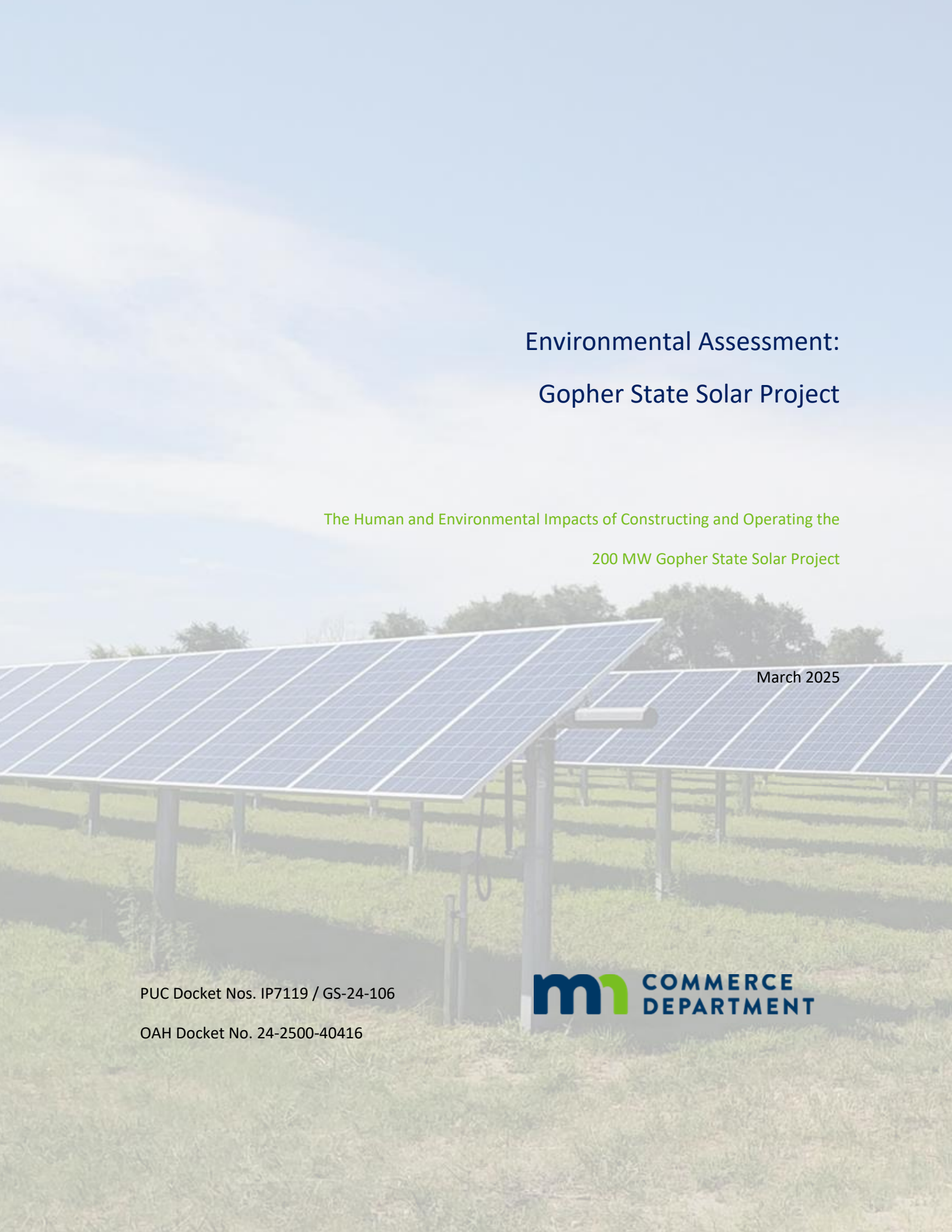

Environmental Assessment:

Gopher State Solar Project

The Human and Environmental Impacts of Constructing and Operating the

200 MW Gopher State Solar Project

March 2025

PUC Docket Nos. IP7119 / GS-24-106

OAH Docket No. 24-2500-40416

COMMERCE DEPARTMENT

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Gopher State Solar, LLC (Gopher State Solar) proposes to construct, own, and operate an up to 200 megawatt solar energy generating system and associated facilities in Renville County, Minnesota. Gopher State Solar must obtain a site permit from the Minnesota Public Utilities Commission before it can construct the proposed Gopher State Solar Project.

Sources

Much of the information used to prepare this environmental assessment comes from the site permit application. Additional sources include information from relevant federal and state environmental review documents for similar projects, spatial data and site visits.

Project Mailing List

To place your name on the project mailing list contact docketing.puc@state.mn.us or (651) 201-2246 and provide the docket number (24-106), your name, email address, and mailing address. Please indicate whether you would like to receive notices by email or U.S. mail.

Alternative Formats

This document can be made available in alternative formats, that is, large print or audio, by calling (651)539-1529 (voice)

Contents

Appendices

Figures

Tables

Acronyms and Abbreviations

Acronym/Abbreviation	Description
AC	alternating current
AIMP	Agricultural Impact Mitigation Plan
ALJ	administrative law judge
applicant	Gopher State Solar
BMP	best management practice
BWSR	Board of Water and Soil Resources
Commerce	Department of Commerce
Commission	Public Utilities Commission
CSW Permit	Construction Stormwater Permit
dBA	A-weighted sound level recorded in units of decibels
DC	direct current
DNR	Department of Natural Resources
DSP	draft site permit
EA	environmental assessment
EJ	Environmental justice
EMF	electromagnetic fields
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gas
kV	kilovolt
MBS	Minnesota Biological Survey
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MW	megawatt
MWh	megawatt hour
mG	milligauss
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MWI	Minnesota Well Index
NAC	noise area classification
NHIS	Natural Heritage Information System
NLEB	Northern Long Eared Bat
NWI	National Wetland Inventory
project	Gopher State Solar Project
PV	photovoltaic
PWI	Public Waters Inventory
ROI	region of influence
ROW	right-of-way
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SWPPP	Stormwater Pollution Prevention Plan

TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area

DEFINITIONS

Several terms used in this document have specific meaning in Minnesota law or regulation. Other terms are defined for clarity.

associated facilities means buildings, equipment, and other physical structures that are necessary to the operation of a large electric power generating plant or high voltage transmission line (Minnesota Rule 7850.1000, subpart 3).

construction means any clearing of land, excavation, or other action that would adversely affect the natural environment of the site or route but does not include changes needed for temporary use of sites or routes for nonutility purposes, or uses in securing survey or geological data, including necessary borings to ascertain foundation conditions (Minnesota Statute 216E.01, subdivision 3).

distribution line means power lines that operate below 69 kilovolts.

easement means… A grant of one or more of the property rights by the property owner to and /or for the use by the public, a corporation, or another person or entity

high voltage transmission line means a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length (Minnesota Statute 216E.01, subdivision 4).

land control area means the 1645-acre area for which Gopher State Solar is assumed to have site control through ownership, a lease agreement, or an easement. The site permit application refers to this as the "Project Area." For this document, it applies to the area for the solar facility as well as area for collection corridors, substation and transmission lines. The term is used to bound a review area and should not be understood to imply the applicant has secured, or will definitely secure, the necessary land rights.

large electric power generating plant means 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, subdivision 5).

local vicinity means 1,600 feet from the land control area and collection line corridor.

mitigation means to avoid, minimize, correct, or compensate for a potential impact.

power line means a distribution, transmission, or high voltage transmission line.

preliminary development area means the 1,135-acre area within the land control area where Gopher State Solar proposes to build the solar facilities. This area does not include the collection corridors or required setbacks. This area is also referred to as the project boundary. The site permit application refers to this as the "Buildable Area."

project area means one mile from the land control area and collection line corridor.

solar facility means ground-mounted photovoltaic equipment capable of operation at 50,000 kilowatts or more connected directly to the electrical grid and the associated facilities such as access roads and collector lines.

solar energy generation system means a set of devices whose primary purpose is to produce electricity by means of any combination of collecting, transferring, or converting solar-generated energy (Minnesota Statute 216E.01, subdivision 9a).

transmission line means power lines that operate at 69 kilovolts and above.

1 Introduction

Gopher State Solar, LLC (Gopher State Solar, applicant) is proposing to construct and operate the Gopher State Solar Project (project), an up to 200 megawatt (MW) solar farm in Renville County, Minnesota. Gopher State Solar must obtain a site permit from the Minnesota Public Utilities Commission (Commission) before it can construct and operate the project. The project will connect to the electric transmission grid through Great River Energy's existing Panther Substation via a new project substation and a 230 kV gen-tie line.

The applicant filed a site permit application (application) on August 19, 2024, and the Commission found the application to be substantially complete on September 24, 2024.

The Minnesota Department of Commerce (Commerce) has prepared this environmental assessment (EA) for the proposed project. The EA describes the project, highlights resources affected by the project, and discusses potential human and environmental impacts on these resources. It also discusses ways to mitigate potential impacts. These mitigation strategies can become enforceable conditions of the Commission's site permit.

An EA is not a decision-making document, but rather an information document. The EA is intended to facilitate informed decisions by state agencies, particularly with respect to the goals of the Minnesota Power Plant Siting Act to "minimize adverse human and environmental impacts while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion".[1]

1.1 How is this document organized?

The EA addresses the matters identified in the scoping decision.

This EA is based on the applicant's site permit application and public scoping comments. It addresses the matters identified in the EA scoping decision (**Appendix A**).

- **Chapter 1** briefly describes the state of Minnesota's role; discusses how this EA is organized; and provides a summary of potential impacts and mitigation.
- **Chapter 2** describes the project—design, construction, operation, and decommissioning.
- **Chapter 3** summarizes the regulatory framework, including the site permit process, the environmental review process, other approvals that might be required for the project, and the criteria the Commission uses to make its decisions.
- **Chapter 4** describes the environmental setting; details potential human and environmental impacts from the Gopher State Solar Project; and identifies measures to mitigate adverse

[1] Minnesota Statutes 216E.02, subd. 1.

impacts. It summarizes the cumulative potential effects of the project and other projects and lists unavoidable impacts and irreversible and irretrievable commitments of resources.

- **Chapter 5** identifies the sources used to prepare the document.

1.2 What does the applicant propose to construct?

Gopher State Solar proposes to construct an up to 200 megawatt solar energy generating system and associated facilities on a site of approximately 1645 acres in Kingman, Osceola, and Bird Island Townships in Renville, Minnesota.

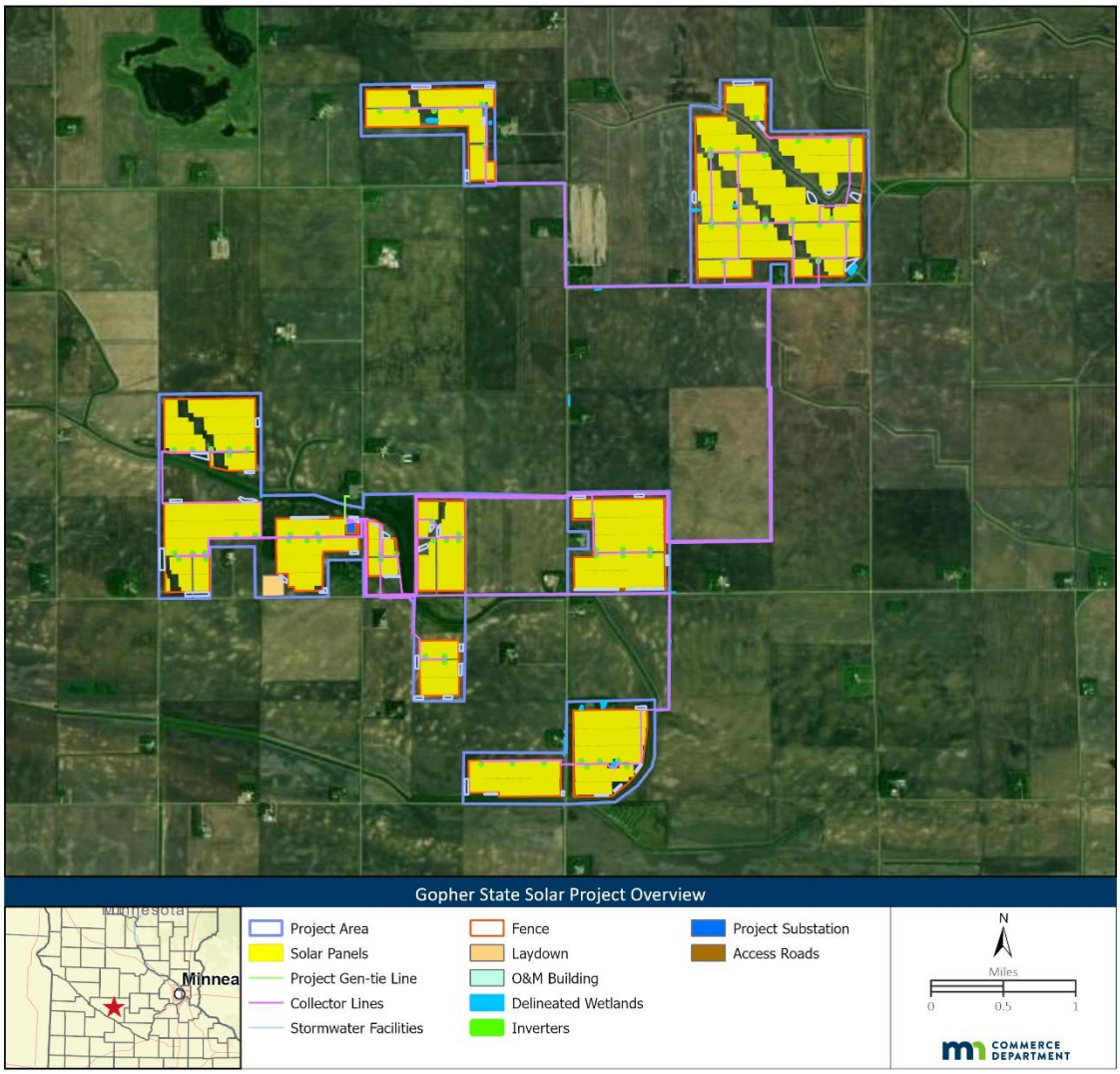
The project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, access roads, security fencing and gates, above-ground and below-ground electric collection lines, a project substation, switchgear and associated facilities (Figure 1). Gopher State Solar will construct the project within the 1645 acres of land under contract or leased by the applicant. Based on the preliminary design, Gopher State Solar anticipates approximately 977 acres within the 1645-acre site will be developed for the solar facilities. The solar facilities will be connected to the project substation via 34.5 kilovolt underground (kV) electric collection lines. All AC (alternating current) collector lines are anticipated to be buried underground, although there may be above-ground installation of DC (direct current) collector lines depending on final design. The project is anticipated to have approximately 37.6 miles of collector lines. At the project substation, the collector system voltage will be stepped up from 34.5 kV to 230 kV and transmitted to the grid via a short aboveground 230 kV transmission line (<1,500 ft in length), connecting to Great River Energy's 230 kV Panther Substation.[2]

Construction is anticipated to begin in 2026 with an anticipated in-service date by the end of 2027.[3]

[2] Gopher State Solar Project, Application to the Minnesota Public Utilities Commission for a Site Permit for a Large Electric Generating Facility, August 19, 2024, eDockets Number 20248-209582-02. (Site Permit Application; SPA).

[3] SPA, p. 1.

Figure 1. Proposed Gopher State Solar Project



1.3 What is the state of Minnesota's role?

The applicant needs a site permit from the Commission to construct the project. Commerce prepared this EA. An administrative law judge will oversee a public hearing.

To build the project, the applicant needs a site permit from the Commission. The project may also require additional approvals from other federal and state agencies and local governments, for example, a driveway permit from Renville County or a Construction Stormwater Permit from the Minnesota Pollution Control Agency (MPCA). A site permit supersedes local zoning, building, and land

use rules.[4] The Commission's site permit decision must be guided, in part, however, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[5]

Gopher State Solar applied to the Commission for a site permit for the project on August 19, 2024.[6] The Commission must consider whether the record supports issuing a site permit, and what conditions should be placed on the site permit.[7]

To ensure a fair and robust airing of the issues, the Minnesota Legislature set out a process for the Commission to follow when considering site permit applications.[8] In this instance, an EA has been prepared, and a public hearing will be held. The goal of the EA is to describe the potential human and environmental impacts of the project (*the facts*), whereas, the public hearing intends to allow interested persons the opportunity to advocate, question, and debate what the Commission should decide about the project (*what the facts mean*). The record developed during this process—including all public input—will be considered by the Commission when it makes its decisions on the applicant's site permit application.

1.4 What is the public's role?

Minnesota needs your help to make informed decisions.

During scoping, you told us your concerns about the project so that we could collect the right facts. At the public hearing, which comes next, you can tell us what those facts mean, and if you think we have represented them correctly in this EA. Your help in pulling together the facts and determining what they mean will help the Commission make informed decisions regarding the project.

1.5 What is an Environmental Assessment?

This document is an Environmental Assessment. The Commission will use the information in this document to inform their decisions about issuing a site permit for the project.

This Environmental Assessment (EA) contains an overview of affected resources and discusses potential human and environmental impacts and mitigation measures. Energy Environmental Review and Analysis (EERA) staff within the Commerce Department (Commerce) prepared this document as part of the environmental review process. Scoping is the first step in the process. It provides opportunities to provide comments on the content of this environmental assessment, suggest alternatives, and to mitigate potential impacts.

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4 Minnesota Statutes 216E.10, subd. 1.
5 Minnesota Statutes 216E.03, subd. 7.
6 Gopher State Solar Project, Application to the Minnesota Public Utilities Commission for a Site Permit for a Large Electric Generating Facility, August 19, 2024, eDockets Numbers 20248-209582-01 (through -09), 20248-209583-01 (through -10), and 20248-209584-01 (through -03).
7 If the Commission grants a site or route permit, it chooses which of the studied locations is most appropriate. In this matter only one site location is studied
8 *See generally* Minnesota Statute 216E.

1.6 Where do I get more information?

For additional information don't hesitate to contact Commission or Commerce staff.

If you would like more information or if you have questions, please contact Commerce staff: Jessica Livingston (jessica.livingston@state.mn.us), (651) 539-1823 or Commission staff: Craig Janezich (craig.janezich@state.mn.us) (651) 201-2203.

Information about the project, including the site permit application, notices, and public comments, can be found on eDockets: https://www.edockets.state.mn.us/EFiling/search.jsp by searching "24" for the year and "106". Information is also available on Commerce's webpage for the project: https://eera.web.commerce.state.mn.us/web/project/15442.

1.7 What permits are needed?

A site permit, from the Commission is required. Federal, state, and local permits may also be necessary to construct the project.

