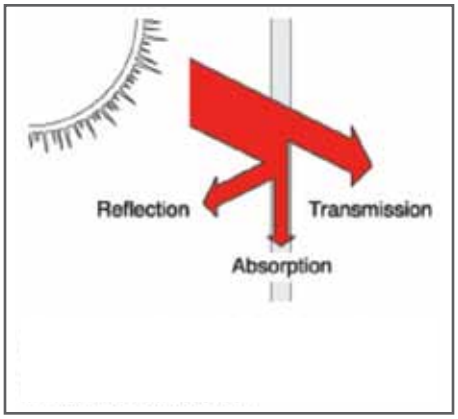


Figure 2.2: Solar radiation through a glazing material is either reflected, transmitted or absorbed

The reflection/refraction behavior of a medium is directly related to its index of refraction. The lower the index of refraction for a medium, the less light it reflects because the medium is allowing more of the incident beam to pass directly through (in our case, directly through the glass to the solar cells). The following list and graphical representation are one-to-one in the order of a materials' representation;

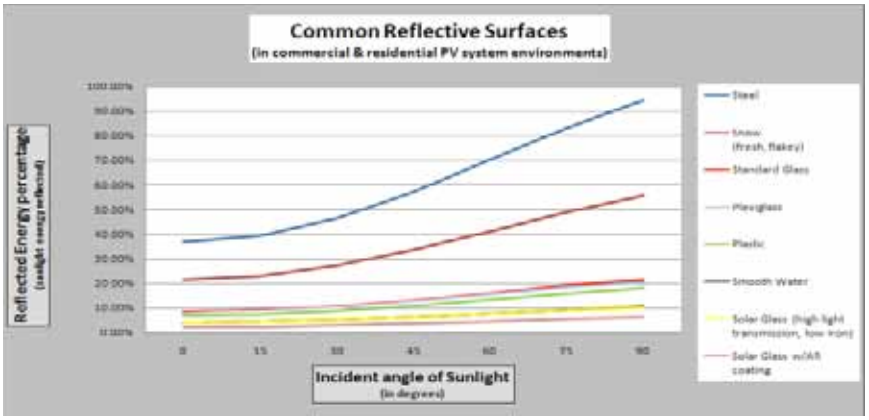


Figure 2.4: Common Reflective Surfaces and reflectance percentages.

n	Common Reflective Surfaces (in surrounding environments for PV systems)
2.500	Steel
1.980	Snow (fresh, flakey)
1.517	Standard Glass
1.500	Plexiglass
1.460	Plastic
1.333	Smooth Water
1.329	Solar Glass (high light transmission, low iron)
1.250	Solar Glass w/AR coating

Material Reflectivity (percent of incident light reflected)

Figure 2.3: Common Reflective Surfaces and Index of Refraction, "n" (the value "n" may vary by reference source, but the hierarchy of "n" values from one material to another will remain the same).

In the below we show the reflected energy percentages of sunlight, off of some common residential and commercial surfaces. The legend and the graph lists the items from top to bottom in order of the highest percentage of reflected energy (as does the list of Common Reflective Surfaces); E.g. – 'Steel' reflects more energy than 'Snow'. 'Snow' reflects more energy than 'standard glass', etc. It should be noted from the graph and the table below, that the reflected energy percentage of Solar Glass is far below that of standard glass and more on the level of smooth water.

Common Reflective Surfaces	Incident angle in degrees						
	0	15	30	45	60	75	approaching 90
Steel	36.73%	35.22%	46.34%	57.11%	70.02%	81.15%	94.40%
Snow (fresh, flakey)	23.63%	23.09%	27.20%	33.63%	41.23%	48.96%	55.59%
Standard Glass	8.44%	9.01%	10.65%	13.12%	16.09%	19.10%	21.69%
Plexiglass	8.00%	8.54%	10.09%	12.44%	15.25%	18.11%	20.56%
Plastic	6.99%	7.46%	8.82%	10.87%	13.33%	15.83%	17.97%
Smooth Water	0.07%	4.35%	5.18%	6.33%	7.76%	9.22%	10.47%
Solar Glass (high light transmission, low iron)	3.99%	4.26%	5.03%	6.20%	7.61%	9.03%	10.26%
Solar Glass w/AR coating	2.47%	2.64%	3.12%	3.84%	4.71%	5.59%	6.35%

Figure 2.5: Common Reflective Surfaces and reflectance percentage values.

Stippled Glass" and "Light Trapping"

In addition to the superior refractive/reflective properties of solar glass versus standard glass, many PV suppliers uses stippled solar glass for their panels. Stippled glass is also used with high powered telescopes and with powerful beacons and flashlights. The basic concept behind stippling is for the surfaces of the glass to be "textured" with small types of indentations. As a result, stippling allows more light energy to be channeled/transmitted through the glass while diffusing (weakening) the reflected light energy. "Light trapping" is also used by more high-quality PV suppliers. "Light Trapping" is the practice of using additional techniques like mirrors and natural surface textures to "trap" light within the layers of the solar cell, allowing even less light to escape by reflection. These concepts are why a reflection of off a high-quality solar panel will look hazy and less-defined than the same reflection from standard glass. This occurs because the stippled and light-trapping PV glass and cell texture are transmitting a larger percentage of light to the solar cell while breaking-up the intensity of the reflected energy.