The project requires a site permit from the Commission because it meets the definition of a large electric power generating plant, which is any electric power generating equipment designed for or capable of operation at a capacity of 50 MW or more.

Various federal, state, and local approvals will be required for activities related to the construction and operation of the project. These permits are referred to as "downstream permits" and must be obtained by the applicant prior to constructing the project.

1.8 What are the potential impacts of the project?

The project will impact human and environmental resources. Impacts will occur during construction and operation.

A potential impact is the anticipated change to an existing condition caused directly or indirectly by the project. Potential impacts can be positive or negative, short- or long-term, and can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations. The impacts of constructing and operating a project can be mitigated by avoiding, minimizing, or compensating for the adverse effects and environmental impacts of a project.

The context of an impact—in combination with its anticipated on-the-ground effect and mitigation measures—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impacts are grouped: archeological and historic resources, human settlement, human health and safety, public services, land-based economies, and natural resources.

Select resource topics received an abbreviated study because they were deemed to be of minor importance to the Commission's site permit decision. Potential impacts are anticipated to be negligible to displacement, communication, implantable medical devices, forestry, and mining.

1.8.1 Human Settlement

Large energy projects can impact human settlement. Impacts range from short-term, such as increased local expenditures during construction, to long-term, such as changes to viewsheds.

Aesthetics The impact intensity level is expected to be moderate and long-term. Locations where visual impacts may potentially be the greatest are adjacent to residences and along public roadways. The solar arrays will be visible from nearby residences and adjacent roadways.

Cultural Values The impact intensity level is anticipated to be minimal. The project is not anticipated to impact or alter the work and leisure pursuits of residents in such a way as to impact the underlying culture of the area. Differences between cultural values related to renewable energy and rural character have the potential to create tradeoffs that cannot be addressed in the site permit.

Land Use and Zoning The impact intensity level is anticipated to be moderate due to the conversion of agricultural land to land used for energy generation. Land use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

Noise Distinct noises are associated with the different phases of project construction. The impact intensity level during construction will range from negligible to significant depending on the activity. Potential impacts are anticipated to be intermittent and short-term. These localized impacts could affect nearby residences and might temporarily exceed state noise standards. Impacts are unavoidable but can be minimized. Operational impacts are anticipated to be minimal.

Property Values Impacts in the local vicinity are anticipated to be minimal to moderate and decrease with distance and over time. Impacts on the value of specific properties within the local vicinity are difficult to determine but could occur.

Tourism and Recreation The impact intensity level for tourism and recreation resources is anticipated to be minimal. Most impacts will be short-term and related to construction.

Public Services Potential impacts to the electrical grid, roads and railroads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts on water (wells and septic systems) are not expected to occur. Overall, construction-related impacts are expected to be minimal and associated with possible traffic delays. During operation, negligible traffic increases would occur for maintenance. Impacts are unavoidable but can be minimized.

Socioeconomics The impact intensity level is anticipated to be minimal to significant and positive. Effects associated with construction will, overall, be short-term and minimal. Significant positive effects may occur for individuals. Impacts from operation will be long-term and significant. Adverse impacts are not anticipated.

Environmental Justice The project will not have disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations.

1.8.2 Human Health and Safety

Large energy projects have potential to impact human health and safety. Most concerns are related to the construction phase.

Electronic and Magnetic Fields (EMF) Impacts to human health from possible exposure to EMFs are not anticipated. Potential impacts will be long-term and localized. These unavoidable impacts will be of a small size. Impacts can be mitigated.

Public Safety and Emergency Services Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. There is land previously impacted by an MDA chemical incident within the project area; however, it is not anticipated that hazardous materials will be encountered. If hazardous materials are encountered, potential impacts are anticipated to be minimal and can be mitigated.

1.8.3 Land-based Economies

Large energy projects can impact land-based economies by limiting land use for other purposes.

Agriculture Potential impacts to agricultural producers are anticipated to be minimal—lost farming revenues will be offset by easement agreements. A negligible loss of farmland in Renville County would occur for the life of the project. With respect to prime farmland, the applicant indicates that no feasible or prudent alternatives to the project exist. Potential impacts are localized and unavoidable but can be minimized.

Tourism Impact intensity is expected to be minimal, and short-term in duration. There may be potential for impacts to local recreational activities during construction, however, impacts will be temporary.

1.8.4 Archeological and Historic Resources

The impact intensity level is anticipated to be negligible to minimal. Impacts would be localized. Impacts can be mitigated through siting and construction monitoring.

1.8.5 Natural Resources

Large energy projects can impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, maintained, and decommissioned. Other factors, such as the environmental setting, influence potential impacts. Impacts vary significantly within and across projects.

Air Quality Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts can be mitigated. Once operational, the solar array will not generate criteria pollutants or carbon dioxide. Negligible fugitive dust and exhaust emissions would occur as part of routine maintenance activities. Impacts are unavoidable and do not affect a unique resource. Impacts can be minimized.

Geology and Groundwater Impacts to geology and domestic water supplies are not expected. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long term. Indirect impacts from surface waters might occur during construction. Impacts can be mitigated through the use of Best Management Practices (BMPs) for stormwater management

Soils Impacts to soils will occur during the construction and decommissioning of the project. The impact intensity level is expected to be minimal. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur. Because the soil at the solar facility will be maintained with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve.

Surface Water and Floodplains The impact intensity level is anticipated to be minimal. Direct impacts to surface waters and floodplains are not expected. The project area is in an area of minimal flood hazard. Indirect impacts to surface waters may occur, such as during increased rain events. These impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

Wetlands The impact intensity level is anticipated to be minimal. Although there is a potential for the wetland to be indirectly affected, direct impacts are not expected. These impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

Vegetation The solar facility will convert row crop farmland to perennial vegetation for the life of the project. Potential impacts of the solar facility can be mitigated through the development of a VMP.

Wildlife and Habitat Potential impacts may be positive or negative and are species-dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species, for example, deer, will be negligible. Significant negative impacts could occur to individuals during the construction and operation of the project. Once restored, the area will provide native habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. The introduction of PV panels and fencing creates the potential for bird collisions and funneling wildlife toward roads in certain areas. Potential impacts can be mitigated in part through design and BMPs. The impact intensity level is expected to be minimal to moderate.

Rare and Unique Resources The impact intensity level is anticipated to be minimal. Impacts could be both short and long-term and could be positive (e.g., through introduction of habitat), or negative (e.g., by removing trees during breeding or migratory season). Impacts can be mitigated.

Climate Change Construction emissions will have a short-term negligible increase in greenhouse gases that contribute to climate change. Overall, the project will generate energy that can be used to displace energy otherwise generated by carbon-fueled sources. The total GHG emissions produced by construction and operation of the project will be minimal when compared to the reduction in GHG emissions long-term. The project's design incorporates design elements that minimize impacts from the increase in extreme weather events such as increased flooding, storms, and wind events that are expected to accompany a warming climate.

1.9 What factors guide the Commission's decision?

Minnesota statute and rule identify the factors the Commission must consider when determining whether to issue a site permit.

After reviewing the project record—including public comments—the Commission will determine whether to issue a site permit and, if a site permit is issued, where the solar facility will be located and what permit conditions are appropriate.

Minnesota Statutes 216E.03 lists considerations that guide the study, evaluation, and designation of site permits. Minnesota Rule 7850.4100 lists the factors the Commission must consider when making a site permit decision:

A. Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

B. Effects on public health and safety.

C. Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.

D. Effects on archaeological and historic resources.

E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.

F. Effects on rare and unique natural resources.

G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

H. Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries.

I. Use of existing large electric power generating plant sites.

J. Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way.

K. Electrical system reliability.

L. Costs of constructing, operating, and maintaining the facility which are dependent on design and route.

M. Adverse human and natural environmental effects which cannot be avoided.

N. Irreversible and irretrievable commitments of resources.

The Commission is also guided by the "state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure."[9]

1.10 Solar Facility Siting Factors – Analysis and Discussion

[9] Minnesota Statutes 216E.03, subd. 7(a).

This analysis applies the siting factors to the project. Some factors are described in just a few words. Other factors are more descriptive and include a list of elements that, when grouped, make up the factor. Finally, certain factors are relatively succinct, but the scoping process identified elements to be analyzed in this EA. For example, the public safety factor includes an EMF element.

Factor M (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) are discussed in Section 4.8 and Section 4.9, respectively, of this EA.. **Factor G** (application of design options) and **Factor L** (costs dependent on design) do not apply as the design of the proposed project is the only design under consideration.

Other factors are ranked as follows:

●	Impacts are anticipated to be negligible to minimal and able to be mitigated or consistent with factor
○	Impacts are anticipated to be minimal to moderate and able to be mitigated in part or less consistent with factor, but nonetheless consistent
⊘	Impacts are anticipated to be moderate to significant and unable to be mitigated fully or consistent in part or not consistent with factor

Table 1 Application of Siting Factors- Solar Facility

Factor A: Human Settlement		
Element	**Construction**	**Operation**
Aesthetics	○	○
Displacement	●	●
Cultural Values	○	○
Electric Interference	●	●
Environmental Justice	●	●
Floodplains	●	●
Land Use and Zoning	●	●
Noise	⊘	●
Property Values	○	○
Recreation	○	●
Socioeconomics	●	●
Factor B: Public Services		
Element	**Construction**	**Operation**
Airports	●	●
Roads	○	●

Utilities	●	●
Factor C: Public Safety		
Element	**Construction**	**Operation**
EMF	●	●
Emergency Services	●	●
Medical Devices	●	●
Public Safety	●	●
Stray Voltage	●	●
Worker Safety	●	●
Factor D: Land-based Economies		
Element	**Construction**	**Operation**
Agriculture	○	○
Forestry	●	●
Mining	●	●
Tourism	●	●
Factor E: Archaeological and Historic Resources		
Element	**Construction**	**Operation**
Archeological	●	●
Historic	●	●
Factor F: Natural Resources		
Element	**Construction**	**Operation**
Air Quality	●	●
Climate Change	●	●
Geology and Groundwater	●	●
Soils	●	●
Surface Water	●	●
Topography	●	●
Vegetation	●	●
Wetlands	●	●
Wildlife	○	●
Wildlife Habitat	●	●
Factor G: Rare and Unique Resources		
Element	**Construction**	**Operation**
Fauna	●	●
Flora	●	●
Factor H: Use of Existing Generating Plants		

Element	Construction	Operation
Existing Plants	⊘	⊘

1.10.1 Discussion

The following discussion highlights potential impacts to factor elements that are anticipated to be moderate to significant, and factors determined less consistent, consistent in part, or not consistent.

FACTOR A: HUMAN SETTLEMENT

Aesthetics Visual impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Because there are existing energy distribution lines nearby (**Error! Reference source not found.**), features the project will not be an entirely new type of feature on the landscape. However, the addition of solar panels and associated infrastructure will create a new aesthetic feature. For those with high viewer sensitivity, for example, neighboring landowners, visual impacts are anticipated to be moderate to significant, while for those that travel through the project area, visual impacts are likely to be minimal, although noticeable.

Cultural Values The project is not anticipated to impact or alter the work and leisure pursuits of residents in such a way as to impact the underlying culture of the area. Differences between cultural values related to renewable energy and rural character have the potential to create tradeoffs that cannot be addressed in the site permit.

Environmental Justice The project is not anticipated to have disproportionately high or adverse human health or environmental effects on low-income, minority, or tribal populations.

Land Use and Zoning Land use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

Noise Distinct noises are associated with the different phases of project construction. These impacts will be temporary and intermittent and range from negligible to significant depending on the construction equipment used and the location of the listener.

Property Values On whole, impacts to property values are anticipated to be minimal and to decrease with distance and over time. However, impacts to a specific property's value are difficult to determine. Because of this uncertainty, impacts to specific properties could be minimal to moderate.

Recreation Potential impacts to recreational resources associated with construction are anticipated to be short-term, intermittent, and localized. The impact intensity level is expected to be minimal to moderate, most likely occurring due to increased traffic and noise from construction. During operation, no impacts to recreation are anticipated; negligible traffic increases would occur for maintenance. Access to recreational trails will remain open throughout the life of the project.

FACTOR B: PUBLIC SERVICES

Transportation Potential impacts to roads and highways associated with construction are anticipated to be short-term, intermittent, and localized. The impact intensity level is expected to be minimal to moderate. During operation, no impacts to roads are anticipated; negligible traffic increases would occur for maintenance.

FACTOR C: LAND-BASED ECONOMICS

Agriculture Potential impacts to agricultural producers are anticipated to be minimal to moderate — lost farming revenues will be offset by lease or easement agreements. A negligible loss of farmland in Renville County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

FACTOR E: NATURAL RESOURCES

Geology and Groundwater Impacts to geology and domestic water supplies are not expected. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long term. Indirect impacts from surface waters might occur during construction. Impacts can be mitigated through use of BMPs for stormwater management.

Soils Impacts to soils will occur during construction and decommissioning of the project. The impact intensity level is expected to be minimal to moderate. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur but can be mitigated with erosion prevention and sediment control BMPs. Because the soil at the solar facility will be covered with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve.

Wildlife and Habitat Impacts to wildlife are anticipated to be minimal to moderate during construction and operation of the project. Potential impacts may be positive or negative and are species-dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species, for example, deer, will be negligible. Significant negative impacts could occur to individuals during the construction and operation of the project. Once restored, the land control area will provide native habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. Additional BMPs can be implemented to avoid impacts to local and rare and unique wildlife (e.g., migratory birds.)

FACTOR I: POWER PLANTS

Because the solar facility is not constructed at an existing power plant, the solar facility is inconsistent with this siting factor.

1.11 What's next?

A public hearing will be held in the project area; you can provide comments at the hearing. The Commission will then review the record and decide whether to grant a site permit

An administrative law judge (ALJ) from the Office of Administrative Hearings will hold a public hearing after the EA is complete and available. At the hearing you may ask questions and submit comments about the project. After the close of the comment period, the ALJ will provide a written report to the Commission with findings, conclusions, and recommendations for the Commission.

The Commission reviews all the information in the project record in determining whether to issue a site permit. Site permits define the location of the project and include conditions specifying mitigation measures. The Commission is expected to make a site permit decision in the first half of 2025.

2 Proposed Project

Gopher State Solar, LLC (Gopher State Solar, applicant) is proposing to construct and operate the Gopher State Solar Project (project), an up to 200 megawatt (MW) solar farm in Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota. The project will connect to the electric transmission grid through Great River Energy's existing Panther Substation in Renville County via a new project substation and a 230 kV gen-tie line. This chapter describes the project and how it would be constructed, operated, and decommissioned.

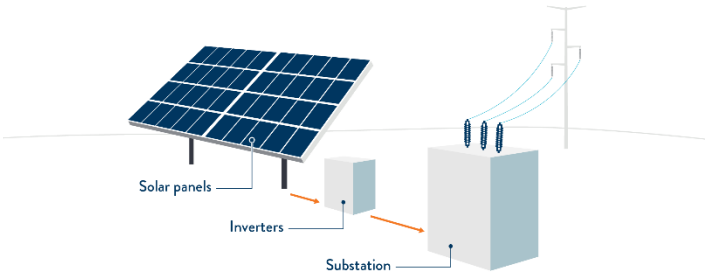
2.1 Solar Facility

2.1.1 How do solar facilities generate electricity?

The *photovoltaic effect* is the physical process through which a PV cell converts sunlight directly into electricity by capitalizing on nature's inherent desire to keep electrical charges in balance.

When direct and indirect solar radiation (direct and scattered sunlight) strikes a PV cell, some radiation is absorbed, which excites electrons within the cell. This results in a continuous flow of electrons from the front to the back of the panel through electrical connections, which results in a continuous flow of electric

Figure 2. Solar Facility Schematic



Solar panels (sometimes referred to as solar modules) are made up of PV cells that generate direct current (DC) electricity, which must be converted to alternating current (AC) electricity before reaching the electrical grid. Solar panels are arranged into electrically connected blocks and connected to inverters. An inverter converts DC electricity to AC electricity. Transformers then step up the electrical voltage before the electrical power is collected through an above- or below-ground collection system. Collection systems combine the electricity from across the array and deliver it to a project substation. **Figure 2** shows a simplified schematic of the major components of the solar generating facility.

2.1.2 Where is the Project located?

The Project is located in Bird Island, Osceola, and Kingman Townships in Renville County, Minnesota (Figure 1).

As shown in **Figure 1**, the solar facility will be located in the townships of Bird Island, Osceola, and Kingman in Renville County, Minnesota. The project location is approximately 1.2 miles north of the city of Bird Island, Minnesota, and 2.55 miles northeast of the city of Olivia, Minnesota.[10] **Table 2** summarizes the project location. Solar panels and associated infrastructure would be located on

[10] Site Permit Application (SPA), p. 23

approximately 977 acres within an area of approximately 1,645 acres of land. Gopher State Solar has secured site control for the project, and all land is either under contract or leased by the applicant. The project is adjacent to Great River Energy's existing 230 kV Panther Substation, which will be the project point of interconnection to the grid. The site is currently used as cultivated farmland.

Gopher State Solar selected the site because of its proximity to the electrical grid and existing electric transmission infrastructure, landowner participation, and the available capacity of the grid to which the project will interconnect.[11] Further, Gopher State Solar believes that the site will minimize environmental and prime farmland impacts.

Table 2: Project Location

Township	Range	Sections	Township	County
115N	34W	1,2	Bird Island	Renville
116N	33W	19, 30	Osceola	Renville
116N	34W	23, 24, 25, 26, 34, 35, 36	Kingman	Renville

2.1.3 How is the solar facility designed?

The project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, electrical cables, conduit, switchgear, supervisory control and data acquisition system (SCADA), metering equipment, project fencing, access roads, stormwater treatment areas, an operations and maintenance building, and a new substation and 230 kV gen-tie line to connect the project.[12]

SOLAR ARRAYS

Gopher State Solar anticipates using PV solar panels affixed to a single-axis tracking system. The current design includes the use of Meyer Burger Glass Utility panels; the final PV panel selection will occur closer to the time of construction. An individual tracker row will be made up of bi-facial panels mounted on a flat beam oriented north-south, with a break in the middle where the gearbox is located. The tracker rows will tilt east-west to follow the sun throughout the day.