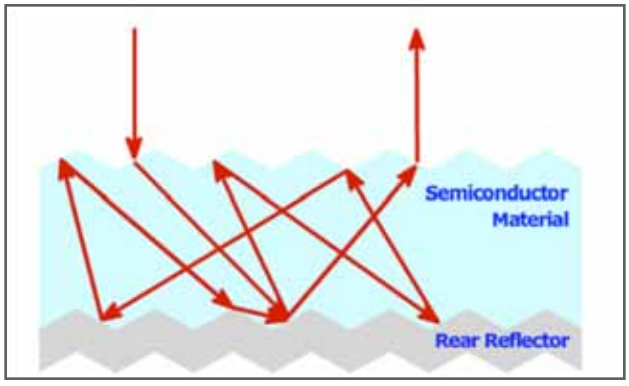


Figure 3.1: Light Trapping. More light energy is absorbed by the cell with each ensuing reflection of the initial light beam.

Try this basic optical experiment where ever a reflection comparison can be safely made between a high-efficiency/high-quality PV panel and a large window or plate of glass.

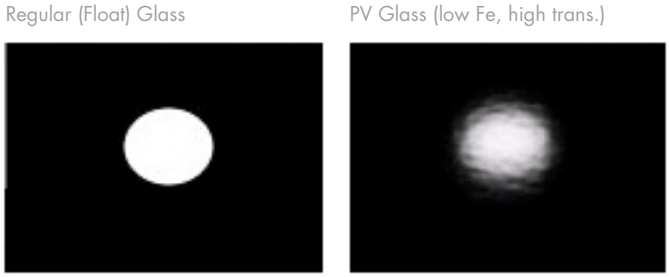


Figure 3.2: Reflection Characteristic example

No Hazard to Air Navigation

A handful of PV suppliers are proud to point out their PV installations at airports and on Air Force bases. The statement "No Hazard to Air Navigation" is the FAA status consistently applied to the large system arrays and power-plants which are continuously being erected on and around airports and Air Force bases. After covering the information prior to this section, it should come as no surprise that PV installations have this status concerning air navigation.

CONCLUSION

SECTION 2

In support of the executive summary, the studies, data and light-beam physics behind the charts and graphs prove beyond a reasonable doubt that solar glass has less glare and reflectance than standard glass. The figures also make it clear that the difference is very decisive between solar glass and other common residential and commercial glasses. In addition, not to be lost in the standard light/glass equations and calculations, PV solar-glass is often stippled and has a light-trapping, very photon-absorbent solar cell attached to its' back side, contributing additional factors which result in even less light energy being reflected.

REFERENCES

SECTION 3

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4.3. C. G. Granqvist, Materials Science for Solar Energy Conversion Systems, (1991), Pergamon, G B.

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4.5. P. Nostell, A. Roos, B. Karlsson, Antireflection of glazings for solar energy applications, Solar Energy Materials and Solar Cells, 54, (1998), 23-233.

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4.7. J. Karlsson and A. Roos, Modeling the angular behavior of the total solar energy transmittance of windows, Solar Energy, 69, 4, (2000).

4.8. J. Karlsson, B. Karlsson and A. Roos, A simple model for assessing the energy efficiency of windows, In Press, Energy and Buildings

4.9. Saint Gobain; SG Solar Eclipse for Airport Zones

SUNPOWER CORPORATION
3939 North 1st Street
San Jose, CA 95134

1.800.SUNPOWER (1.800.786.7693)
sunpowercorp.com

September 23, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Question 19**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the September 17, 2015 request for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached response to EERA Question 19 contained in EERA's September 17, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC TO ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTION 19

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following response to Question 19 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Question 19 is repeated below, with Marshall Solar's response immediately following.

Question 19:

Please discuss the Project's consistency with Lyon County Ordinances regarding shoreland. The Application, at p. 63, notes that the drainage ditches within the site are not considered public waters, but Figure 4.8 identifies two PWI watercourses adjacent to the site.

Response: Figure 4.8 from Application shows water resources within the Project Area. Marshall Solar used the MnDOT Streams data to show the locations of all types of water resources, including PWI watercourses and water resources not considered public waters. There are no PWI watercourses within the Project Area; however, there are two watercourses that are not public waters within the Project Area that drain into PWI watercourses that run adjacent to the Project Area. First, there is a drainage ditch (Judicial Ditch 18) in the northern portion of the Project Area in Section 28 of Stanley Township. Outside of Section 28 (and on the east side of 320th Avenue), this water flowage is designated as a PWI Stream. Second, there is a drainage ditch (Judicial Ditch 34) in the southern portion of the Project Area. This drainage ditch is not mapped as a water resource in the MnDOT Streams data set and thus is not shown in Figure 4.8 in the Application, but

is considered a judicial ditch by Lyon County. This judicial ditch flows into a PWI Stream to the southeast of the Project Area in Section 34 (also on the east side of 320th Avenue). As noted in the Application, Marshal Solar has and will continue to work with Lyon County to ensure that the Project is sited to be compatible with Lyon County Zoning Ordinance standards. To this end, John Biren of the Lyon County Planning and Zoning Office indicated in correspondence to Marshall Solar that the applicable Lyon County setback distance from drainage ditches is 120 feet (see also Lyon County Zoning Ordinance Section 8.5, Subp D). Marshall Solar also notes that the Lyon County Zoning Ordinance requires a setback of 100 feet from the ordinary high water mark of "Tributary Streams" such as the two PWI watercourses identified near the Project and discussed above (see Lyon County Zoning Ordinance Section 17.1, Subp. B(1)). In compliance with these requirements, Project infrastructure will be located at least 120 feet from the two judicial drainage ditches mentioned above. Additionally, because no PWI watercourses are within the Project Area, Project infrastructure will be located at least 120 feet from the points where the two judicial drainage ditches drain into a PWI watercourse. Project infrastructure will also be located over 1,000 feet from the PWI watercourse to the southeast of the Project. Marshall Solar will continue to work with Lyon County as Project siting and engineering progresses to ensure appropriate Lyon County shoreland standards are met.