The modules and tracking rack system are generally aligned in rows oriented north and south, with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and west towards the sunset in the afternoon, optimizing the angle of the modules with the sun.[13] **Figure 3** and **Figure 4** show examples of typical solar mounting and tracking systems. At the approximate maximum tilt of 60 degrees, the edge of the modules will be a maximum of 15 feet off the ground and a minimum of 18 inches off the ground or greater. Gopher State Solar states that to

[11] SPA, p. 10
[12] SPA, p. 7
[13] SPA, pp. 10-11

the extent practical, the racking system foundations will be installed on piers and will not require concrete.[14]

Figure 3. Typical Solar Array

Figure 4. Typical Solar Tracking Profile

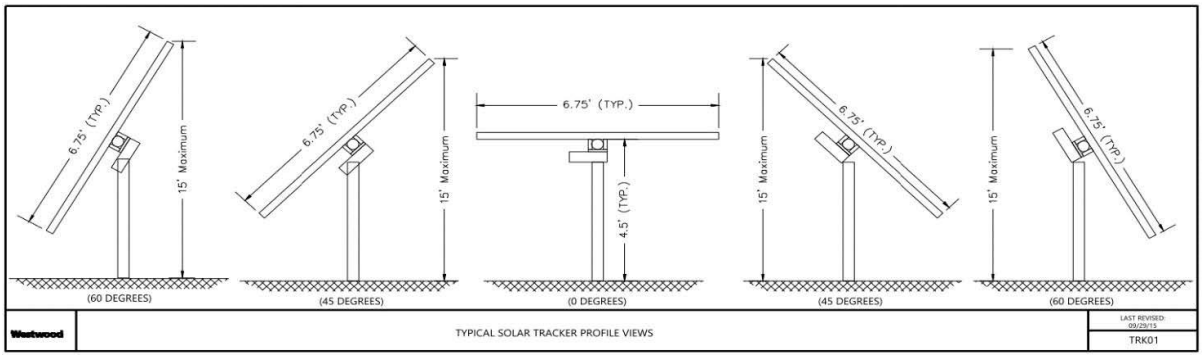
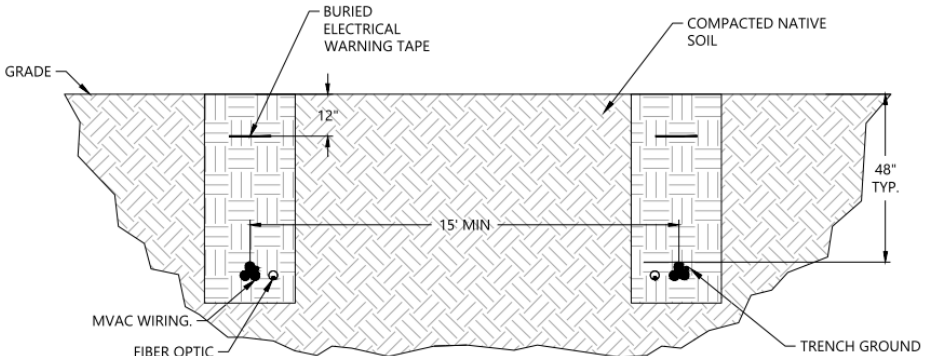


Figure 5: Underground Cabling



[14] Id.

Electrical Collection System

The solar panels will deliver power to project inverters through either underground collector lines, buried in a trench of conduit, or a combination of both above and belowground, in which case the DC collector line will be strung under each row of panels and racking, and the AC collection will be buried underground. Buried collector lines will be at least 4 feet deep and 1 to 2 feet wide, in accordance with the Agricultural Impact Mitigation Plan (AIMP) (**Figure 5**). The electrical collection system cables will be installed using a trenching machine, excavator, or equivalent to a depth of approximately four feet to account for existing utilities or other features. During the excavations, topsoil will be removed and stockpiled separately. Once collector lines are laid in the trench, the trench will be backfilled with subsoil followed by segregated topsoil. Stockpiled topsoil will be replaced over the subsoil in sufficient quantities to restore the trench to the original grade after settling.[15] Gopher State Solar indicates that the project is anticipated to have approximately 37.6 miles of collector lines. The specific electrical collector line technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials.[16]

The project is anticipated to require approximately 72 inverters (**Figure 6**). The current inverter design includes use of SunGrow SG400UD-MV-US inverters, however, a specific inverter has not been selected for the project. Gopher State Solar will select a final inverter based on availability at the time of procurement, and will consider cost, performance, and environmental and safety standards when making final selection. Each inverter will be located on a mounded gravel pad, and will convert the DC output of the PV panels to AC output, required for delivery to the electrical grid. After the electricity is converted, it is stepped up from low voltage to medium or intermediate voltage (stepped up to 34.5 kV) via a transformer.[17]

Figure 6. Inverter

Fencing

All solar arrays will be fenced for security. Permanent security fencing will be installed along the perimeter of each grouping of the solar arrays. The perimeter fencing around the project will extend a maximum total height of approximately seven feet above grade and will consist of a lightweight agricultural woven wire fabric secured to wooden posts that will be directly embedded in the soil or set in concrete foundations. Warning signs, including "high voltage keep out" signs, will be placed along the fence line in accordance with the National Electrical Safety Code (NESC).[18]

Gopher State Solar indicates that consisent with Minnesota Department of Natural Resources (DNR) guidnace, project fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment, which could cause harm or injury.[19]

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[15] SPA, pp. 12-13.
[16] SPA, p. 13.
[17] Id.
[18] SPA, p. 14.
[19] Id.

Access Roads

Although the total length of access roads will depend upon final site design, the preliminary layout anticipates approximately 8.95 miles of graveled access roads that lead to the inverters and the O&M building. Gopher State Solar indicates that these roads are typically 12-16 feet wide along straight portions of the roads, and wilder along curves at internal road intersections (approximately 45 feet). Gopher State Solar also notes that during construction, access roads may be temporarily wider, however they will be reduced in width for long term site access upon completion. The project substation and O&M building will be accessed using a newly furnished gravel road extending west from 380th Street to the project facilities.[20]

Gopher State Solar will work with Renville County to facilitate road upgrades to meet required standards, and with landowners for final design considerations as needed. Gopher State Solar will also continue to coordinate with county and state road authorities as the project develops, and will obtain driveway and/or access permits from relevant road authorities for access to the project through public roads, as well as for installation of temporary facilities that may be proposed to occupy portions of public road rights-of-way during construction. Gopher State Solar will obtain relevant permits and/or authorizations from road authorities relating to electric cables and/or feeder lines that may be placed in or access a public road right-of-way.[21]

Project Substation

The project substation will connect the project to the transmission grid. The substation is proposed for an area west of 380th Street and south of the existing Great River Energy Panther Substation, and is estimated to occupy approximately 1.65 acres of land. Gopher State Solar indicates that the substation will be designed in accordance with regional utility practices and codes. The project substation will include a parking area and will be accessible to operations and approved parties at all times through the project access roads.

Substation components consist of supporting structures for high-voltage electrical structures, breakers, transformers, lighting protection, and control equipment. The location will be graded and the ground will be dressed with crushed rock. Secondary containment areas for the transformer will be installed as necessary. Underground 34.5 kV collector lines will deliver solar-generated energy to the project substation, where the voltage will be stepped up from 34.5 kV to 230 kV and transmitted to Great River Energy's 230 kV Panther Substation via a short (between 1,300 and 1,500 feet long) gen-tie line. The area within the project substation will be graveled to minimize vegetation growth in the area and reduce fire risk.[22]

Lighting

Gopher State Solar indicates that substation lighting will follow the Minnesota Department of Transportation's (DOT) approved products for luminaries, which recommends using shielded and downward facing lighting and lighting that minimizes blue hue. This can minimize the impacts of LED

[20] SPA, p. 14.
[21] Id.
[22] SPA, p. 12.

lighting on wildlife, such as birds, insects, and fish. Gopher State Solar will choose lighting for the project substation and O&M building that limits the maximum nominal color temperature to 4,000 kelvin.[23]

FENCING

The fenced area of the project substation will be approximately 72,000 square feet in size, and surrounded by a minimum 20-foot buffer.[24] To comply with the NESC, security fencing around the project substation will consist of a 7-foot-high chain-link fence. Fence posts will be spaced a maximum of 10 feet apart and warning signs will also be installed on the project substation fence. A lockable gate will be installed on the substation fencing. Gopher State Solar indicates project fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment, which could cause harm or injury.[25]

2.1.4 How would the solar facility be constructed?

Gopher State Solar anticipates that construction of the solar facility will begin in 2026 with an expected in-service date of 2027. This section summarizes construction activities.

CONSTRUCTION

Gopher State Solar anticipates that construction will begin in 2026 to meet an in-service goal of 2027.[26] The actual construction schedule is dependent upon permitting, final design, delivery of equipment, and workforce availability.

Construction will begin after all necessary permits and approvals have been received. Project construction will begin with workforce mobilization and the initial site preparation work, including vegetation removal, and grading. Gopher State Solar provided a preliminary grading acreage estimate of 977 acres.[27]

After site preparation, construction will begin with laydown areas and temporary job site trailers along with civil construction of access roads and construction of fencing. PV foundation posts will be pile driven, and trackers, PV solar modules, and collector line systems will be installed. Electrical enclosure/inverters will be installed before constructing the project substation, O&M building, and gen-tie line.

Typical construction equipment will be used for the project such as scrapers, bulldozers, dump trucks, motor graders, vibratory compactors, pile drivers, watering trucks, and backhoes. Additional specialty equipment could include a skid steer loader, concrete truck and boom truck, a high reach bucket truck,

[23] Id.
[24] Id.
[25] SPA, p. 14.
[26] SPA, p. 1.
[27] SPA, p. 18.

a medium duty crane, an all-terrain forklift, and a truck-mounted auger or drill rig. Upon completion of construction, heavy equipment will be removed from the project site.[28]

COMMISSIONING

Gopher State Solar notes equipment inspections will be conducted prior to commercial operations, and in compliance with applicable Site Permit requirements. Inspection and testing will occur for each component of the solar array, as well as associated communication, meteorological, collector line, and SCADA systems. Testing, inspections, and commissioning will occur at periods during construction and upon completion of the construction phase.[29]

RESTORATION

Gopher State Solar will restore temporary staging and laydown areas and other temporary disturbance areas as project construction nears completion. In accordance with the project AIMP, the project will be graded to natural contours where possible, and soil will be de-compacted. Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the project Vegetation Management Plan (VMP) and Stormwater Pollution Prevention Plan (SWPPP). These seed mixes are designed to be used with the vegetation management practices of periodic mowing and selective spot herbicide applications. All areas that will not contain permanent facilities will be stabilized with erosion control measures, such as silt fence, sediment control logs, temporary seeding, and mulching as needed, until permanent vegetation has been established. Gopher State Solar anticipates that the short-term establishment practices will occur from years 0-5, with long-term maintenance practices occurring from year six onward. The project will use an adaptive management approach of vegetation maintenance as outlined in the VMP, including monitoring vegetation during the active growing season (June-September). Site evaluations are planned during the vegetation establishment and maintenance phases.[30]

Gopher State Solar's VMP[31] outlines several vegetation maintenance strategies that may be implemented for the project, including mowing when vegetation reaches a height of approximately 18 to 24 inches during the initial mowing period to bring it back to a height of roughly 4 to 6 inches, which will help control weed species until the desired perennial vegetation becomes established. Herbicides will be employed only where it is determined that mowing alone will not accomplish perennial weed control.[32]

2.1.5 How would the solar facility be operated and maintained?

Gopher State Solar estimates the service life of the project to be 40 years. This section summarizes operations and maintenance activities.

[28] Id.
[29] Id.
[30] SPA, p. 18.
[31] SPA - Appendix E: Vegetation Management Plan (VMP)
[32] SPA, p. 19.

Operation and Maintenance

Following commissioning and during commercial operation, the care, custody, and control of the project facilities will transfer from construction to operations staff. The project will be professionally maintained and operated by Gopher State Solar, an affiliate, or a qualified contractor. Primary tasks include regularly scheduled inspection(s) of electrical equipment, vegetation management, and snow removal on access drives, as needed.[33]

Gopher State Solar estimates that the project will result in up to three to five full-time staff positions to operate and maintain project facilities, and indicate that a maintenance plan will be created for the project, ensuring performance. After construction, it is expected that two maintenance trucks and up to six commuter vehicles will be on-site weekly with potentially more personnel on site and intervals associated with scheduled maintenance.[34] Gopher State Solar provided a list of scheduled activities in Appendix J of their Site Permit Application.[35] All maintenance activities will be performed by qualified personnel during the day to the extent that they do not disrupt energy production. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts to local residents.

Supervisory Control and Data Acquisition System

The generating facility will be operated through a real-time control system for most operations functions. A Supervisory Control and Data Acquisition (SCADA) system will be part of the O&M building and will provide data on solar energy generation and production, availability, meteorology, and communications. The SCADA system can be used for remote performance monitoring, energy reporting, and troubleshooting related to the solar arrays, which will communicate directly with the system. This system will allow anomalies and failures to be predicted before they arise by analyzing trends, allowing abnormalities to be identified immediately allowing for timely action.[36]

Equipment inspection

Inspection of the main equipment will occur at regular intervals, as outlined below and in the Site Permit Application Appendix J.[37]

[33] Id.
[34] Id.
[35] SPA - Appendix J: Operations and Maintenance Schedule.
[36] SPA, p. 20.
[37] Id.

Table 3. Regular Operations and Maintenance Tasks

Equipment	Task
PV modules	Visual check of the modules, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.
Inverters, transformer, and electrical panels	Visual check of the devices including connection equipment and the grounding network, check for water and dust
Electric Boards	Check of the main switches and safety devices (fuses)
Noise	Check for abnormal sounds
Cabling and wiring	Visual check of electrical lines (where visible) and connection box to verify status
Transmission line	Routine visual inspection of gen-tie line, structures and components
Project substations	Scheduled visual inspections

2.1.6 What happens at the end of the solar facility's useful life?

As the project progresses through its service life, the applicant may seek to repower the project. The applicant's decision on whether to pursue repowering will consider the equipment performance, maintenance costs, extending the useful life of the project, or a desire to increase generation output. Any site permit issued by the Commission will specify the maximum generating capacity, so if the generation capacity increases, the existing site permit must be amended. At the end of the project's useful life, Gopher State Solar will either take the necessary steps to continue the operation of the project (re-permitting and retrofitting) or will decommission the project. Any proposed repowering will abide by all local, state, and federal regulations.

Commission-issued site permits require that the permittee be responsible for removing all project components and restoring the site to pre-construction conditions at the end of a project's useful life and that the permittee is responsible for all costs associated with decommissioning the project. Gopher State Solar provided a draft decommissioning plan as Appendix F of its site permit application.

If the project is not repowered, Gopher State Solar will decommission the project and remove the project facilities. Decommissioning would include the removal of the solar arrays (modules, racking, and foundation posts), inverters, fencing, access roads, cables and lines, and the O&M building. Underground cables and conduits will be removed to a depth of 4 feet. Standard decommissioning

practices will be used, including dismantling and repurposing; salvaging, recycling, or disposing of the solar energy improvements, and restoration.[38]

Gopher State Solar estimates that decommissioning will take approximately 40 weeks to complete, and indicates that all equipment and materials will be recycled or disposed of properly.[39]

Gopher State Solar anticipates that the total estimated cost to decommission the project is approximately $7,034,025 (approx. $35,170 per MW). Estimated salvage/scrap value is approximately $5,593708, reducing net decommissioning costs to approximately $1,440,317. The decommissioning financial assurance will be posted as a bond/letter of credit prior to the start of construction. The decommissioning estimate will be revised every 5 years, including reassessing and revising costs to reflect any identified changes.[40]

2.2 Project Costs

Gopher State Solar estimates the total cost to construct the project to be in the range of $187.75 to $242.5 million (Table 4).[41] Project cost components include planning and permitting, design, procurement and construction, operation, decommissioning, interconnection, and the project gen-tie line. Actual costs will depend on final material and labor costs, and salvage value from decommissioning.

Table 4. Estimated Project Cost Ranges[42]

Project Component	Estimated Cost ($USD millions)
Planning and Permitting	0.5-1
Design, Procurement, Construction	175-225
Operation	1-2
Decommissioning	1-2
Interconnection	10-12
Gen-Tie Line	0.25-0.5
Total Project Cost	**187.75-242.5**

2.3 Project Schedule

[38] SPA, pp. 21-22.
[39] Id.
[40] SPA - Appendix F: Decommissioning Plan.
[41] Appendix D – Gopher State Solar Response to Data Requests.
[42] Id.

Gopher State Solar anticipates the project will be in service by 2027.[43] Table 5 shows Gopher State Solar's estimated development and construction milestones.

Table 5. Anticipated Project Schedule[44]

Activity	Anticipated Timeframe
Secure Land Rights	Completed
Commission Site Permit	Q3 2025
PV/Equipment Procurement	Q4 2025
Downstream Permits	Q1 2026
Mobilization/Civil Grading	Q2 2026
Begin Racking Installation	Q2 2026
Begin PV Module Installation	Q1 2027
Begin PV Commissioning	Q4 2027

[43] SPA, p. 1.
[44] SPA, p. 3.

3 Regulatory Framework

Chapter 3 discusses the site permit approval required from the Commission. It describes the environmental review process and lists the factors the Commission considers when making its decision. This chapter also discusses required approvals from federal and state agencies and local units of government with permitting authority for actions related to the project. Lastly, it lists topics outside the scope of this EA.

3.1 What Commission approvals are required?

The project requires a site permit from the Commission before it can be constructed.

The project requires a site permit from the Commission because it meets the definition of a *large electric power generating plant*, which means any electric power generating equipment designed for or capable of operation at a capacity of 50 MW or more (Minn. Stat. 216E.01, subd. 5). The project is exempt from the certificate of need requirement per Minn. Stat. 216B.243, subd. 8 solar energy generating systems, because Gopher State solar is an independent power producer.

3.2 What is environmental review?

Environmental review informs interested persons about potential impacts and possible mitigation measures associated with the project; environmental review informs Commission decisions.

Minnesota law requires that potential human and environmental impacts be analyzed before the Commission decides whether to grant a site permit. This analysis is called environmental review.

Minnesota law provides the Commission with two processes to review site permit applications. The alternative process, which applies to solar generating facilities, such as the project, requires an EA instead of an environmental impact statement and a public hearing instead of the more formal contested-case hearing.[45,]

3.3 What permitting steps have occurred to date?

The Commission accepted the site permit application as complete on September 24, 2024. Public information and scoping meetings were held online on October 28, 2024, and in person in Olivia, Minnesota on October 29, 2024.

[45] Minnesota Statutes 216E.04, subd. 1 and 5; Minn. R. 7850.3700, subp. 1. Applicants are free to elect the alternative process if their project qualifies for it.