September 25, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Questions 20-23**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the September 23, 2015 requests for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached responses to EERA Questions 20-23 contained in EERA's September 23, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC
TO
ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTIONS 20-23

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following responses to Questions 20-23 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Questions 20-23 are repeated below, with Marshall Solar's response immediately following.

Question 20:

The application, at p. 26, lists a variety of decommissioning tasks. These tasks include both removal of "below ground cabling" and "abandonment of underground utilities"

a. Please describe what is meant by "underground utilities."

Response: The "underground utilities" referred to in Section 3.5.1 of the Application refer primarily to any groundwater well facilities or septic system that the project would install to support operations. Since an on-site Operations and Maintenance facility is no longer planned to be constructed on the Project Site, Marshall Solar does not anticipate the need to construct these underground utilities. Consequently, there will not be any need to abandon any newly constructed underground utilities at the end of the Project's life. Marshall Solar does anticipate that work will be required on the existing utilities located at the 4.3-acre parcel. Handing of those facilities were previously discussed in Marshall Solar's response to EERA's question #6.

b. Please clarify what is meant by abandonment.

Response: The term "abandonment" refers to the procedures mandated by a government agency, in this case, the Minnesota Pollution Control Agency or Lyon County, to safely remove, salvage, demolish in place, or leave in place a utility that is no longer required to remain in-service. The procedures are meant to safeguard the surrounding area from future contamination. Leaving certain types of utilities in place rather than excavating to remove can sometimes be the preferred procedure.

c. What would determine whether underground utilities would be removed or abandoned?

Response: As discussed in response part a. above, Marshall Solar does not intend to construct new utilities on the Project Site and plans to address the existing utilities at the 4.3-acre parcel as previously described.

Question 21: *Please discuss the types of maintenance activities that are likely to be performed between 10 pm and 7 am (considered to be nighttime noise as per PCA noise standards).*

Response: Typically, no routine or scheduled maintenance activities are performed at night at any of the solar facilities owned and operated by indirect affiliates of NextEra Energy Resources, LLC, and no recurring maintenance is planned to take place at night. All routine or scheduled maintenance activities are planned to be performed during daylight hours. With respect to Marshall Solar, the site is also not planned to be staffed 24 hours a day and seven days a week. The only type of work likely to be performed at night will be emergency maintenance on a critical piece of equipment such as the Project's main transformer. In this case, the work will be performed using the minimum amount of lighting necessary to allow crews to safely operate and in accordance with the applicable noise standards.

Question 22: *Please describe how lighting will be provided during the construction phase of the Project and for maintenance during the operations phase of the Project.*

Response: The Marshall Solar Project will be constructed almost exclusively during daylight hours. In the event that non-labor intensive activities, such as testing or commissioning, need to be performed during hours of darkness temporary lighting will be provided by generator-operated light towers, vehicle headlights, or man-portable shop lighting. Any lighting used will be kept to a minimum and pointed at the areas where work is being performed.

Similarly, during operations, Marshall Solar does not schedule or plan to conduct routine maintenance activities at night. As explained in the response to Question 21, any emergency maintenance activities will be performed using the minimum amount of lighting necessary to allow crews to safely operate.

Question 23:

Gen-Tie Line and Structures

a. Please provide an estimate (a range is acceptable) of the number of gen-tie structures that Marshall Solar anticipates will be installed for the Project.

b. Please provide an estimate of the electric field strength (kV/m at one meter above ground) and the magnetic flux density (milligauss at one meter above ground) for the anticipated gen-tie line.

Response: Marshall Solar has modeled the expected levels of electric field strength and magnetic flux density as requested. It is important to note that the final design of the short generation tie-line is not yet complete, so the model below assumed "typical" line specifications with actual loading data from the proposed solar project. Marshall Solar estimates that one, possibly two structures would be needed between the newly constructed Project substation and the Lyon County Substation. The number of structures will ultimately depend on the final geometry of the interconnection and these details are currently under evaluation by Marshall Solar and Northern States Power.

Electric Field Strength (kV/m)										
Structure Type	Maximum Operating Voltage (kV)	Distance to Centerline								
		-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
Horizontal	121	0.003	0.011	0.076	0.453	0.698	0.453	0.076	0.011	0.003

Magnetic Flux Density (mG)										
Structure Type	Average Current (amps)	Distance to Centerline								
		-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
Horizontal	72.7	0.1	0.3	1.0	3.6	17.3	3.6	1.0	0.3	0.1

Note: Average current is calculated with an annual average capacity factor in the mid-20% range.

Assumptions:

- Horizontal configuration
- 12.5-foot phase spacing
- 25-foot minimum ground clearance
- 63 MW_{AC} peak output
- 121 kV maximum operating voltage
- DRAKE 795 ACSR single phase conductor (1.107-inch diameter)
- Calculations performed using EPRI's EMF Workstation 2015

September 28, 2015

Via Electronic Mail

Suzanne Steinhauer
Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101

Re: **Responses of Marshall Solar, LLC to Energy Environmental Review and Analysis Questions for Development of Environmental Review, Questions 24-25**

In the Matter of the Application of Marshall Solar, LLC for a Site Permit for the Marshall Solar Energy Project and Associated Facilities in Lyon County, Minnesota

Docket No. IP-6941/GS-14-1052

Dear Ms. Steinhauer:

Marshall Solar, LLC ("Marshall Solar") is in receipt of the September 24, 2015 requests for information of the Minnesota Department of Commerce Energy, Environmental Review, and Analysis ("EERA"), in connection with EERA's development of an environmental review document in the above-captioned matter. Marshall Solar hereby submits the attached responses to EERA Questions 24-25 contained in EERA's September 24, 2015 request.

Thank you for your attention to this matter.

Sincerely,

Brandon Stankiewicz
Marshall Solar, LLC

Attachment

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application	**)**	
of Marshall Solar, LLC for a	**)**	
Site Permit for the Marshall	**)**	**Docket No. IP-6941/GS-14-1052**
Solar Energy Project and	**)**	
Associated Facilities	**)**	
in Lyon County, Minnesota	**)**	

RESPONSES OF MARSHALL SOLAR, LLC TO ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS QUESTIONS FOR DEVELOPMENT OF ENVIRONMENTAL REVIEW, QUESTIONS 24-25

Marshall Solar, LLC ("Marshall Solar") respectfully submits the following responses to Questions 24-25 from the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff in connection with EERA's development of an environmental review document in the above-captioned matter. Questions 24-25 are repeated below, with Marshall Solar's response immediately following.

Question 24:

Please describe any Reinvest in Minnesota (RIM) or USFWS easements at the site.

Response: Based on the Minnesota Board of Water and Soil Resources' most current (July 2015) dataset of State Funded Conservation Easements ("RIM Reserve"), there are no known RIM Reserve easements within the Marshall Solar Project site.

Likewise, based on the most current (May 2015) USFWS Easement dataset, there are no known USFWS easements within the Marshall Solar Project site.

Question 25:

a. Please describe the status of the Agricultural Mitigation Plan being developed for the Project.

b. Please describe the major components of the Agricultural Mitigation Plan (e.g. control of invasive species, soil compaction, topsoil segregation, re-vegetation).

Response (a): To facilitate the development of the Agricultural Impact Mitigation Plan ("Plan"), Marshall solar has been coordinating with the Natural Resources Conservation Service, the Minnesota Department of Agriculture, the Minnesota Department of Natural Resources, and a research soil scientist, Michael Russelle, (who previously worked at the U.S. Department of Agriculture and now is an Adjunct Professor at the University of Minnesota) on identifying best management practices to avoid, mitigate, repair, and/or compensate for negative agricultural impacts that may result from the construction, operation, and eventual decommissioning of the Project. Marshall Solar is currently drafting the Plan and intends to present the initial draft to both the above mentioned agencies in the October 2015 timeframe. Following the receipt of any agency comments, Marshall Solar will continue to refine the plan as Project design moves towards completion through late 2015 and early 2016. Marshall Solar is anticipating that the requirement to produce a "final" Plan may be a pre-construction stipulation in any Site Permit issued by the Minnesota Public Utilities Commission. Thus, a final Plan will be complete no later than the spring of 2016.

Response (b): The primary focus of the Plan will be to address how Marshall Solar will work to minimize impacts to soil at the Project site so the soil maintains its character as prime farmland. Specifically, the Plan will include components to address potential soil impacts during the construction and operation of the Project, the possible decommissioning of the Project at the end of its useful life, and the ability to return the site to active agricultural use upon decommissioning. More specifically, these Plan components include the following:

- Project Overview – includes detailed descriptions of all Project components as well as the means and methods used to install each of those Project components;

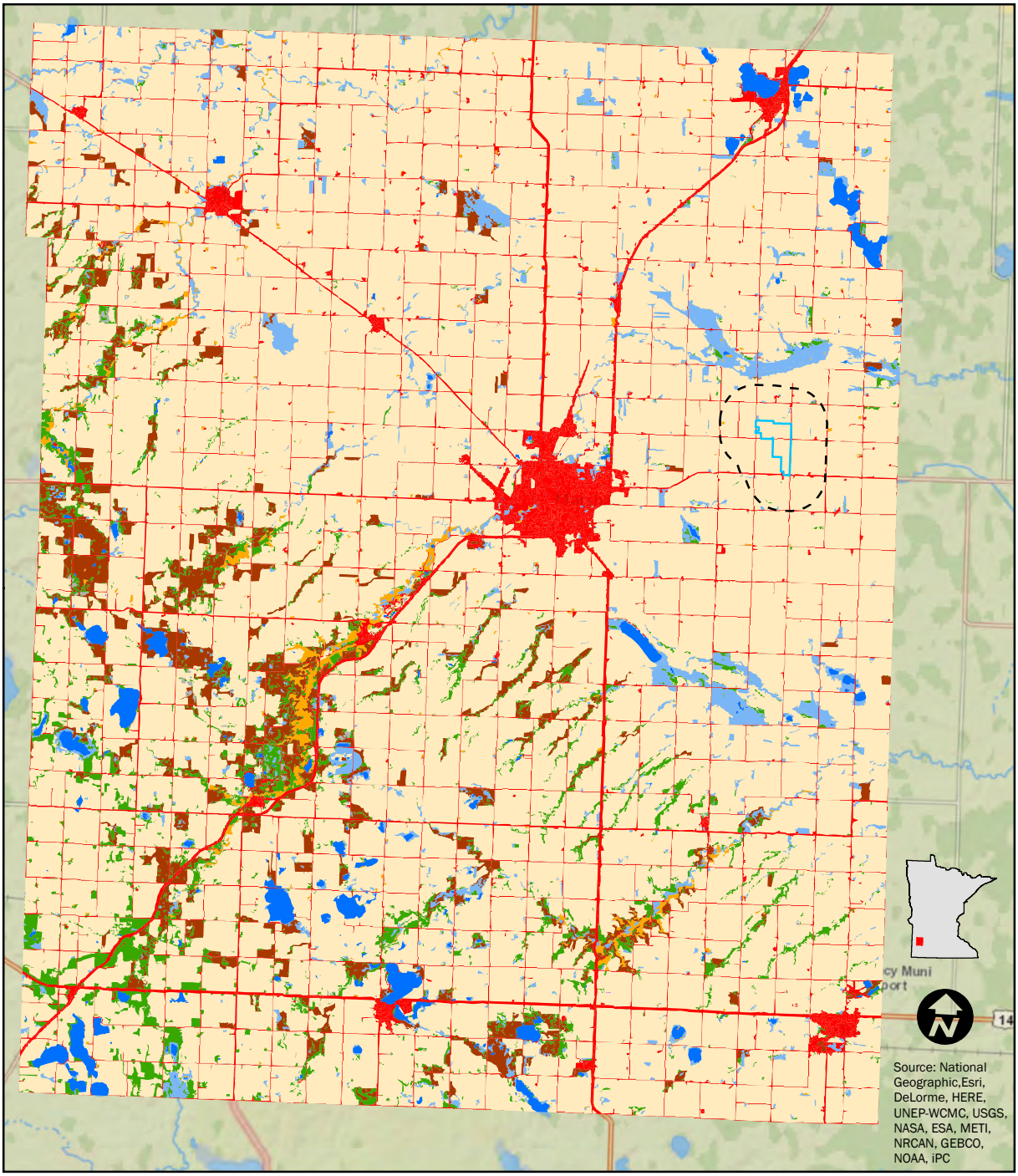
- Best Management Practices Used During Construction – describes the methods the construction contractor will utilize on site during grading, road construction, foundation construction, trenching, and panel installation. This section will also include a discussion of erosion control, weed control, best practices to identify, avoid, and repair drain tile, and construction debris removal;