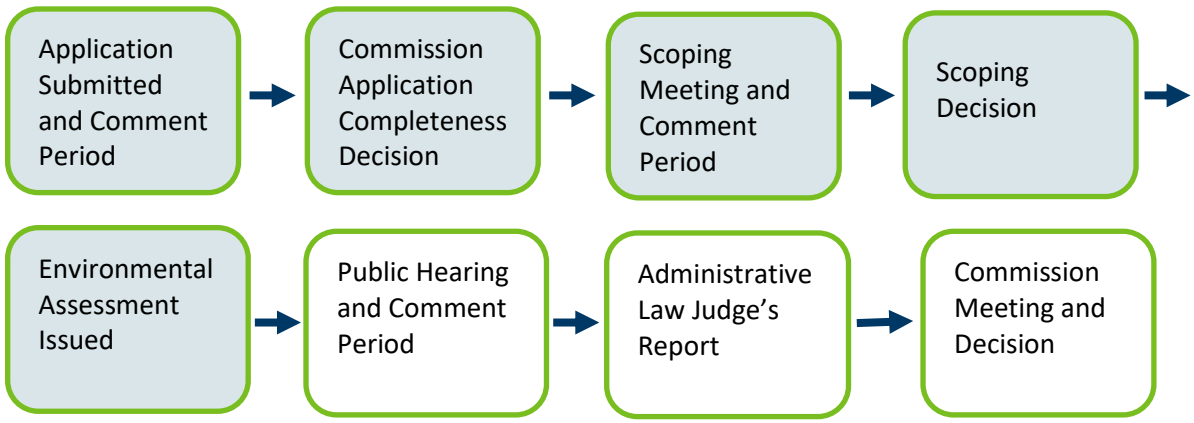
Application Filing and Acceptance

Gopher State Solar provided the required written notice of its intent to file a site permit under the alternative process on March 1, 2024.[46]

Gopher State Solar filed an application for a site permit on August 19, 2024.[47] The Commission accepted the application as substantially complete in its order dated September 9, 2024.[48] The order also referred the matter to the Office of Administrative Hearings for appointment of an administrative law judge (ALJ) to conduct a public hearing for the project. Commission staff provided a *Sample Site Permit for a Solar Energy Generating System* on October 8, 2024.[49]

Figure 7. outlines the permitting process as it has unfolded for this project.

Figure 7. Permitting Process Summary[50]



Scoping Process

Scoping is the first step in the environmental review process. It helps focus the EA on the most relevant information needed by the Commission to make informed decisions.

[46] Gopher State Solar, Notice of Intent by Gopher State Solar to Submit a Site Permit Application under the Alternative Permitting Process Docket No. IP-7127/GS-24-106., March 1, 2024, eDocket ID: 20243-204022-01

[47] Gopher State Solar Project, Application to the Minnesota Public Utilities Commission for a Site Permit for a Large Electric Generating Facility, August 19, 2024, eDocket ID: 20248-209582-01 (through -09), 20248-209583-01 (through -10), 20248-209584-01 (through -03).

[48] Commission, *Order*, September 24, 2024, eDocket ID: 20249-210438-01

[49] Commission Staff, Sample Solar Site Permit, October 8, 2024, eDockets No. 202410-210821-01

[50] Read from left to right; shaded steps are complete.

Scoping includes a public meeting and comment period that provides opportunities for interested persons to help develop the scope (or contents) of the EA.[51] The purpose of the public information and scoping meetings is to provide information and answer questions about a proposed project and the permitting process. The meeting and associated comment period also provide an opportunity to gather input regarding potential impacts and mitigative measures that should be studied in the EA.

On October 14, 2024, the Commission and Commerce issued a joint *Notice of Public Information and Environmental Assessment Scoping Meeting* and associated public comment period.[52] The notice was sent to those individuals on the project contact list and was also available on Commerce's webpage for the project.

Commission and Commerce staff held public information and scoping meetings in Olivia, Minnesota on October 29, 2024, and an online meeting on October 28, 2024. The comment period closed on November 15, 2024. Approximately 15 people attended the Gopher State Solar meeting and two attendees provided public comments. There were no public comments at the online meeting.[53] Written comments were received from Renville County, the Laborers' International Union of North America (LIUNA), and the Minnesota Department of Natural Resources (DNR).[54]

Public comments addressed a number of potential impacts and concerns related to the project including setbacks, tile lines, weed control, emergency response training, aesthetic impacts, PV panel materials, decommissioning and disposal of PV panels, wind and fire risk, employment, dust control, project lighting, tree removal, and erosion control.

Gopher State Solar filed comments on November 15, 2024.[55] Gopher State Solar responded to public comments regarding potential project setbacks, emergency response, road use agreement, drain tiles, and decommissioning.

SCOPING DECISION

The scoping decision identifies the issues studied in this EA.

After considering public comments and recommendations by staff, Commerce issued a scoping decision on December 6, 2024[56] (**Appendix A**). The scoping decision identifies the issues to be evaluated in this EA.

3.4 Are other permits or approvals required?

[51] Minn. R. 7850.3700, subp. 2.
[52] Commission and Commerce *Notice of Public Information and Environmental Review Scoping Meeting*, October 14, 2024, eDocket ID: 202410-210918-01
[53] Oral Comments on the Scope of Environmental Assessment, Public Scoping and Information Meetings, Olivia, Minnesota, October 29, 2024 and virtual meeting, October 28, 2024, eDocket ID: 202411-212434-02.
[54] Written Comments on the Scope of Environmental Assessment, eDocket ID: 202411-212434-01.
[55] Gopher State Solar, Comments, November 15, 2024, eDockets: 202411-212006-01.
[56] Appendix A – Scoping Decision

Yes, other permits and approvals are required for the project.

A site permit from the Commission is the only state permit required for siting the project. However, various federal, state, and local approvals might be required for activities related to construction and operation of the project. These subsequent permits are referred to as "downstream" permits and must be obtained by the permittee prior to construction.[57] **Table 6** lists potential downstream permits that might be required, several of which are discussed below.

Table 6. Potential Downstream Permits

Unit of Government	Type of Application	Purpose	Anticipated for Project
Federal			
U.S. Army Corps of Engineers	Section 404 Clean Water Act – Dredge and Fill	Protects water quality by controlling discharges of dredged and fill material	Possible
U.S. Environmental Protection Agency	Spill Prevention, Control and Countermeasures Plan	Protect facilities with oil storage of more than 1,320 gallons	Possible
U.S. Fish and Wildlife Service	Threatened and Endangered Species Consultation	Consultation to mitigate impacts to federally listed species	Possible
	Section 10 Endangered Species Incidental Take Permit	Potential impacts on federally endangered or threatened species	Possible
State			
Department of Natural Resources	License to Cross Public Lands and Waters	Prevent impacts associated with crossing public lands and waters	No
	Water Appropriation Permit	Balances competing management objectives; may be required for construction dewatering of more than 10,000 gallons of water per day or 1 million gallons per year.	Possible
	Public Water Work Permit	Regulates placement of structures in public waters.	Possibly
Minnesota Pollution Control Agency	Construction Stormwater Permit	Minimizes temporary and permanent impacts from stormwater	Yes
	Section 401 Clean Water Act – Water Quality Certification	Ensures project will comply with state water quality standards	Possible
	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons.	Possible

[57] DSP (Appendix C), Section 4.5.2 (stating the permittee "shall obtain all required permits for the project and comply with the conditions of those permits").

Unit of Government	Type of Application	Purpose	Anticipated for Project
State Historic Preservation Office	National Historic Preservation Act Section 106 Consultation	Ensures adequate consideration of impacts to significant cultural resources	Yes
Department of Agriculture	Agricultural Impact Mitigation Plan	Establishes measures for protection of agricultural resources	Yes
Department of Labor and Industry	Electrical Inspection	Necessary to comply with electric code.	Yes
Department of Transportation	Utility Accommodation on Trunk Highway ROW Permit	Controls utilities being placed along or across highway rights-of-way (ROW)	No
	Oversize/Overweight Permit	Controls use of roads for oversize or overweight vehicles	Possible
Board of Water and Soil Resources	Wetland Conservation Act	Ensures conservation of wetlands	No
Local			
Renville County	Public Ditches	Required for crossing public ditches	Possible
	Individual Sewage Treatment Systems Permit	Required prior to installing any individual sewage treatment system	Possible
	Driveway/Entrance Permit	Required for constructing new driveway access to county roads	Possible
	Utility Permit	Required for installation of utility infrastructure in a county road right of way	Possible
	Work in the Right of Way Permit	Required to work within public road right of way	
	Oversized/Overweight Permit	Regulates the use of overweight/oversized vehicles on county roads	Possible
	Drainage Policy	Required if project is within 60' of the drain tile corridor or overtop of tile	Possible
Renville County Soil and Water Conservation District (SWCD)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	Possible

3.4.1 Federal

The U.S. Army Corps of Engineers (USACE) "regulates the discharge of dredged or fill material into waters of the United States, including wetlands."[58] Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. A permit is required

[58] U.S. Environmental Protection Agency (October 27, 2015) *Section 404 Permit Program*, retrieved from: http://www.epa.gov/cwa-404/section-404-permit-program.

from USACE if the potential for significant adverse impacts exists. The USACE is also charged with coordinating with Native American tribes regarding potential impacts to traditional cultural properties.

The U.S. Environmental Protection Agency (USEPA) enforces the Spill Prevention, Control and Countermeasures Plan (SPCCP). "The purpose of the Spill Prevention, Control, and Countermeasure (SPCC) rule is to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines. The SPCC rule requires facilities to develop, maintain, and implement an oil spill prevention plan, called an SPCC Plan." If a plan is required for this project, it would prevent oil spill, as well as control a spill should one occur. This plan may be required for the storage of fuel for construction.

A permit is required from the U.S. Fish and Wildlife Service (USFWS) for the incidental taking[59] of any threatened or endangered species. As a result, USFWS encourages project proposers to consult with the agency to determine if a project has the potential to impact federally listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

3.4.2 State

Potential impacts to state lands and waters, as well as fish and wildlife resources, are regulated by the DNR. Licenses are required to cross state lands or waters.[60] Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a *Public Waters Work Permit*.[61] Not unlike the USFWS, DNR encourages project proposers to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

Construction projects that disturb one or more acres of land require a general *National Pollutant Discharge Elimination System / State Disposal System Construction Stormwater Permit* ("CSW Permit") from the MPCA. This permit is issued to "construction site owners and their operators to prevent stormwater pollution during and after construction."[62] The CSW Permit requires use of best management practices; the development of a Stormwater Pollution Prevention Plan; and adequate stormwater treatment capacity once the project is complete. Projects must be designed so that stormwater discharged after construction does not violate state water quality standards. Specifically, projects with net increases of one acre or more to impervious surface must be designed to treat water volumes of one inch times the net increase in impervious surface. PV panels are impervious and are counted towards total impervious surface along with access roads, buildings, etc. The area beneath the panel, however, is pervious if properly vegetated. To account for this, MPCA developed a solar

[59] 16 U.S. § 1532(19) (defining "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).
[60] Minnesota Statutes 84.415.
[61] DNR (n.d.) *Requirements for Projects Involving Public Waters Work Permits*, http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.
[62] MPCA. *Construction Stormwater*. (2023). https://www.pca.state.mn.us/business-with-us/construction-stormwater

panel calculator that estimates the amount of stormwater retained by PV solar facilities. This amount can be applied as a credit towards the total amount of stormwater treatment needed for a project.[63]

A Clean Water Act Section 401 *Water Quality Certification* from MPCA might also be required. "Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates that the discharge complies the applicable water quality standards."[64] The certification becomes a condition of the federal permit.

Additionally, MPCA regulates the generation, handling, and storage of hazardous wastes.

The State Historic Preservation Office (SHPO) is charged with preserving and protecting the state's historic resources. SHPO consults with project proposers and state agencies to identify historic resources to avoid and minimize impacts to these resources.

The Minnesota Department of Agriculture (MDA) ensures the integrity of Minnesota's food supply while protecting the health of its environment and the resources required for food production. MDA assists in the development of agricultural impact mitigation plans that outline necessary steps to avoid and mitigate impacts to agricultural lands.

The Minnesota Department of Labor and Industry requires an electrical inspection as a component of an electrical permit.[65]

A permit from MnDOT is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway rights-of-way.[66] Coordination would be required to construct access roads or driveways from trunk highways.[67] A permit is also required for oversized/overweight vehicles exceeding MnDOT limits. These permits are required to ensure that use of the right-of-way does not interfere with free and safe flow of traffic, among other reasons.[68]

The Board of Water and Soil Resources (BWSR) oversees the implementation of Minnesota's *Wetland Conservation Act* (WCA). The WCA is implemented by local units of government.

3.4.3 Local

Renville County local permits may be required as a component of this project, including:

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[63] MPCA. *Minnesota Stormwater Manual*. (2022). https://www.pca.state.mn.us/water/minnesotas-stormwater-manual.

[64] MPCA. (n.d.) *Clean Water Act Section 401 Water Quality Certifications*, https://www.pca.state.mn.us/water/clean-water-act-section-401-water-quality-certifications.

[65] MNDLI (n.d.) Electrical Permits, Contractors, https://www.dli.mn.gov/business/electrical-contractors/electrical-permits-contractors.

[66] Minnesota. Rules, Part. 8810.3300, subp. 1.

[67] Mn DOT *Land Management*. (2022). https://www.dot.state.mn.us/utility/forms.html:.

[68] MnDOT. *Utility Accommodation on Trunk Highway Right of Way: Policy OP002.* (2017). http://www.dot.state.mn.us/policy/operations/op002.html.

- Public Ditches: Required for crossing public ditches.
- Individual Sewage Treatment Systems Permit: Required prior to installing any individual sewage treatment system.
- Driveway/Entrance Permit: Required for constructing new driveway access to county roads.
- Utility Permit: Required for installation of utility infrastructure in a county road right of way.
- Work in the Right of Way Permit: Required to work within public road right of way.
- Oversized/Overweight Permit: Regulates the use of overweight/oversized vehicles on county roads
- Drainage Policy: Required if a project is within 60' of the drain tile corridor or overtop of tile.

Commission site permits preempt local zoning, building, and land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose government; however, coordination with local governments may be required for the issues listed below.

- Access/Driveway: Coordination may be required to construct access roads or driveways from county or township roads.
- Overwidth Load: Coordination may be required to move over-width or heavy loads on county or township roads.
- Road Crossing and Right-of-Way: Coordination may be required to cross or occupy county or township road rights-of-way.

3.5 Do electrical codes apply?

Yes, if constructed the project must meet electrical safety code requirements.

The project must meet requirements of the National Electrical Safety Code.[69] These standards are designed to safeguard human health "from hazards arising from the installation, operation, or maintenance of conductors and equipment in electric supply stations and overhead and underground electric supply lines."[70] They also ensure that facilities and all associated structures are built from materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided operational maintenance is performed.

3.6 Are any issues outside the scope of this EA?

Yes, the scoping decision identified several issues that will not be studied.

The EA will not address following topics:

- Any site other than the project site proposed by the applicant.
- The manner in which landowners are compensated for the project.

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[69] *See* Minnesota. Statute. 326B.35; Minn. R. 7826.0300, subp. 1 (requiring utilities to comply with the most recent edition of the National Electric Safety Code when constructing new facilities or reinvesting capital in existing facilities)

[70] IEEE Standards Association (n.d.) *2017 – National Electrical Safety Code Brochure*, retrieved from: https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/nesc_2017_brochure.pdf.

4 Project Impacts and Mitigation

Chapter 4 describes the environmental setting, affected resources, and potential impacts from the project. It also discusses mitigation of potential impacts.

4.1 How are potential impacts measured?

Potential impacts are measured on a qualitative scale based on an expected impact intensity level; the impact intensity level takes mitigation into account.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be positive or negative, short- or long-term, and, in certain circumstances, can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations.

Direct impacts are caused by the proposed action and occur at the same time and place. An indirect impact is caused by the proposed action but is further removed in distance or occurs later in time. This EA considers direct and indirect impacts that are reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. Cumulative potential effects are the result of the incremental impacts of the proposed action in addition to other projects in the environmentally relevant area.

4.1.1 Potential Impacts and Mitigation

The following terms and concepts are used to describe and analyze potential impacts:

- Duration Impacts vary in length. Short-term impacts are generally associated with construction. Long-term impacts are associated with the operation and usually end with decommissioning and reclamation. Permanent impacts extend beyond the decommissioning stage.
- Size Impacts vary in size. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.
- Uniqueness Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.
- Location Impacts are location-dependent. For example, common resources in one location might be uncommon in another.

The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an impact intensity level, which can range from beneficial to harmful. Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended as value judgments, but rather a means to ensure common understanding among readers and to compare potential impacts between alternatives.

- Negligible impacts do not alter an existing resource condition or function and are generally not noticeable to an average observer. These short-term impacts affect common resources.

- Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short- or long-term.
- Moderate impacts alter an existing resource condition or function and are generally noticeable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Moderate impacts might be long-term or permanent to common resources, but generally short- to long-term to uncommon resources.
- Significant impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and affect common or uncommon resources.

Also discussed are opportunities to avoid, minimize, or compensate for potential impacts. Collectively, these actions are referred to as mitigation.

- To avoid an impact means to eliminate it altogether, for example, by not undertaking parts or all of a project, or relocating the project.
- To minimize an impact means to limit its intensity, for example, by reducing project size or moving a portion of the project.
- To correct an impact means to repair, rehabilitate, or restore the affected resource.
- To compensate for an impact means replacing it or providing a substitute resource elsewhere, or by fixing it by repairing, rehabilitating, or restoring the affected resource. Compensating an impact can be used when an impact cannot be avoided or further minimized.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized, but compensation can be applied. The level at which an impact can be mitigated might change the impact intensity level.

4.1.2 Regions of Influence

Potential impacts to human and environmental resources are analyzed within specific geographic areas called regions of influence ("ROI"). This EA uses the following ROIs:

- Land control area (land control of the solar generating facility and collection corridors)
- Local vicinity (1,600 feet from the boundary of the solar generating facility)
- Project area (one mile from the boundary of the solar generating facility)
- Region (Renville County)

Impacts to resources may extend beyond these distances but are expected to diminish quickly. ROIs vary between resources. **Table 7** summarizes the ROIs used in this EA.

Table 7. Regions of Influence for Human and Environmental Resources

Resource Type	Resource Element	Region of Influence
Human Settlement	Displacement, Land Use and Zoning	Land control area
	Noise, Property Values	Local vicinity
	Aesthetics, Recreation and Tourism, Cultural Values, Transportation and Public Services	Project area
	Socioeconomics, Environmental Justice, Cultural Values	Region
Public Health and Safety	Electric and Magnetic Fields, Implantable Medical Devices, Public Safety and Emergency Services	Land control area
Land-based Economies	Agriculture, Forestry, Mining	Land control area
	Tourism	Project area
Archaeological and Historic Resources	—	Project area
Natural Environment	Geology and Groundwater, Soils, Surface Water and Floodplains, Wetlands	Land control area
	Vegetation, Wildlife and Habitat (except birds)	Project Area
	Wildlife and Habitat (birds), Rare and Unique Resources	Local vicinity
	Air Quality, Climate Change	Region

4.2 Project Setting

The project is in a rural area, north of the city of Bird Island and north and east of the city of Olivia in Renville County, Minnesota. Renville County has been slowly decreasing in population, compared to the rest of Minnesota. The project area is dominated by agricultural land uses and scattered residences. Presently, there are no large energy projects within the project area. Roads within and surrounding the area include county state aid highways, county roads, or township roads.