- Mitigation Measures – this section will focus primarily on the vegetative ground cover Marshall Solar is planning to utilize during both construction and long-term operations, and, specifically, how it will be established and maintained; and

- Decommissioning – this section will discuss the steps and practices that will be employed during any decommissioning of the Project in the future.

Appendix D:

County Level Maps

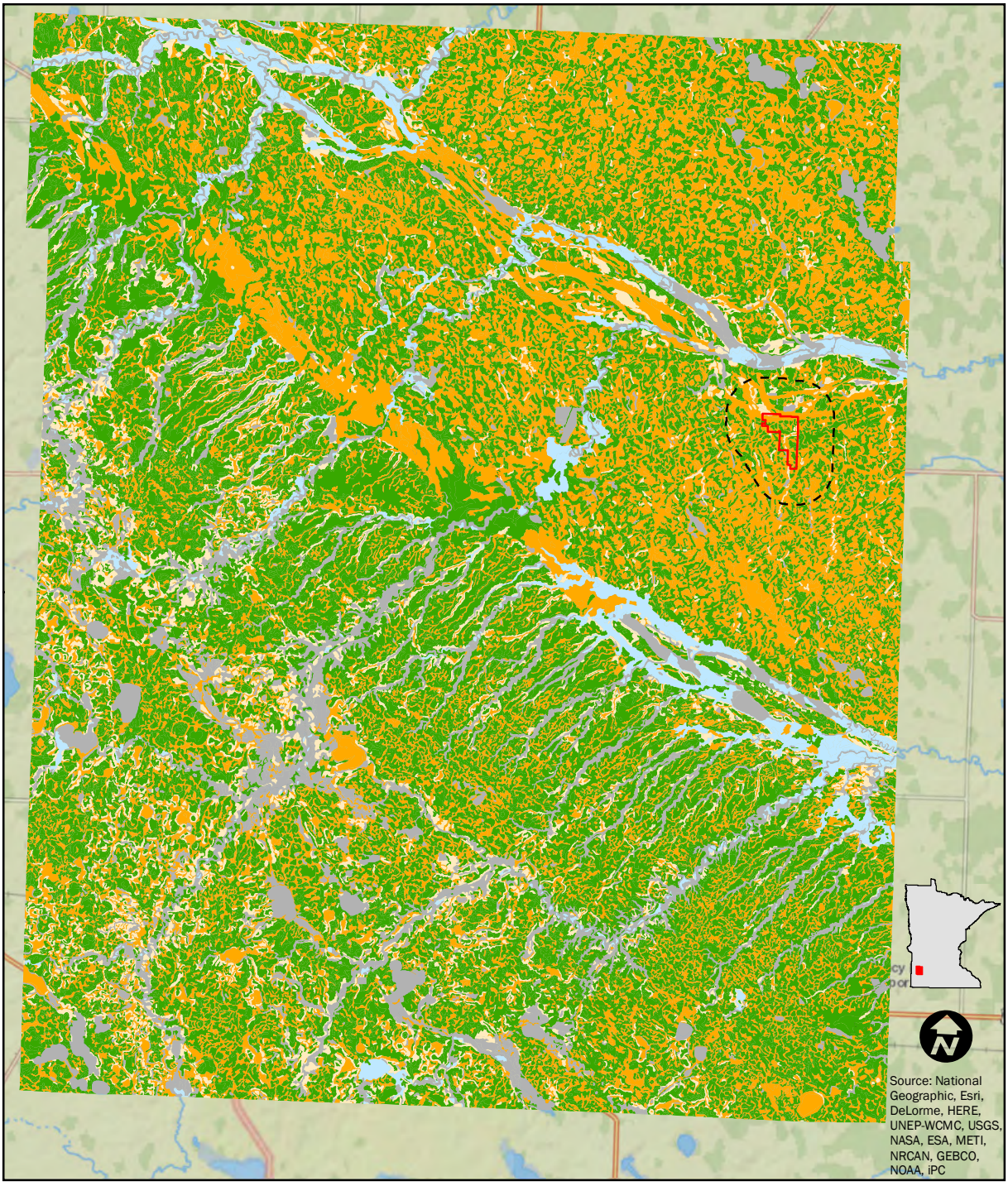


Marshall County

Land Cover Overview

- Project Area
- Site
- Open Water (NLCD)
- All Developed (NLCD)
- Barren Land (NLCD)
- All Forest (NLCD)
- Shrub/Scrub (NLCD)
- Grassland (NLCD)
- Pasture/Hay (NLCD)
- Cultivated Crops (NLCD)
- All Wetlands (NLCD)

Minnesota Department of Commerce



Marshall County

Prime Farmland

Site

Project Area

Farmland of statewide importance

All areas are prime farmland

Prime farmland if drained

Other prime farmland

Not prime farmland

Minnesota Department of Commerce

Appendix E:

Glare Analysis

Solar Glare Hazard Analysis Report

EERA staff utilized the Scandia National Laboratories Solar Glare Hazard Analysis Tool (©1997-2014 Scandia Corporation) to assess potential glare from the PV panels. The following is a summary of this analysis. Outcomes from this tool are limited, for example, it does not take into account on-the-ground obstacles, such as trees, hills, or buildings that might reduce or eliminate glare. The full technical reference manual and user's manual are available at: https://share.sandia.gov/phlux/references/.

Inputs

Analysis name	Marshall Solar 1
PV array axis tracking	None
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	30.00
Rated power (kW)	50,000 kW
Vary reflectivity	True
PV surface material	Smooth glass with ARC
Timezone offset	-6.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal legth (m)	0.017
Time interval (min)	1.0
Correlate slope error with material	False
Slope error (mrad)	8.43

PV Array Vertices

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of Panels Above Ground (ft)	Total Elevation (ft)
1	44.4721174375	-95.6552546471	1111.27	12.0	1123.27
2	44.4615904373	-95.6552573293	1103.57	12.0	1115.57
3	44.461616281	-95.6602180749	1104.58	12.0	1116.58
4	44.4650131888	-95.6602422148	1109.58	12.0	1121.58
5	44.4650141459	-95.6649401039	1114.72	12.0	1126.72
6	44.4723595582	-95.6648891419	1110.56	12.0	1122.56
7	44.4723614722	-95.6650728732	1110.26	12.0	1122.26
8	44.4726753662	-95.6650634855	1109.39	12.0	1121.39
9	44.4726791942	-95.6657769531	1108.65	12.0	1120.65

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of Panels Above Ground (ft)	Total Elevation (ft)
10	44.4723719991	-95.6657809764	1109.55	12.0	1121.55
11	44.4723605152	-95.6708785146	1103.15	12.0	1115.15
12	44.4779261428	-95.6708436459	1091.70	12.0	1103.70
13	44.4784428694	-95.6651426107	1090.60	12.0	1102.60
14	44.4784734901	-95.6553203613	1090.60	12.0	1102.60

Observation Points

Id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
A	44.4804169145	-95.6742882729	1100.60	6.0
B	44.4806924909	-95.6543111801	1100.27	6.0
C	44.4760534487	-95.6743848324	1109.47	6.0
D	44.4715824716	-95.6802642345	1110.60	6.0
E	44.4722102665	-95.6645357609	1110.61	6.0

F	44.4717815293	-95.6500518322	1124.81	6.0
G	44.4679380657	-95.6760585308	1120.43	6.0
H	44.4593123204	-95.6629224122	1110.60	6.0
I	44.4582593792	-95.6593859196	1117.04	6.0
J	44.4564061565	-95.6594932079	1116.49	6.0
K	44.4568809547	-95.6526267529	1110.6	6.0
L	44.4583665886	-95.6514036655	1110.63	6.0

Observation Points and Preliminary Development Area

Glare Occurrence Plots

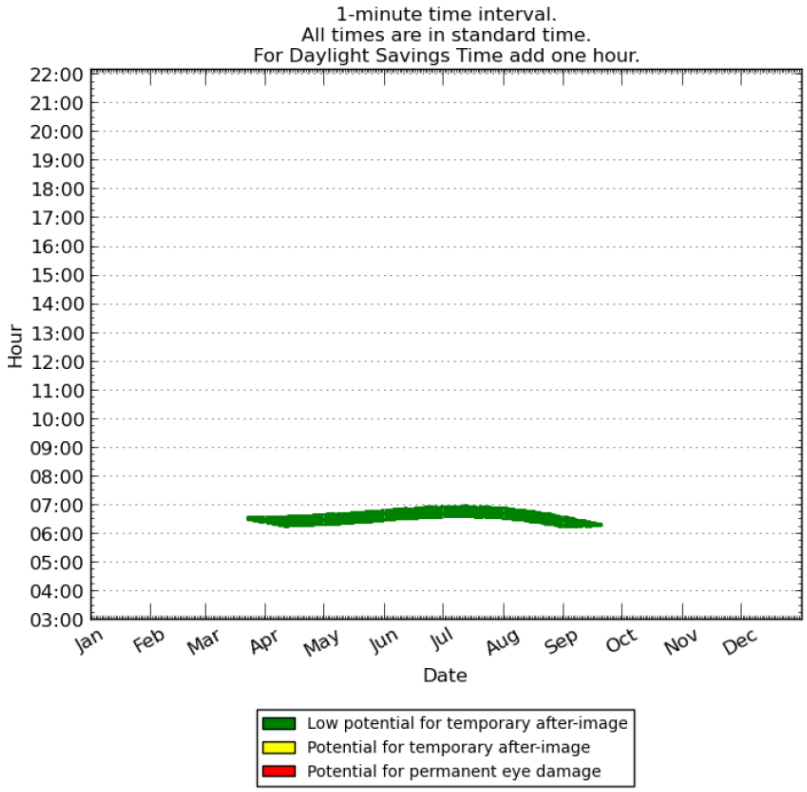
Observation Point A

No glare.