The proposed solar facility is located in parts of Kingman, Osceola, and Bird Island townships. The location is approximately 1.2 miles north of the city of Bird Island and approximately 2.55 miles northeast of the city of Olivia in Renville County, Minnesota. The solar facility is generally bounded by 870th Avenue to the north, 405th Street to the east, 830th Avenue to the south, and 365th street to the west. The Project is intersected north to south by Main Street/County State Aid Highway 5 and east to west by 840th Avenue/County Road 70.[71] According to the Natural Resources Conservation Service (NRCS) the project Land Resource Region (LRR) is within the Central Feed Grains and Livestock Region and Major Land Resource Area (MLRA) is within the Central Iowa and Minnesota Till Prairies. The topography of the project site is relatively flat with gentle rolling till plains, with some morainic hills in the east.[72]

The project is in the North Central Glaciated Plains Section of the Minnesota River Prairie Subsection (251Ba) within the Prairie Parkland province.[73] The subsection is made up of large till plains along the Minnesota River and consists of gently rolling moraine. Most of this subsection is covered in glacial drift 100 to 400 feet deep. Cretaceous shales, sandstones, and clays are the most common bedrock. Dominant soils include well- to moderately well-drained loamy soils and annual precipitation in the area typically ranges from 25 to 30 inches, with 11 to 13 inches during growing season (ranging from 147 to 152 days). Pre-settlement vegetation consisted of primarily tallgrass prairie with islands of wet prairie. Forests that included silver maple, elm, cottonwood, and willow grew along floodplains associated with the Minnesota River and other streams. The current land use in the project area is predominately agricultural.

Land use in the project area is predominantly agricultural but includes developed areas in the cities of Bird Island and Olivia and other residential areas, transportation corridors, and commercial and industrial uses. Land use within the area of land control is dominated by agriculture; primarily corn and soybeans. Built features common to the area include residences and farmsteads, grain storage, and paved and gravel roads.

4.3 Human Settlement

Large energy projects can impact human settlements. Impacts might be short-term, such as increased local expenditures during construction, or long-term, such as changes to viewshed.

4.3.1 Aesthetics

The ROI for aesthetics is the project area. The project will introduce new manmade structures into the existing landscape. Portions of the project will be visible from local roads adjacent to the project, and nearby residences. For most people who pass through the area on US Highway 212, US Highway 71, or more distant local roads, the impact intensity level is expected to be minimal. For individuals with greater viewer sensitivity, such as people who live in the project area, the impact intensity level is anticipated to be moderate to significant. Impacts will be short- and long-term, and localized. Potential impacts are unavoidable but can be mitigated in part.

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[71] SPA, p. 23.
[72] Id.
[73] DNR (n.d.) *Ecological Classification System: Ecological Land Classification Hierarchy*, retrieved from: https://www.dnr.state.mn.us/ecs/index.html

Aesthetics refers to the visual quality of an area as perceived by the viewer and forms the impression a viewer has of an area. Aesthetics are subjective, meaning their relative value depends upon the perception and philosophical or psychological responses unique to individuals. Impacts to aesthetics are equally subjective and depend upon the sensitivity and exposure of an individual. How an individual values aesthetics, as well as perceived impacts to a viewshed, can vary greatly.

A viewshed includes the natural landscape and built features visible from a specific location. Natural landscapes can include wetlands, surface waters, distinctive landforms, and vegetation patterns. Buildings, roads, bridges, and power lines are examples of built features.

Viewer exposure refers to variables associated with observing a viewshed, and can include the number of viewers, frequency and duration of views, and view location. For example, a high exposure viewshed would be observed frequently by large numbers of people. These variables, as well as other factors such as viewing angle or time of day, affect the aesthetic impact.

Figure 8. Existing Viewshed of Gopher State Solar Project[74]

[74] Agricultural fields along County Road 5 looking North and West.

Figure 9. Existing Landscape and Distribution Line Near Gopher State Solar Project[75]

The existing landscape in the project is area is rural and agricultural consisting of generally flat terrain, dominated by agricultural crop fields of corn and soybeans, with some livestock raised in the area. **Figure 8** shows the existing viewshed along Main Street/County Road 5.

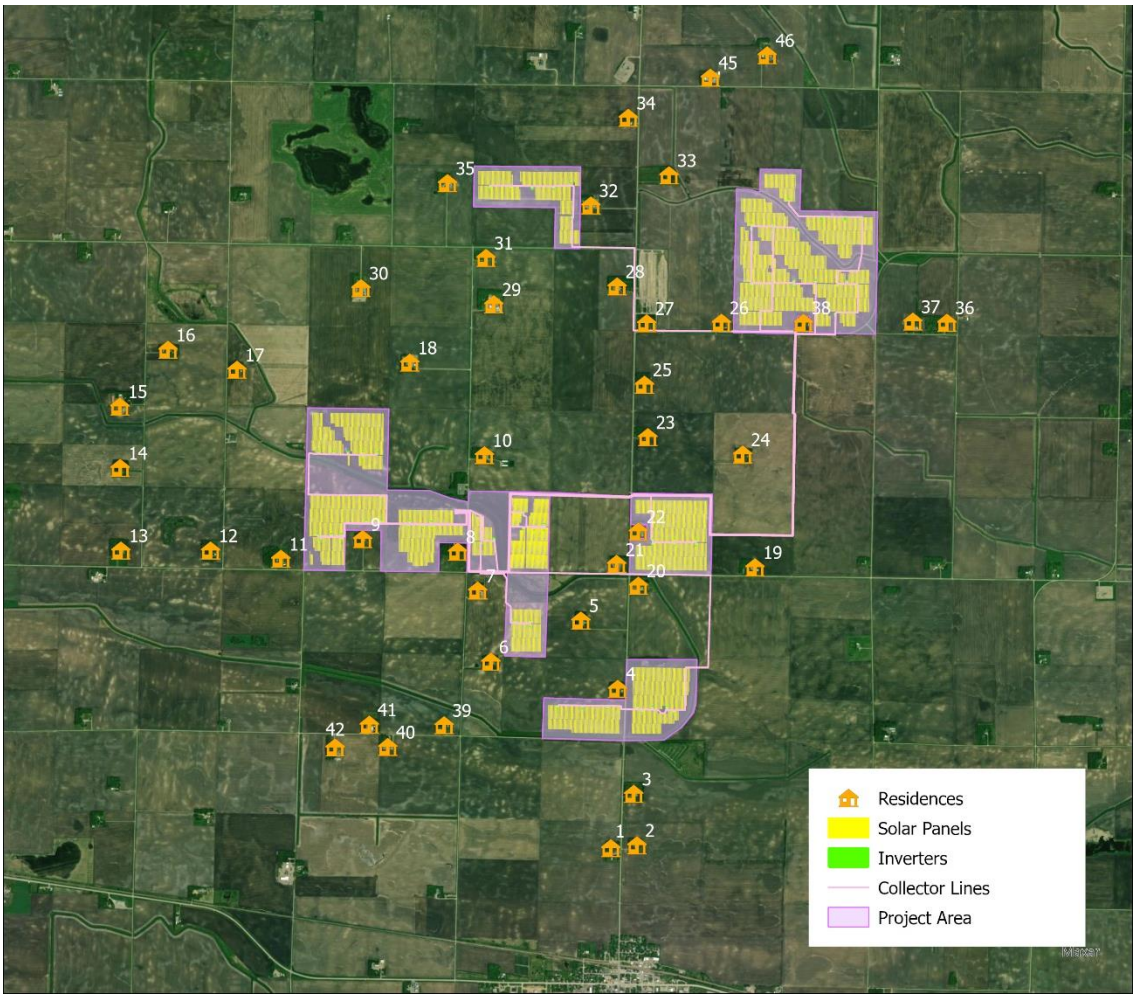
Figure 9 shows the view of existing electric distribution lines in the project area along 840th Ave.

The built environment in the project area includes farmsteads scattered throughout the area, commonly consisting of houses, outbuildings, and grain storage. There is an average of six rural residences within a square mile. Most farms are surrounded by planted windbreaks of trees and shrubs. U.S. Highways 212 and 71 are approximately 1.5 miles south of the project area. Surface water features in the area primarily support the removal of water from agricultural fields from numerous drain tiles and ditches. As shown in **Figure 10**, there are no businesses within the project area; however, there is one residence within the project area, 18 residences within 0.25 miles of the project

[75] Agricultural fields and existing distribution lines along 840th Ave looking East.

site, and over 40 residences within a mile of the project. One home is within the project site and located approximately 566 feet from the nearest solar array, 600 feet from the collector lines, and 600 feet away from the nearest inverter.[76]

Figure 10. Residences within Local Area



4.3.1.1 Potential Impacts

The visible elements of the solar facility will consist of new PV solar modules, transformers and inverters, access roads, an O&M facility, a new substation, and security fencing surrounding the project.

The project will be a noticeable change in the landscape, converting approximately 1645 acres of agricultural fields into solar production. Although the change will be noticeable, there are other existing infrastructure features in the landscape including gravel roads and distribution lines. How an individual viewer perceives the change from a field of corn to a field of solar panels depends, in part,

[76] SPA, pp. 33-34.

on how a viewer perceives solar panels. Will the viewer consider the harvesting of solar energy to be like harvesting crops or will the viewer see an agricultural use be replaced by an industrial use?

For residents outside the project vicinity and for others with low viewer sensitivity, such as travelers along U.S. Highway 212 and 71, aesthetic impacts are anticipated to be minimal. For these viewers, the solar panels would be relatively difficult to see due to distance, fencing and vegetation, or would be visible for a very short period. For residents in the project vicinity and for others with high viewer sensitivity traveling on local roads in the project vicinity, Main Street/County Road 5, aesthetic impacts are anticipated to be moderate to significant.

Current fields of corn and soybeans will be replaced with acres of solar panels. Gopher State Solar indicates that most of the facility will be low-profile, typically less than 15 feet tall. Panels will have a relatively low profile, when level to the ground they will be 4 to 7 feet tall, with a maximum height of 15 feet off the ground at maximum tilt.[77] Construction of the new 1.65-acre project substation, the associated collection, and the 29,400-square-foot O&M facility will also present new visual impacts. The O&M facility will include a SCADA system, which is an area for maintaining and storing equipment.

PV panels are designed to absorb light to convert the light to electricity. Compared to clear glass, which typically reflects approximately eight percent of the sunlight, PV panels typically reflect approximately three percent of the sunlight when the panels are directly facing the sun.

Downward-facing security lighting will be installed outside the O&M facility and project substation for safety and security. Gopher State Solar indicates that lighting for the project substation and O&M facilities will be consistent with Minnesota Department of Transportation (MnDOT) guidance for luminaries.[78]

MITIGATION

Minimizing aesthetic impacts from solar generating facilities is primarily accomplished by locating the facilities so that they are not immediately adjacent to homes, ensuring that damage to natural landscapes during construction is minimized, and shielding the facilities from view by terrain or vegetation. Impacts from facility lighting can be minimized by using shielded and downward-facing light fixtures and using lights that minimize blue hue.

Impacts can be mitigated through standard or special permit conditions. A draft site permit (DSP) for the Project is included in **Appendix C**.[79]

- Section 4.3.8 of the DSP is a standard condition that requires the permittee to consider landowner input with respect to visual impacts and to use care to preserve the natural landscape.

Site-specific landscaping plans can minimize visual impacts to adjacent land uses and homes through vegetation screening, berms, or fencing. Gopher State Solar can work with adjacent landowners to

[77] SPA, p. 11.
[78] SPA, p. 12.
[79] Appendix C – Proposed Draft Site Permit.

determine the need for additional vegetation screening and landscaping to minimize aesthetic impacts of the project.

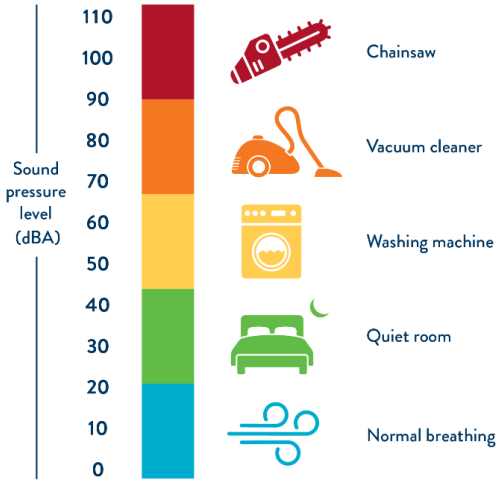
- Section 5.1 of the DSP is a special condition for vegetative screening along roadsides and requires the permittee to coordinate with jurisdictional road management authorities to develop vegetative screening plans for state, county, and township roads adjacent to or bisecting the Project. Vegetative screening plans must comply with jurisdictional ROW management and/or setback requirements.

Aesthetic impacts can also be mitigated through individual agreements with neighboring landowners (sometimes referred to as good neighbor agreements). Such agreements are not within the scope of this EA.

4.3.2 Noise

The ROI for noise is the local vicinity. Distinct noises are associated with the different phases of project construction. The impact intensity level during construction will range from negligible to significant depending on the activity. Potential impacts are anticipated to be intermittent and short-term. These localized impacts during construction could affect nearby residences and might temporarily exceed state noise standards. Impacts are unavoidable but can be minimized. Operational impacts are anticipated to be minimal.

Figure 11. Common Noise Levels



Noise can be defined as any undesired sound. It is measured in units of decibels on a logarithmic scale. The A-weighted scale ("dBA") is used to duplicate the sensitivity of the human ear.[80] A three dBA change in sound is barely detectable to average human hearing, whereas a five dBA change is clearly noticeable. A 10 dBA change is perceived as a sound doubling in loudness. Noise perception is dependent on a number of factors, including wind speed, wind direction, humidity, and natural and built features between the noise source and the receptor. **Figure 11** provides decibel levels for common indoor and outdoor activities.[81]

In Minnesota, noise standards are based on *noise area classifications* ("NAC") corresponding to the location of the listener, referred to as a receptor. NACs are assigned to areas based on the type of land use activity occurring at that location. Household units, designated camping and picnicking areas, resorts and group camps are assigned to NAC 1; recreational activities

[80] MPCA. *A Guide to Noise Control in Minnesota.* (2015). https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf.

[81] Federal Aviation Administration (2022) *Fundamentals of Noise and Sound*, retrieved from: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics/.

(except designated camping and picnicking areas) and parks are assigned to NAC 2; agricultural and related activities are assigned to NAC 3.

Noise standards are expressed as a range of permissible dBA over a one-hour period. L_{10} may be exceeded 10 percent of the time, or six minutes per hour, while L_{50} may be exceeded 50 percent of the time, or 30 minutes per hour. Standards vary between daytime and nighttime hours. There is no limit to the maximum loudness of a noise. **Table 8** provides current Minnesota noise standards.

Table 8. Noise Area Classifications (dBA)

Noise Area Classification	Daytime (7:00 a.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

The MPCA noise standards are public health standards. That is, they protect people from noise generated by all sources at a specific time and place. The total sum of noise at a specific time and location cannot exceed the standards. The MPCA evaluates whether a specific noise source is in violation by determining if the source causes or significantly contributes to a violation of the standards.

Potential Impacts

The primary noise receptors are the local residences. There is one residence within the site, and 33 residences in local proximity (within 3,200 feet).[82] The proposed project is in a rural, agriculturally dominated area. Rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime level of 34 dBA.[83] Residences are in NAC 1. Noise receptors could also include individuals working outside in the project vicinity. Potential noise impacts from the project are associated with construction noise and operational noise.

Construction

Noise from construction will be temporary in duration, and the amount of noise will vary based on what type of construction is occurring, and the distance from the noise source. Sound levels from grading equipment and backhoes are anticipated to generate noise between 81 and 85 dBA, and are not dissimilar from the typical tractors and larger trucks used in agricultural communities during harvest. Impact driving of the piles for rack supports will be the most significant source of construction noise at roughly 101 dBA at 50 feet. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and

[82] SPA, pp. 31-32.
[83] SPA, p. 29.

receptor. Thus, this construction noise will generate a temporary increase in ambient noise, which could exceed state noise standards at select times and locations. Impacts will be intermittent and localized.

Gopher State Solar indicates that the installation of each rack support takes between thirty seconds to a few minutes depending on the soil conditions, and anticipates this activity will take up to 3 to 6 months (depending on construction crew size). Construction noise will not be concentrated in the same location, but rather will rotate around the project site during that time as each stage of construction is completed in sequence. Site preparation may occur at some array locations while pile driving is occurring at others.[84]

Operation

Noise levels during operation of the project are anticipated to be minimal. The primary source of noise from the solar facility will be from inverters and transformers. Gopher State Solar used the assumed background ambient noise level of 40 dBA due to the rural land use category of the project area.[85] For the inverters, a sound pressure level of 40 dBA is detectable at 450 feet, whereas it is detectable at 19 feet from a transformer.[86] The nearest residence to an inverter will be 535 feet away, and the nearest residence to a transformer will by 926 feet away. As a result, the noise from the inverters are not projected to have any impact on nearby residences. At that distance from the transformer, the noise impacts from the transformer are 6 dBA, which is below the threshold of human hearing. As a result, the noise from the transformer is not projected to have any impact on nearby residences. During operation, Gopher State Solar anticipates that the project will not generate an increase in ambient noise levels near the project that exceed state noise standards.

MITIGATION

Sound control devices on vehicles and equipment (e.g., mufflers), conducting construction activities during daylight hours, and running vehicles and equipment only when necessary are common ways to mitigate noise impacts. Gopher State Solar indicates that construction will be limited to daylight hours, using construction equipment and vehicles with properly functioning mufflers and noise-control devices.[87]

- Section 4.3.7 of the DSP (**Appendix C**) is a standard condition that requires the permittee to comply with noise standards established under Minnesota noise standards as defined under Minnesota Rule, part 7030.010 to 7030.0080, and to limit construction and maintenance activities to daytime hours to the extent practicable.

No additional mitigation is proposed.