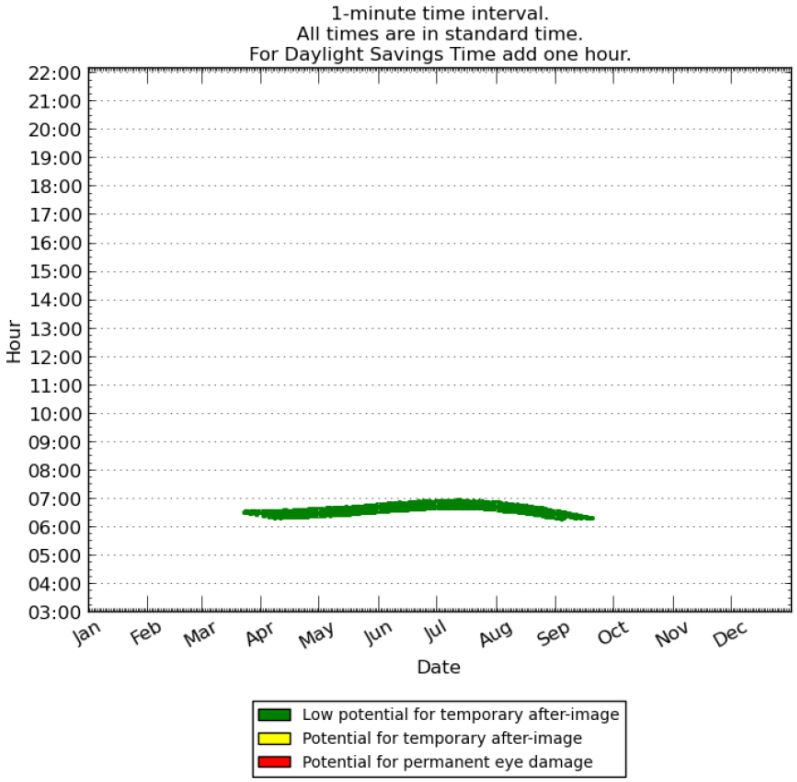
Observation Point B

No glare.