4.3.3 Cultural Values

The ROI for cultural values is the project area and the region. Development of the project will change the character of the area, potentially changing residents' sense of place. There are tradeoffs

[84] SPA, p. 29-31.
[85] Id.
[86] Id.
[87] SPA, p. 32.

for rural communities between renewable energy projects and retaining the rural character of an area. Construction and operation of the project is not anticipated to impact or alter the work and leisure pursuits or community events of residents in the project area in such a way as to impact the underlying culture of the area.

Cultural values can be defined as shared community beliefs or attitudes that define what is collectively important to the group. These values provide a framework for individuals and community thought and action. Infrastructure projects believed inconsistent with these values can deteriorate community character. Those found consistent with these values can strengthen it. Projects often invoke varying reactions and can, at times, weaken community unity.

Individual and community-based renewable energy is becoming more valued across the nation. Utility scale renewable projects—generally located far from load centers in rural areas—are also valued, but, at times, opposed by residents. The highly visible, industrial look and feel of these projects can erode the rural feeling that is part of residents' sense of place.

Cultural values can also be informed by ethnic heritage. Residents of Renville County derive primarily from European ancestry, which accounts for approximately 85.5% of the population, followed by 10.2% Hispanic or Latino, 1.7% Native American, and 2.3% African American, Asian American, and Pacific Islander.[88] The region surrounding the project area has cultural values tied to the area's German, Norwegian, and Native American heritage and the agricultural economy. Cultural values and community representation are also informed by local geographic features, such as lakes and parks, agricultural economy, such as farmers' markets, as well as seasonal events and holidays. Cultural representation in community events appears to be connected to community organizations such as the American Legion and the 4-H club, art, food, seasonal events, national holidays, and municipal events.[89]

POTENTIAL IMPACTS

The project contributes to the growth of renewable energy and is likely to strengthen and reinforce this value in the area. At the same time, the development of the project will change the character of the area. The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might—for some residents—change their perception of the area's character, thus potentially eroding their sense of place. The project area is not located within municipal areas where events typically occur, so impacts on community events are not anticipated.

MITIGATION

There are no conditions included in the DSP that directly address mitigation for impacts to cultural values. Section 4.3.24 addresses impacts to cultural properties. No additional mitigation is proposed.

4.3.4 Land Use and Zoning

The ROI for land use and zoning is the land control area. The impact intensity level is anticipated to be moderate due to the conversion of agricultural land to land used for energy generation. Land

[88] U.S. Census Beaureau (2020a).
[89] SPA, p. 41.

use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

The National Land Cover Database (NLCD) provides "spatial reference and descriptive data for characteristics of the land surface" nationwide.[90] As shown in **Table 9,** the project land cover is dominated by cultivated agriculture, with scattered areas of wetlands and developed areas around farmsteads.

Land use is the characterization of land based on what can be built on it and how the land is used. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to guide specific land uses within specific geographic areas. Land cover documents how much of a region is covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types, including wetlands. Construction of solar generating facilities and transmission line will alter current and future land use and land cover.

Table 9. Land Cover

Category	Land Control Area (Acres)	Percentage
Developed, Open Space	15.29	0.9%
Developed, Low Density	12.89	0.8%
Developed, Medium Density	2.62	0.2%
Developed, High Density	0.21	0.01%
Emergent Herbaceous Wetlands	23.59	1.4%
Deciduous Forest	9.39	0.6%
Cultivated Crops	1580.99	96%
Total	**1645**	100%

A site permit from the Commission supersedes local zoning, building, or land use rules.[91] Though zoning and land use rules are superseded, the Commission's site permit decision must be guided, in part, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[92]

The project area is located within Kingman, Osceola, and Bird Island Townships in Renville County. Renville County's zoning map identifies the entire project area as agricultural land, and there are no project components located in areas zoned as a shoreland district. Renville County has a Land Use

[90] U.S. Geological Survey. *The National Land Cover Database (NLDC) 2019 Products (ver 3.0)*. (February 2024), retrieved from: https://www.usgs.gov/data/national-land-cover-database-nlcd-2019-products-ver-30-february-2024#publications.
[91] Minnesota Statutes 216E.10, subd. 1.
[92] Minnesota Statutes 216E.03, subd. 7.

Ordinance that includes Zoning Regulations and Renewable Energy Regulations. These regulations outline standards for "Solar Energy Conversion Systems (large and small)." The county lists solar farms greater than 100 kilowatts as conditional use in the agricultural district. The Renewable Energy Regulations prescribe performance standards and minimum setbacks for placement of solar energy systems from dwellings, cemeteries, road rights-of-way, drainage ditches, county tile lines, and side/rear yard property lines.[93]

Gopher State Solar states that county setbacks will be considered where practical. In its November 2024 Reply Comments, Gopher State Solar addressed project setbacks. Gopher State Solar does not object to establishing project infrastructure setbacks for at least 20 feet from non-participating landowners' property lines. However, county drain tile setbacks are recommended to be 40 feet. Gopher State Solar stated that the final project design will accommodate the 40-foot drain tile setbacks when possible, however, there may be tradeoffs associated with this setback that affect panel siting. The Renville County Land Use Ordinance applies to solar energy systems over 100 kilowatts that are not subject to oversite by the Minnesota Power Plant Siting Act (Minn. Stat. § 216E.10, subd. 1), where the Commission site permit supersedes local zoning, building, or land use rules.[94]

Potential Impacts

Development of a solar farm in this area will temporarily change the land use from predominantly agricultural uses to energy generation for the life of the project. The change of land use will have a minimal to moderate impact on the rural character of the surrounding area, and a minimal impact on the county character as a whole.

Gopher State Solar states that the project is designed to be consistent with the Renville County Comprehensive Plan and that the project area does not include any areas noted as future urban expansion areas or rural residential areas. It is not anticipated that the project will prevent the future extension of utilities such as water, sewer, or other services.

Mitigation

The project would convert approximately 1645 acres of cultivated cropland with small pockets of forest and developed areas to solar energy production. Gopher State Solar has developed an Agricultural Impact Mitigation Plan (AIMP)[95] and a Vegetation Management Plan (VMP)[96] that will be implemented throughout the duration of the project. The AIMP and VMP identify measures to avoid, minimize, mitigate, and/or repair potential negative agricultural impacts that may result from the construction operation, or decommissioning of the project. The AIMP and VMP outline ensures the project area may be returned to future agricultural use after the end of the project's useful life, including identifying best management practices (BMPs) that will be used during construction.

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[93] Renville County, Land Use Ordinance, https://www.renvillecountymn.gov/wp-content/uploads/2024/06/RenvilleCty_Ordinance-Chapter15RenewableEnergyRegulations-Rev05252021.pdf

[94] SPA, pp. 44-46.

[95] SPA – Appendix D: Agricultural Impact Mitigation Plan (AIMP).

[96] SPA – Appendix E: Vegetation Management Plan (VMP).

Although the project is subject to oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, Gopher State Solar will continue to coordinate with Renville County and local Townships on other potential permits or agreements for the project, such as a road use agreement for use of township and county roads.

The DSP (**Appendix C**) has several permit conditions related to the preservation and restoration of agricultural land:

- Section 4.3.17 requires the applicant to prepare a vegetation management plan to prevent soil erosion and invest in soil health by establishing a plan to protect soil resources by ensuring perennial cover. The applicant's draft VMP is found in Appendix E of the site permit application.[97]
- Section 4.3.18 requires the applicant to prepare an AIMP that details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. The applicant's draft AIMP is found in Appendix D of the site permit application.[98]
- Section 5.2 is a special condition requiring the applicant to adhere to all Renville County renewable energy setback requirements, except for drain tile, in which the Permittee shall adhere to the 40-foot drain tile setback to the extent practical.
- Section 5.3 is a special condition requiring the applicant to enter into a Road Use and Development Agreement with Renville County and affected Townships.
- Section 9 requires the applicant to prepare a decommissioning plan focused on returning the project site to pre-project condition at the end of the project's useful life. The applicant's draft decommissioning plan is found in Appendix F of the site permit application.[99]
- Section 5.4 is a special condition requiring the applicant to coordinate with Renville County to develop a mutually agreeable decommissioning plan consistent with Section 9.1 of the DSP.
- Section 9.2 requires removal of all project-related infrastructure upon decommissioning.

4.3.5 Property Values

The ROI for property values is the local vicinity. Impacts to property values within the local vicinity could occur; however, changes to a specific property's value are difficult to determine. Because of this uncertainty, impacts to specific properties in the project vicinity could be minimal to moderate and would decrease with distance and over time.

Impacts to property values can be measured in three ways: sale price, sales volume, and marketing time. These measures are influenced by a complex interaction of factors. Many of these factors are parcel specific, and can include condition, size, acreage, improvements, and neighborhood characteristics; the proximity to schools, parks, and other amenities; and the presence of existing infrastructure, for example, highways or transmission lines. In addition to property-specific factors,

[97] SPA – Appendix E: VMP.
[98] SPA – Appendix D: AIMP.
[99] SPA – Appendix F: Decommissioning Plan.

local and national market trends, as well as interest rates, can affect all three measures. The presence of a solar facility becomes one of many interacting factors that could affect a specific property's value.

Because each landowner has a unique relationship and sense of value associated with their property a landowner's assessment of potential impacts to their property's value is often a deeply personal comparison of the property "before" and "after" a proposed project is constructed. The landowner's judgments, however, do not necessarily influence the market value of a property. Professional property appraisers assess a property's value by looking at the property "after" a project is constructed. Moreover, potential market participants are likely to see the property independent of the changes brought about by a project; therefore, they do not take the "before" and "after" into account the same way a current landowner might. Staff acknowledges this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[100]

Electrical generating facilities can impact property values. Often, negative effects result from impacts that extend beyond the project location. Examples include emissions, noise, and visual impacts. Unlike fossil-fueled electric generating facilities, the project would not generate emissions. Potential impacts from operational noise are not anticipated. Aesthetic impacts will occur, but because the project is relatively low in height – as compared to a wind turbine or a smokestack – impacts would be localized.

Large solar facilities exist in Minnesota; however, limited sales information is available. A review of the literature identified one peer-reviewed journal article that addressed impacts to property values based on proximity to utility-scale, PV solar facilities. The Lawrence Berkeley National Lab studied over 1,500 large-scale PV solar facilities in six states (including Minnesota) to determine whether home sale prices were influenced within 0.5 miles (from over 1.8 million home sale transactions).[101] In summary, the study found that effects, "on home sale prices depend on many factors that are not uniform across all solar developments or across all states."

In Minnesota in particular, the study found that homes within one-half mile of large-scale PV solar facilities had a 4 percent reduction in home sale prices compared to homes 2-4 miles away. This finding was considered statistically significant. Additionally, only large-scale PV solar facilities developed on previously agricultural land, near homes in rural areas, and larger facilities (roughly 12 acres or more) were found to be linked to adverse home sale price impacts within one-half mile. The analysis did not include consideration of site features or site design, for example setbacks or landscaping features, which could play a role in nearby property valuation. Another limitation of the study was the lack of examination of the broader economic impacts or benefits to host communities from large-scale PV solar facilities, which might positively impact home sale prices.

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[100] This paragraph is based, in part, on the following: Chalmers, James (October 30, 2019) *High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation*, retrieved from: https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf; Department of Commerce (August 5, 2014) *Rights-of-way and Easements for Energy Facility Construction and Operation*, retrieved from: https://mn.gov/Commerce/energyfacilities/.

[101] Shedding light on large-scale solar impacts, March 2023. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0301421523000101 .

Other studies with smaller sample sizes did not find a consistent negative impact to the sales value of properties near large solar facilities. Chisago County Environmental Services and Zoning found that home sales exceeded assessed value near the 100 MW North Star solar facility at a rate comparable to the general real estate market in the area.[102] Additionally, a study prepared by CohnReznick examined compared sale prices of properties near 10 existing large solar facilities (including the North Star project) with comparable properties, and did not find a consistent negative impact to the sales value of properties near large solar facilities.[103]

POTENTIAL IMPACTS

Impacts to the value of specific properties within the project vicinity are difficult to determine but could occur. Considerations such as setbacks, benefits to the community, economic impact, and vegetative screening could have an unpredictable range of influence over property value. Several, but not all, of the closest residents have some screening from the Project.

Based on analysis of other utility-scale solar projects, minimal to moderate property value impacts could occur, but significant negative impacts to property values in the project vicinity are not anticipated. To the extent that negative impacts do occur they are expected to be within one-half mile of the solar facility and to decrease with distance from the project and with time. Aesthetic impacts that might affect property values would be limited to residences and parcels in the project vicinity where the solar panels are easily visible.

MITIGATION

Impacts to property values can be mitigated by reducing aesthetic impacts and impacts to future land use. Impacts can also be mitigated by Gopher State Solar through individual agreements with neighboring landowners, such as a visual screening plan.

4.3.6 Tourism and Recreation

The ROI for tourism and recreation is the project area. Potential impacts to recreational opportunities and tourism are anticipated to be minimal. During construction, unavoidable short-term impacts will occur as construction equipment and vehicle traffic will create noise, dust, and visual impacts. These impacts will be intermittent and localized. There are no anticipated long term impacts from this project.

In 2022, the leisure and hospitality industry in Renville County accounted for about $11,545,796 in gross sales, and 228 private sector jobs.[104] Tourism in the project area is largely related to recreational activities including camping, hiking, biking, fishing, horseback riding, canoeing, snowmobiling, and hunting.

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[102] Kurt Schneider, Environmental Services Director, (October 20, 2017) *Email to Commerce staff*.

[103] Patricia L. McGarr, Andrew R. Lines, Sonia K. Singh. Real Estate Adjacent Property Value Impact Report: Research and Analysis of Existing Solar Facilities, Published Studies, and Market Participant and Assessor

[104] Explore Minnesota (n.d.) *2022 Leisure & Hospitality Industry Data*, retrieved from: https://mn.gov/tourism-industry/assets/24-suitcase-sheet-couty-data_8.5x11_tcm1135-607260.pdf

There are no Wildlife Management Areas (WMAs), public water access sites, or federal or state parks within one mile of the project area.[105] There is one snowmobile trail, the Renville County Drift Runner trail, that runs parallel to County Road 5 within the project area. Other recreational areas near the project include the Renville Rangers Shooting Club, a rifle and pistol shooting range adjacent to the southern boundary of the project on 830th Avenue, the Renville County fairgrounds, located approximately 1.8 miles from the project, and the Olivia Golf Club, a public golf course approximately 3.7 miles from the project.

Impacts to tourism and recreation can be direct or indirect. Direct impacts are impacts that directly impede the use of a recreational resource, for example, closing of a trail to facilitate project construction. Indirect impacts reduce the enjoyment of recreational resources but do not prevent use, for example, aesthetic impacts visible from a scenic overlook.

Potential Impacts

Impacts to tourism and recreation are anticipated to be minimal and temporary. Due to construction, there will be short-term increases in traffic and noise that could potentially impact recreational activities in close proximity to the project area, including visitors at the snowmobile trail and the shooting range. There could also be a temporary increase in dust and visual impacts from construction equipment for local visitors. However, impacts will be temporary. Access to the snowmobile trail will remain open throughout the operation of the project. No significant long-term impacts to recreational activities are anticipated.

Mitigation

Because impacts to recreational activities are anticipated to be minimal and temporary, no additional mitigation measures are proposed.

Gopher State Solar indicates that although the project is not anticipated to disrupt nearby recreational activities, the applicant will coordinate with the Minnesota DNR, the U.S. Fish and Wildlife Service (USFWS), Renville County, and Kingman, Osceola, and Bird Island Townships to ensure construction of the project will not cause significant impacts to nearby natural resources.[106]

Gopher State Solar will communicate with the operator of the shooting range along with other landowners near the project area regarding any construction traffic that could temporarily affect local access.[107]

If construction activity occurs during time of snow cover, Gopher State Solar will coordinate with the Renville County Drift Runners to minimize impacts to the trail and to determine procedures for informing the public of construction in the area.[108]

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[105] DNR, Wildlife Management Areas; Public Waters Inventory (PWI) Basin and Watercourse Delineations. Available from https://gisdata.mn.gov/

[106] SPA, p. 42.

[107] Id.

[108] Id.

4.3.7 Transportation and Public Services

The ROI for transportation and public services is the project area. Potential impacts to the electrical grid, roads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts to water (wells and septic systems), railroads, and airports are not expected to occur. Overall, construction-related impacts are expected to be minimal and are associated with possible traffic increases. During operation, negligible traffic increases would occur for maintenance. Impacts are unavoidable but can be minimized.

Public services are services provided by a governmental entity or by a regulated private entity to provide for public health, safety, and welfare.

Water and Wastewater Most residents in the surrounding area have private septic systems. Domestic wells are also common in the area.

Electric Utilities The project area includes two overhead electric transmission lines. In addition to the high-voltage transmission lines, there are also several lower-voltage electric distribution lines throughout the project area.[109]

Pipelines An existing pipeline corridor runs through the project area, where one natural gas transmission pipeline and one crude oil pipeline share a right-of-way in the northeast portion of the proposed project.[110]

Roads The major roadways accessing the project area are County Road 5, which runs north-south through the project area, Main Street in Bird Island, running south of the project, County Road 57 (405th Street), comprising a portion of the eastern boundary, and County Road 69 (370th Street) located near the western boundary of the project area. The project area is bordered by Township Road 56 (830th Avenue) to the south and County Road 11 (860th Avenue) to the north. There are no public transportation services available in the vicinity of the project.[111] **Table 10** shows traffic data from the Minnesota Department of Transportation for three county roads within the project area.

Table 10: Annual Average Daily Traffic in Project Vicinity (2019)

Roadway	AADT Traffic Volume Total
County Road 70 (840th Ave)	45
County Road 11 (860th Ave)	435
County Road 5 (Main Street)	1000

Railroads There are no railroads located within the project area.

Airports There are no FAA-registered airports located in the project area. There are two operating public-use airports or heliports in the vicinity. The nearest FAA-registered airports are the Olivia Regional Airport, located approximately 5 miles southwest of the project, and the Hector Municipal

[109] SPA, pp. 42-43.
[110] Id.
[111] Id.

Airport, is located approximately 10 miles southeast of the project.[112] In order to assure safety, both the FAA and MnDOT office of Aeronautics have established guidelines for the location of structures near airports. The FAA has height restrictions for development near public airports and guidelines for placement of buildings and other structures near high frequency omnidirectional range navigation systems. MnDOT has zoning areas around public airports that restrict the area where buildings and other structures can be placed.

Potential Impacts

Large energy projects can impact public services, such as buried utilities or roads. These impacts are usually temporary, for example, road congestion associated with material deliveries. Impacts can be long-term if they change the area in a way that precludes or limits public services.

Water and Wastewater Impacts to water and wastewater systems, are not anticipated as there are no wells located within the project area. If potable water is required for the O&M building, Gopher State Solar indicates that a domestic water well permit will be acquired, and an approved well drilling contractor will be hired prior to O&M building construction. Water use at the O&M building will be limited to restroom and vehicle wash services. Once the exact design and dimensions of the O&M building are finalized, the water use will be estimated by appropriate water usage calculations and permitted as necessary.[113]

Roads During construction, workers and trucks delivering construction material and equipment will use the existing state, county, and township road system to access the project. Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exists local roadways near the project, or equipment and materials are delivered to the project site. Construction traffic will be perceptible to area residents, but because the average daily traffic in the area is relatively low, this increased traffic is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However, these delays should be minimal for the relatively short construction delivery period. Except for the temporary increased use of existing county and township roads for access to and construction of the project, no changes to the existing public roads are anticipated.[114]

No impacts to roads are anticipated during the operation; negligible traffic increases would occur for maintenance.

Railroads No impacts to railroads are anticipated as there are no railroads within the project area.

Electric Utilities No long-term impacts to utilities will occur because of the project. The Project will not impact existing transmission lines, although Gopher State Solar indicates that there may be limited, temporary impacts to electrical service during interconnection. Gopher State Solar will coordinate any planned outages with local utilities to avoid and/or minimize disruptions to service in the area, and

[112] US FAA, *Airport Data and Information Portal* https://adip.faa.gov/agis/public/#/public.
[113] SPA, p. 57.
[114] SPA, p. 42-43.

indicates that existing utilities will be identified and marked prior to construction using public and private utility locator services.[115]

Pipelines The project area contains an existing pipeline corridor located in the northeast portion of the proposed project area. Gopher State Solar indicates that it is in the process of determining the width of the existing pipeline right-of-way and coordinating with the pipeline owner regarding the project infrastructure, if any, that will be allowed to cross the pipeline right-of-way. The project design includes a conservative panel design that avoids the pipeline; however, final pre-construction design may be modified to ensure the project avoids pipeline infrastructure.[116]

Air Safety The FAA's Notice Criteria Tool was used to determine if further aeronautical study or FAA filing is needed for the project.[117] The tool generated a "no notice required" for large components of the project in the area, including solar panels, construction cranes up to 150 ft. in height, electric transmission poles/towers up to 150 ft., or communications towers up to 150 ft. As a result, no further FAA studies or filings are necessary for the project.

MITIGATION

Water and Wastewater Gopher State Solar indicates that existing utilities will be marked prior to construction start. A well construction permit from the Minnesota Department of Health (MDH) would be required if a well is installed at the facility in the future.

Utilities

- Section 4.3.5 of the DSP (**Appendix C**) is a standard permit condition that requires the permittee to minimize disruptions to public utilities.

Impacts to electrical infrastructure that cross the project can be mitigated by appropriate coordination with the owners of the existing infrastructure and following industry best practices.

The location of underground utilities can be identified using the Gopher State One Call system during engineering surveys and marking the underground utility locations prior to construction. If a utility is identified, the project component or the utility itself might need to be relocated if it cannot be successfully crossed. Relocation, as well as any necessary crossing, would need to be coordinated with the affected utility.

Roads Changes or additions to driveways from county roads will require permits from the county.

- Section 4.3.22 of the DSP requires permittees to inform road authorities of roads that will be used during construction and acquire necessary permits and approvals for oversize and overweight loads. Permitted fencing and vegetative screening cannot interfere with road maintenance activities, and the least number of access roads shall be constructed.

[115] SPA, p. 43.
[116] SPA, p. 44.
[117] Federal Aviation Administration (FAA) Notice Criteria Tool, 2023. Retrieved from: https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp.

In addition to permit requirements for driveway access and the conditions of the draft site permit, the following practices can mitigate potential impacts:

- Pilot vehicles can accompany movement of heavy equipment.
- Deliveries can be timed to avoid traffic congestion and dangerous situations on the roadway.
- Traffic control barriers and warning devices can be used as necessary.
- Photographs can be taken prior to construction to identify pre-existing conditions. Permittees would be required to repair any damaged roads to preconstruction conditions.

Gopher State Solar indicates that to minimize traffic impacts, it will coordinate with local road authorities to schedule large material and or equipment deliveries to avoid periods when traffic volumes are high whenever practical. In addition, traffic control barriers and warning devices will be used when appropriate. Gopher State Solar states that safety requirements to maintain flow of public traffic will be followed at all times and construction operations will be conducted to offer the least practical obstruction and inconvenience to public travel.[118]

Pipelines Gopher State Solar indicates that the project is designed to avoid impacts to the existing pipeline located in the northeast portion of the project. Gopher State Solar is in the process of determining the pipeline ROW width and location and is coordinating with the pipeline owner regarding crossing the ROW.[119] Gopher State Solar can also avoid impacts to the pipeline from underground cable trenching and installation by ensuring the cabling is at a depth that avoids disturbance to the existing pipeline ROW.

4.3.8 Socioeconomics

The ROI for socioeconomics is the region. The impact intensity level is anticipated to be minimal to significant and positive. Effects associated with construction will, overall, be short-term and minimal. Significant positive effects may occur for individuals. Impacts from operation will be long-term and significant. Adverse impacts are not anticipated.

Renville County is growing slower than Minnesota as a whole; between 2010 and 2020, the population in Renville County decreased by 5.4 percent, compared to a growth of 7.6 percent for the population of the State of Minnesota. From 2010 to 2020, the population of Bird Island Township decreased by 1.95 percent, the population of Kingman Township decreased by 14.4 percent, and the population of Osceola Township decreased by 18.4 percent. Renville County, Bird Island, Kingman, and Osceola Townships have a lower minority population than the state. Renville County has a lower median household income than the state, however, Bird Island, Kingman, and Osceola Townships have higher median household incomes compared to the state as a whole (**Table 11**).[120]

In 2022, the sectors with the largest employment in Renville County were production (12.6%) office & administrative support (10.9%), sales (8.5%), and healthcare support (8.4%). Renville County is part of the Minnesota Department of Economic Development Region 6E, which is located in the Central

[118] SPA, p. 44.
[119] SPA, pp. 43-44.
[120] U.S. Census Bureau, https://data.census.gov/ ; 2023, Minnesota State Demographic Center, Population Data, Our Estimates, https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/

Planning Region. Unemployment rates fluctuate with the economy, but the unemployment rate for Renville County has typically been higher than Minnesota's unemployment rate.[121] In 2023, Renville County had a slightly higher unemployment rate (3.7%) than the state average (2.7 %). The county also has a slowing labor force participation, with a 6.6% decline in the labor force between 2008 and 2023.[122]

Table 11. Population Characteristics

Area	Total Population				Population Characteristics***		
	2010 Census*	2020 Census*	% Change 2010 - 2020	2023 Estimate **	% Minority‡	Median Household Income ($)	% Below Poverty Level (125% of poverty level)
Minnesota	5,310,584	5,706,494	7.5	5,800,386	23.2	87,556	12.1
Renville County	15,565	14,723	-5.4	14,348	11.9	69,086	11.2
Bird Island Township	205	201	-1.95	--	0.5	128,750	11.4
Kingman Township	201	172	-14.4	--	0	94,583	5.0
Osceola Township	158	129	-18.4	--	2.5	88,750	6.3

* U.S. Census Bureau, https://data.census.gov/

** 2023, Minnesota State Demographic Center, Population Data, Our Estimates, https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/

*** 2023 American Community Survey 5-year estimates

‡ Minority population includes all persons who do not self-identify as white alone.

Potential Impacts

The impact intensity level is anticipated to be positive. Potential impacts associated with construction will be positive, but minimal and short-term. Significant positive effects might occur for individuals. Impacts from operation will be long-term, positive, and moderate. The project will not disrupt local communities or businesses and does not disproportionately impact low-income or minority

[121] Minnesota Department of Economic Employment and Development (DEED). *Economic Development Region Profile, Renville County 2023 Regional Profile*. (2022), https://mn.gov/deed/assets/012725_renville_tcm1045-407420.pdf.

[122] Id.

populations (see discussion of environmental justice in Section 4.3.9). Adverse impacts are not anticipated.

Construction of the project is likely to result in temporary increased expenditures for lodging, food and fuel, transportation, and general supplies at local businesses during construction. Construction of the project will create local job opportunities for various trade professionals, and will also generate and circulate income throughout the community by investing in local business expenditures as well as state and local taxes.

Gopher State Solar indicates that general skilled labor is expected to be available in Renville County of Minnesota to serve the basic project infrastructure and site developed needs. Hiring local labor can be beneficial for the area. Local workers are found to generate approximately three times more local economic activity through spending than a non-local worker at the individual level,[123, 124] and a largely local workforce can generate up to double the economic impact of a largely non-local workforce.[125]

The use of local workers who reside in Renville County could have significant positive impacts, not only through providing employment, but by developing employment opportunities, offering living wage jobs that attract young people and support families, and providing experience for the local labor force tailored to industry needs.[126] Employment in the renewable energy sector provides workers the opportunity to develop the required technical skills to work in the green economy,[127] which can increase opportunities for future employment. Minnesota is anticipated to continue to expand renewable energy development in the coming years,[128] and the state's investments in the development and incentivization of clean energy will enable future renewable projects.

Specialized labor will be required for certain aspects of the project, which may be necessary to import from other areas of Minnesota or neighboring states. Much of the workforce is expected to be comprised of Minnesota-licensed electricians, due to the work being considered electrical work under the Minnesota State Electrical Code.[129]

Gopher State Solar will issue an RFP to contractors for construction of the project, including preferences for contractor bids that use local, construction craft employees to the greatest extent

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[123] Franco, L. 2020 *A Transformative Investment: Maximizing the Socioeconomic Benefits of the Fargo-Moorhead Diversion Project.* Retrieved from: https://d3ciwvs59ifrt8.cloudfront.net/272d7204-1f87-45d8-a9dc-744c9333acc6/e6f95bb7-5559-4dd9-a0bd-21c636c5b778.pdf

[124] Franco, L. 2019. *Catching the Wind 3.0: The impact of local versus non-local hiring practices on wind farms in North Dakota.* Retrieved from: https://ndlegis.gov/assembly/67-2021/testimony/SNATRES-2301-20210204-5243-F-FRANCO_LUCAS_A.pdf

[125] Franco, L. 2020. *Maximizing The Benefits of Wind Energy Development Through Local Construction Hiring: The Northern Divide Wind Energy Project Case Study.*

[126] Comprehensive Plan Task Force. Renville County Comprehensive Plan. (2002/2010). https://www.renvillecountymn.gov/government/comprehensive-plan/

[127] Grima, S., Sood, K., Özen, E., & Dalli Gonzí, R.E. (Eds.). (2025). *Greening our economy for a sustainable future*, retrieved from: https://www.sciencedirect.com/book/9780443236037/greening-our-economy-for-a-sustainable-future

[128] 2024 Minnesota Energy Factsheet, retrieved from: https://www.cleanenergyeconomymn.org/wp-content/uploads/2024/04/2024-Minnesota-Energy-Factsheet.pdf

[129] SPA, p. 39.

feasible in accordance with project budget, timeline, industry standards and requirements, and corporate safety policies. Gopher State Solar will require the selected contractor to work with labor unions, local subcontractors, or other vendors to implement a project construction staffing model that attempts to maximize local hiring and local economic benefits for the project, while ensuring the project is built safely, on time, and within the budget.[130]

Once the project is operational, Gopher State Solar will pay property tax and production taxes on the land and energy production to local governments. Property taxes are calculated on the land underlying the facility. Because the land for the solar generating facility is used primarily for solar generation, the land is classified as Class 3a (commercial/industrial/public utility) which is taxed at a higher rate than land used primarily for homestead or agriculture. The value of the generation equipment is exempted from the property tax.[131]

Minnesota has adopted a production tax of $1.20/MWh paid 80 percent to counties and 20 percent to the cities and townships.[132] Gopher State Solar estimates that over the lifetime of the project, it will create an annual state and local benefit of approximately $35,000,000 in total, with approximately $4,879,289 in total benefit for the townships in which the project is located.[133]

Gopher State Solar anticipates that the operation and maintenance of the facility will require approximately three to five long-term personnel. The project anticipates that sufficient temporary lodging and permanent housing will be available within the project areas to accommodate construction laborers and long-term personnel. Indirect economic benefits will occur from additional local spending on lodging, goods and services and local sales tax.[134]

If the project is constructed, approximately 1,129 acres could be removed from agricultural production that are currently used to produce corn, and soybeans.[135] The removal of cultivated land is likely to result in an incremental decrease to agricultural-related businesses, such as farm dealerships, seed dealers, and dealers of agricultural inputs such as fertilizer and pesticides, in the area. The extent of any decrease in sales is difficult to determine, but the removal of approximately 0.2 percent of the approximately 624,114 acres of farmland in Renville County is unlikely to have a significant impact.[136] Adverse impacts associated with the loss of agricultural land and agricultural production will be mitigated through lease, easement, or purchase payments to landowners.

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[130] Id.

[131] Minnesota Statutes 272.02, subdivision 24; Minnesota House Research, *Property Tax 101: Property Tax Variation by Property Type*, July 2022, https://www.house.leg.state.mn.us/hrd/pubs/ss/ssptvart.pdf .

[132] *Minnesota Department of Revenue. 2021.* https://www.revenue.state.mn.us/solar-energy-production-tax#:~:text=The%20Solar%20Energy%20Production%20Tax%20rate%20is%20%241.20%20per%20megawatt,nameplate%20capacity%20exceeding%201%20megawatt

[133] SPA, p. 39.

[134] Id.

[135] SPA, 46.

[136] USDA, Census of Agriculture County Profile, Renville County Minnesota (2017). https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27129.pdf.

MITIGATION

Socioeconomic impacts are anticipated to be overall positive. Adverse socioeconomic impacts will be limited to the temporary loss of agricultural production on the land currently farmed; however, Gopher State Solar indicates that these temporary losses are offset by agreements and payment to landowners through leases and easements or purchase contracts.[137]

Several sections of the Draft Site Permit (DSP) address socioeconomic impacts, including employment:

- Section 4.5.3 of the DSP requires the permittee, as well as its construction contractors and subcontractors, to pay no less than the prevailing wage rate. No additional mitigation is proposed.
- Section 8.5 of the DSP requires quarterly reports concerning efforts to hire Minnesota workers. Consistent with Minn. Stat. 216E.03, subd. 10 (c).

4.3.9 Environmental Justice

The ROI for environmental justice analysis is the region. The project will not have disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations.

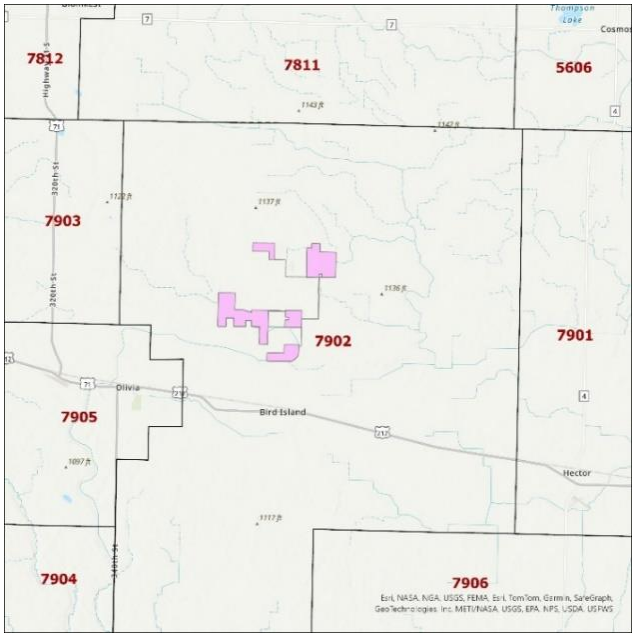
Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[138] The goal of this "fair treatment" is not to shift risks among populations, but to identify potential disproportionately high and adverse effects and identify alternatives that may mitigate these impacts.[139]

As defined by Minnesota Statute 216B.1691, subd. 1(e), "Environmental justice area" means an area in Minnesota that, based on the most recent data published by the United States Census Bureau, meets one or more of the following criteria:

(a) 40 percent or more of the area's total population is nonwhite;
(b) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;
(c) 40 percent or more of residents over the age of five have limited English proficiency; or
(d) the area is located within Indian country, as defined in United States Code, title 18, section 1151.

[137] SPA, pp. 40-41.
[138] US EPA Environmental Justice, https://www.epa.gov/environmentaljustice .
[139] US EPA, Guidance for Incorporating Environmental Justice Concern in EPA's NEPA Compliance Analyses (pdf),

Figure 12. Census Tracts in Project Area



To identify potential environmental justice concerns in the project area, the US EPA's EJ Screening Tool was used to consider the composition of the census tract in which the project is within, and to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations. At the time of the preparation of this EA, the EJ Screening Tool was available for public use. Currently, the tool may not be accessible.[140] **Figure 12** shows the census tract used to compare the project area with Renville County and Minnesota as a whole.

Low-income and minority populations are determined to be present in an area when the low-income or minority group percentage exceeds 50 percent or is "meaningfully greater" than in the general population. For this report, "meaningfully greater" is considered 10 percentage points or more than the general population. Recent U.S. Census Bureau data was used to identify low-income and minority populations in the project census tract. **Table 12** provides low-income and minority population data.

Table 12. Low-Income and Minority Population Characteristics

Area	% Below Poverty Level (125% of poverty level)	Median Household Income ($)	% Minority Population‡
Region of Comparison			
Minnesota	12.1	87,556	23.2
Renville County	11.2	69,086	11.9
Project Census Tract			
Census Tract 7902	10.4	85,972	4.1

Source: U.S. Census Bureau, 2023 American Community Survey 5-year Estimate

‡ Minority population includes all persons who do not self-identify as white alone.

Potential Impacts

Utility infrastructure can adversely impact low-income, minority or tribal populations. Based on the project area population and demographics data (**Table 11. Population Characteristics; Table 12. Low-**

[140] US EPA EJ Screen, https://www.epa.gov/ejscreen..

Income and Minority Population Characteristics), the project is not within an "Environmental Justice Area", as there are no environmental justice communities that meet the defined criteria within the area. Therefore, there are no anticipated environmental justice impacts or concerns for the project.

MITIGATION

The project will not create disproportionate or adverse impacts to low-income or minority populations because the percentage of low-income and minority residents in the project area is not meaningfully greater than Renville County or the state of Minnesota. Additional mitigation is not proposed.

4.4 Human Health and Safety

Construction and operation of a solar facility has the potential to impact human health and safety.

4.4.1 Electric and Magnetic Fields

The ROI for EMF is the area of land control. Impacts to human health from possible exposure to EMFs are not anticipated.