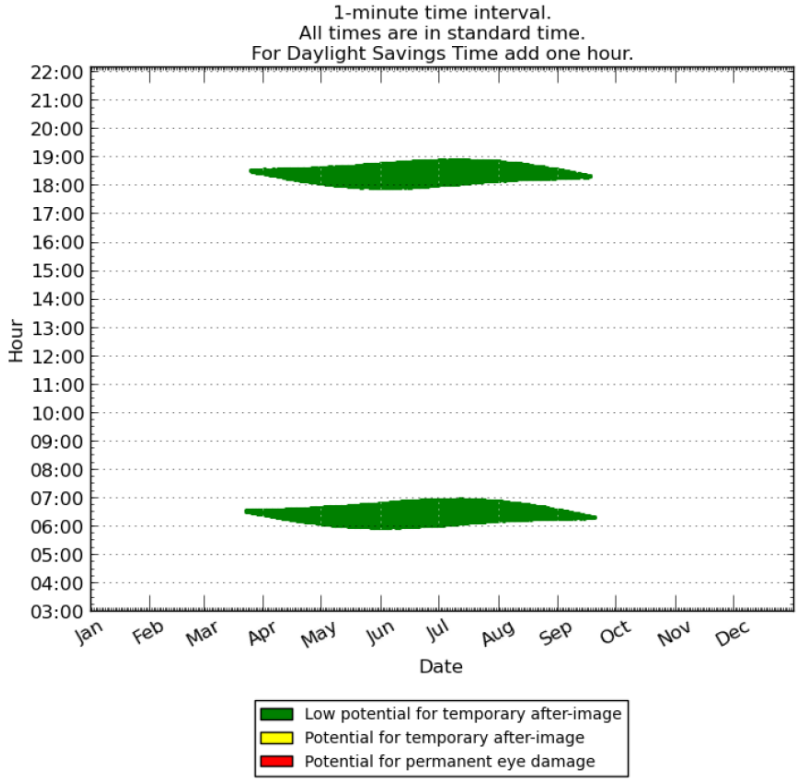
Observation Point C



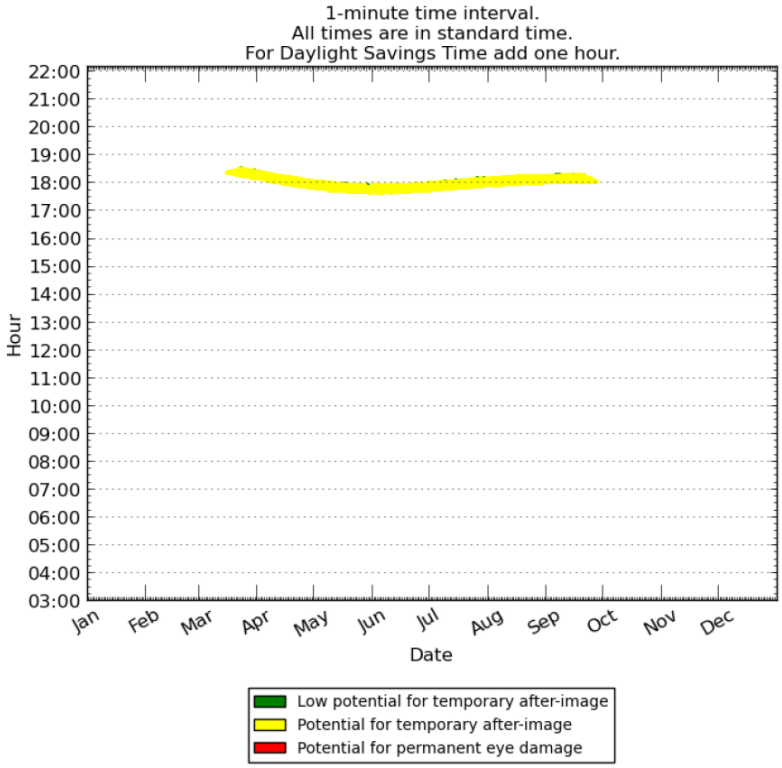
Observation Point D



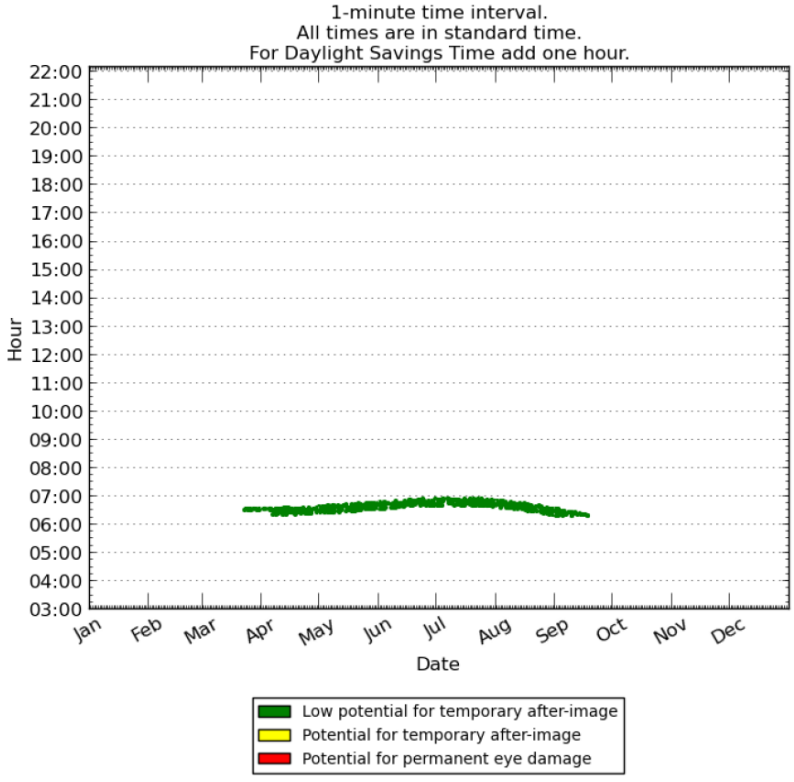
Observation Point E



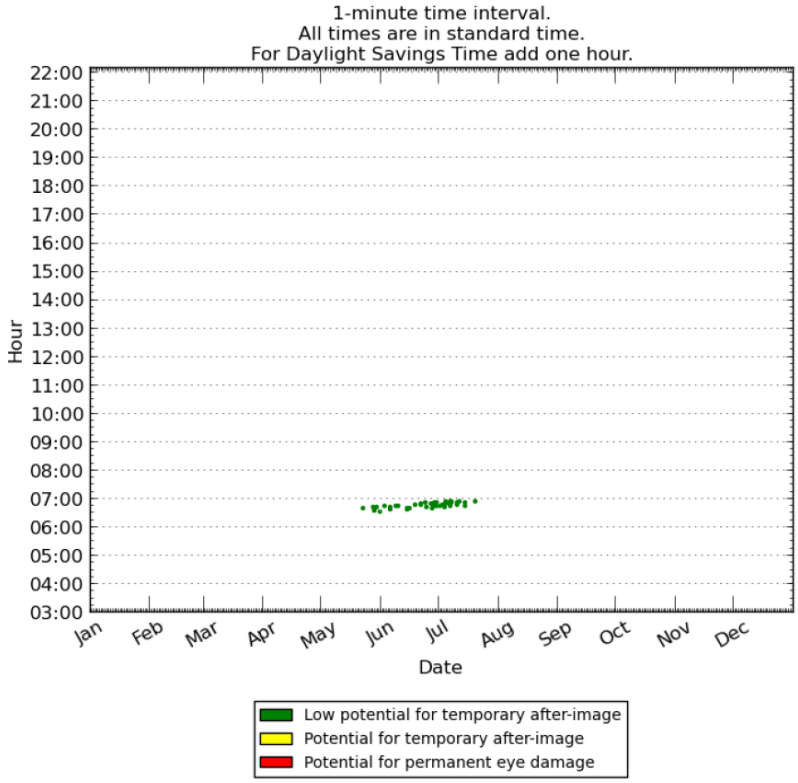
Observation Point F



Observation Point G



Observation Point H



Observation Point I

No glare.

Observation Point J

No glare.

Observation Point K

No glare.

Observation Point L

No glare.