Electric and magnetic fields (EMFs) are invisible forces that result from the presence of electricity. They occur naturally and are caused by weather or the geomagnetic field. They are also caused by all electrical devices and found wherever people use electricity. EMFs are characterized and distinguished by their frequency, that is, the rate at which the field changes direction each second. Electrical lines in the United States have a frequency of 60 cycles per second or 60 hertz, which is extremely low frequency EMF ("ELF-EMF"). The strength of an electric field decreases rapidly as it travels from the conductor and is easily shielded or weakened by most objects and materials.

Voltage on a conductor creates an electric field that surrounds and extends from the wire. Using water moving through a pipe as an analogy, voltage is equivalent to the pressure of the water moving through the pipe. The strength of the electric field is measured in kilovolts per meter (kV/m). Electric fields decrease rapidly as they travel from the conductor and are easily shielded or weakened by most objects and materials.

Current moving through a conductor creates a magnetic field that surrounds and extends from the wire. Using the same analogy, current is equivalent to the amount of water moving through the pipe. The strength of a magnetic field is measured in milliGauss (mG). Like electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases; however, unlike electric fields, magnetic fields are not easily shielded or weakened.

Table 13. Electric and Magnetic Field Strength of Common Household Objects provides examples of electric and magnetic fields associated with common household items. "The strongest electric fields that are ordinarily encountered in the environment exist beneath high voltage transmission lines. In contrast, the strongest magnetic fields are normally found very close to motors and other electrical appliances, as well as in specialized equipment such as magnetic resonance scanners used for medical imaging."[141]

[141] World Health Organization. *Radiation: Electromagnetic Fields, What are typical exposure levels at home and in the environment?* (2016). https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields

Table 13. Electric and Magnetic Field Strength of Common Household Objects[142]

Electric Field*		Magnetic Field**			
Appliance	kV/m	Appliance	mG		
	1 foot		1 inch	1 foot	3 feet
Stereo	0.18	Circular saw	2,100 to 10,000	9 to 210	0.2 to 10
Iron	0.12	Drill	4,000 to 8,000	22 to 31	0.8 to 2
Refrigerator	0.12	Microwave	750 to 2,000	40 to 80	3 to 8
Mixer	0.10	Blender	200 to 1,200	5.2 to 17	0.3 to 1.1
Toaster	0.08	Toaster	70 to 150	0.6 to 7	< 0.1 to 0.11
Hair Dryer	0.08	Hair dryer	60 to 200	< 0.1 to 1.5	< 0.1
Television	0.06	Television	25 to 500	0.4 to 20	< 0.1 to 1.5
Vacuum	0.05	Coffee maker	15 to 250	0.9 to 1.2	< 0.1

* German Federal Office for Radiation Safety
** Long Island Power Institute

Health Studies In the late-1970s, epidemiological studies indicated a weak association between childhood leukemia and ELF-EMF levels. "Epidemiologists observe and compare groups of people who have had or have not had certain diseases and exposures to see if the risk of disease is different between the exposed and unexposed groups but does not control the exposure and cannot experimentally control all the factors that might affect the risk of disease."[143]

Ever since, researchers have examined possible links between ELF-EMF exposure and health effects through epidemiological, animal, clinical, and cellular studies. To date, "no mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified. Unlike high-energy (ionizing) radiation, EMFs in the non-ionizing part of the electromagnetic spectrum cannot damage DNA or cells directly," that is, the ELF-EMF that is emitted from HVTLs does not have the energy to ionize molecules or to heat them.[144] Nevertheless, they are fields of energy and thus have the potential to produce effects.

> "The few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer."[145]

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[142] Id.

[143] National Institute of Environmental Health Sciences. *EMF: Electric and Magnetic Fields Associated with the Use of Electric Power.* (2002). https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf

[144] National Cancer Institute. *Magnetic Field Exposure and Cancer*. (2016). http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet.

[145] National Institute of Environmental Health Sciences. *Electric and Magnetic Fields*, (2018). http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm.

> "Overall there is no evidence that exposure to ELF magnetic fields alone causes tumors. The evidence that ELF magnetic field exposure can enhance tumor development in combination with carcinogens is inadequate."[146]

> "A number of scientific panels convened by national and international health agencies and the U.S. Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe."[147]

The Minnesota State Interagency Working Group on EMF Issues, comprised of staff from state agencies, boards, and Commission, was tasked to study issues related to EMF. In 2002, the group published *A White Paper on Electric and Magnetic Field Policy and Mitigation Options*, and concluded the following:

> "Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF…. However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship…, nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.
>
> The Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk cannot be dismissed.[148]"

Regulations and Guidelines Currently, there are no federal regulations regarding allowable ELF-EMF produced by power lines in the United States; however, state governments have developed state-specific regulations. For example, Florida limits electric fields to 2.0 kV/m and magnetic fields to 150 mG at the edge of the ROW for 161 kV transmission lines.[149] Additionally, international organizations have adopted standards for exposure to electric and magnetic fields (**Table 14**).

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[146] World Health Organization. *Extremely Low Frequency Fields*. (2007). http://www.who.int/peh-emf/publications/Complet_DEC_2007.pdf?ua=1, page 10.

[147] State of Minnesota, State Interagency Working Group on EMF Issues (2002) *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*, https://apps.commerce.state.mn.us/eera/web/project-file?legacyPath=/opt/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf: page 1.

[148] Id., page 36.

[149] Florida Department of State. *Rule 62-814.450 Electric and Magnetic Field Standards*. (2008). https://www.flrules.org/gateway/ruleNo.asp?id=62-814.450.

Table 14. International Electric and Magnetic Field Guidelines

Organization	Electric Field (kV/m)		Magnetic Field (mG)	
	Public	Occupational	Public	Occupational
Institute of Electrical and Electronics Engineers	5.0	20.0	9,040	27,100
International Commission on Non-Ionizing Radiation Protection	4.2	8.3	2,000	4,200
American Conference of Industrial Hygienists	—	25.0	—	10,000/ 1,000[a]
National Radiological Protection Board	4.2	—	830	4,200

[a] For persons with cardiac pacemakers or other medical electronic devices

POTENTIAL IMPACTS

Potential impacts are anticipated to be negligible and are not expected to negatively affect human health. Impacts will be long-term and localized but can be minimized. The primary sources of EMF from the generating facility will be from the solar arrays, buried electrical collection lines, and the transformers installed at each inverter. The EMF generated by solar arrays is at the level generally experienced near common household appliances. Measured magnetic fields at utility-scale PV projects drop to very low levels of 0.5 mG or less at distances of 150 feet from inverters.[150] For electrical collection lines, a study found that at 27.5 kV that magnetic fields are within background levels at 1 meter above ground.[151]

MITIGATION

No health impacts from EMF are anticipated. EMF diminishes with distance from a conductor or inverter. The nearest solar array is located approximately 566 feet from the nearest residence, the nearest inverter is located approximately 600 feet from the nearest residence and the nearest 34.5 kV collector line is approximately 600 feet from the nearest residence. At this distance both electric and magnetic fields will dissipate to background levels. No additional mitigation is proposed.

4.4.2 Public Safety and Emergency Services

The ROI for public and work safety is the land control area. Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. There is land previously impacted by an MDA chemical incident within the project area; however, it is not anticipated that hazardous materials will be encountered. If hazardous materials are encountered, potential impacts are anticipated to be minimal and can be mitigated.

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[150] George Flowers and Tommy Cleveland, *Health and Safety Impacts of Solar Photovoltaics*, (2017). North Carolina Clean Energy Technology Center https://content.ces.ncsu.edu/health-and-safety-impacts-of-solar-photovoltaics , at p. 13

[151] McCallum L.C., Whitefield Aslund M.L., Knopper L.D., Ferguson G.M., & Ollson C.A. (2014). *Measuring electromagnetic fields (EMF) around wind turbines in Canada: is there a human health concern?* DOI: 10.1186/1476-069X-13-9

Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Construction might disturb existing environmental hazards on-site, for example, contaminated soils. During operation, there are occupational risks similar to those associated with construction. Other potential health and safety concerns include hazardous materials, electric shock and arc flash, and fire safety. Public risks would result from unauthorized entry into the facility.

Construction crews must comply with local, state, and federal regulations when installing the project. This includes standard construction-related health and safety practices. This generally includes safety orientation and training, as well as daily/weekly safety meetings.

Emergency services in the project area are provided by local law enforcement and emergency response agencies in nearby communities. Law enforcement in the project area is provided by the Renville County Sheriff. Fire service is provided by the Olivia and Bird Island volunteer fire departments. Ambulance response is provided by the Olivia and Bird Island emergency medical services. All emergency services are within 4 miles of the project area.[152]

Gopher State Solar completed a Phase I Environmental Site Assessment (Phase I ESA) for the project area. The survey identified one listed Minnesota Department of Agriculture (MDA) Agricultural Chemical Incident in the project area. As identified in the Phase I ESA, the MDA Agricultural Chemical Incident was a 2018 spill of approximately 200 gallons of liquid fertilizer into a ditch located in the northwest intersection of County Road 11 (860th Ave) and County Road 57 (405th Street). As part of the MDA-approved remediation action, impacted soil was excavated and field applied outside of the project area, for fertilizer use. The excavation area within the project area was then backfilled with clean soil. The status of the incident is closed in MDA's regulatory database.[153] Within one mile of the project area, a Minnesota Pollution Control Agency (MPCA) Unpermitted Landfill, MPCA Site Assessment, MPCA Agency Interest, and multiple MPCA Animal Feedlots are listed. Gopher State Solar indicates that other recorded release areas within one mile with a potential hydrological connection to the project area were evaluated during the Phase I ESA, and do not have the potential to impact soil or groundwater in the project area.[154]

Potential Impacts

Worker safety issues are primarily associated with construction. Public safety concerns would be most associated with unauthorized entry to the project.

The inflow of temporary construction personnel could increase demand for emergency and public health services. On the job injuries of construction workers requiring assistance due to slips, trips or falls, equipment use, or electrocution can create a demand for emergency, public health, or safety services that would not exist if the project were not to be built. Although no road closures are anticipated during construction, any temporary closures could impede police, fire, and other rescue vehicles access to the site of an emergency.

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[152] SPA, pp. 24-25.
[153] Id.
[154] Id.

During public scoping meetings, potential fire risk was brought up. Like any electrical system, solar panels do represent a potential fire risk. Research on fire risk in PV systems indicates that electrical arcing is a main cause of fires, arising due to the use of faulty products, installation errors, or irregular maintenance failing to identify issues with system components.[155] Research investigating the causes of fire in PV systems has mainly focused on rooftop installations; considering that ground-mounted PV systems contain similar electrical components as rooftop systems, they likely experience similar fire causes as well.

The preliminary development area will contain native vegetation, which could increase the fire hazard if improperly managed. The Olivia and Bird Island volunteer fire departments. would be the initial responder to fires on site, and a small-town fire department may lack experience managing fires in large-scale electrical utilities. Law enforcement, fire services, and ambulances may need to enter the site in an emergency. If site access or maneuverability is hindered, this may delay their response time. The applicant can work with local emergency services, including fire departments, to ensure proper training and preparation for fire risk.

The project area is also on land that has environmental records documenting an agricultural incident of spilled fertilizer. However, this incident has been remediated and is considered closed by MDA, so it is unlikely that the presence of hazardous materials remains, and impacts from encountering remaining hazardous materials are not anticipated. Other documented release areas within one mile of the project area were evaluated and do not have the potential to impact soils or groundwater in the area.[156]

Risks of site contamination from solar construction are minimal because PV technologies employ few toxic chemicals used in very small quantities. The generation of emission-free electricity can reduce harmful particulate matter including sulfur dioxide and nitrogen oxides. Due to the reduction in pollution and greenhouse gas emissions from the decrease of fossil fuels and the increase in solar energy production, the overall impact of solar development on human health can be viewed as positive.[157]

However, the entire life cycle of the PV systems must be taken into account. In Minnesota, unless solar panels discarded by commercial entities are specifically evaluated as non-hazardous, the panels are assumed to be hazardous waste due to the probable presence of heavy metals. Heavy metals in solar panels can include arsenic, cadmium, lead, and selenium. If hazardous waste, they must be properly disposed of in a special facility or recycled if recyclers are available.[158]

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[155] Ong, N., Sadiq, M., Said, M., Jomaas, G., Tohir, M., & Kristensen, J. (2022). *Fault tree analysis of fires on rooftops with photovoltaic systems.* DOI: https://doi.org/10.1016/j.jobe.2021.103752

[156] SPA, pp. 24-25.

[157] SPA, p. 25.

[158] MPCA, *2017 Toxics and Pollution Prevention Evaluation Report*, p. 22- 23 https://www.lrl.mn.gov/docs/2018/mandated/180453.pdf

MITIGATION

The project will be designed and constructed in compliance with applicable electric codes. Electrical inspections will ensure proper installation of all components, and the project will undergo routine inspection. Electrical work will be completed by trained technicians.[159]

Precise PV system installation can reduce fire risk resulting from inaccurate construction methods, and proactive maintenance and monitoring of electrical equipment can identify risky system components before a fire occurs. Additionally, site vegetation will be controlled via mowing and/or grazing, preventing the accumulation of biomass and reducing fire hazard. The use of rotating PV arrays alongside vegetation removal techniques such as grazing can reduce fire hazards.[160] Gopher State Solar indicated that it will work with local emergency responders and other government officials to provide training and to establish points of contact and emergency response plans.[161]

Construction is bound by federal and state Occupational Safety and Health Administration (OSHA) requirements for worker safety, and must comply with local, state, and federal regulations regarding installation of the facilities and qualifications of workers. Established industry safety procedures will be followed during and after construction of the project. Gopher State Solar indicates that the project will be fenced and locked to prevent unauthorized access, and signs will be posted to warn unauthorized persons not to enter fenced area due to the presence of electrical equipment.

In the case that soils are encountered that contain historic residual hazardous materials from the documented agriculture incident, a Contaminated Sites Management Plan (CSMP) can be followed. A CSMP plan includes identification, notification and documentation of the contamination, management of the contaminated materials (e.g., soil, water) through proper removal and disposal with continuous testing and monitoring of the area, and reporting to the MPCA for any observations and management activity that took place within the contaminated area.

Public safety is addressed in several sections of the DSP (**Appendix C**):

- Section 4.3.30 requires the permittee to take several public safety measures, including landowner educational materials, appropriate signs and gates, etc.
- Section 5.6 is a special condition requiring the permittee to work with and train with local emergency response teams that may have to enter the project to ensure teams are aware of access points and can perform their duties safely.
- Section 8.12 requires permittees file an *Emergency Response Plan* with the Commission and local first responders prior to operation.
- Section 8.13 requires disclosure of extraordinary events, such as fires, etc.

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[159] SPA, p. 39.

[160] Vaverková, M., Winkler, J., Uldrijan, D., Ogrodnik, P., Vespalcová, T., Aleksiejuk-Gawron, J., Adamcová, D., & Koda, E. July 2022. *Fire hazard associated with different types of photovoltaic power plants; Effect of vegetation management.* DOI: https://doi.org/10.1016/j.rser.2022.112491

[161] Appendix A – Scoping Decision.

- Section 9.1 requires a decommissioning plan prior to construction and updated every five years. Periodic updates of the plan will address the developing information on end-of-life options for PV panels.

No additional mitigation is proposed.

4.5 Land-based Economies

Solar facilities impact land-based economies by precluding or limiting land use for other purposes.

4.5.1 Agriculture

The ROI for agriculture is the land control area. Potential impacts to agricultural producers are anticipated to be minimal to moderate — lost farming revenues will be offset by lease or easement agreements. A loss of farmland in Renville County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

Agricultural use dominates the area of land control, with approximately 96 percent of the project area used for cultivated row crops (corn, soybeans, and sugar beets are the dominant crops).

In 2017, there were approximately 624,114 acres of farmland in Renville County, comprising approximately 98.8 percent of all land in the county. There are a total of 1,026 individual farms located in Renville County, with an average farm size of 608 acres. Cropland, which includes grains, beans, and vegetables, make up approximately 96 percent of the farmland, with woodland and other farmland use making up the remaining 4 percent. The market value of agricultural production in Renville County in 2017 was an average of $593,752 per farm, for a total of approximately $609 million.[162]

Prime farmland is defined by Federal regulation at 7 C.F.R.657.5(a)(1) as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses.” Approximately 98 percent of the project development area is designated as prime farmland (1,107 acres), made up of 26 percent prime farmland (299 acres), 69 percent prime farmland if drained (787 acres), 2 percent prime farmland if protected from flooding or not frequently flooded during the growing season (21 acres), and 2 percent farmland of statewide importance (28 acres). With respect to potential impacts to prime farmland, the applicant indicates that no feasible or prudent alternatives to the project exist.[163]

Potential Impacts

The impact intensity level will range from minimal to moderate. The intensity of the impact is likely to be subjective. For example, conversion of farmland to solar energy production can be viewed as a conversion from one type of industrial use to another. Conversely, the conversion of farmland to solar energy production can be viewed as a negative impact to agricultural production. Restoring the site with native grasses and forbs will reduce soil erosion, provide pollinator and wildlife benefits, and

[162] USDA, Census of Agriculture County Profile, Renville County Minnesota (2017). https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27129.pdf.

[163] SPA - Appendix B: Prime farmland Assessment

improve soil health. This EA acknowledges that the perceived impacts to farmland are subjective and may be difficult to assess given the trade-offs associated with utility scale solar projects.

Rural areas, with large parcels of relatively flat, open land, are ideal for solar development, which requires six to eight acres of land to generate one MW of electricity. The project will result in up to 1,129 acres of farmland, with 1,107 acres of that being prime farmland, removed from agricultural production for the life of the project. This change in land use would take productive farmland out of production for the life of the project, representing approximately 0.2 percent of existing agricultural land in Renville County. The applicant indicates that the land could be returned to pre-construction conditions and uses after the project is decommissioned and the site is restored.

Construction of the project has the potential to damage agricultural soils through compaction or erosion if BMPs are not implemented to minimize damage.

MITIGATION

Several sections of the DSP (**Appendix C**) address agricultural mitigation and soil-related impacts:

- Section 4.3.9 requires protection and segregation of topsoil.
- Section 4.3.10 requires measures to minimize soil compaction.
- Section 4.3.11 requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls to ensure that stormwater does not become a problem on or off-site.
- Section 4.3.16 requires the permittee to implement "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".
- 4.3.17 requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates and timing of revegetation will stabilize soils and improve overall soil health. Gopher State Solar has included a draft VMP as Appendix E of its site permit application.
- Section 4.3.18 requires the permittee to develop an AIMP with MDA. Gopher State Solar's draft AIMP (Appendix D of its site permit application) details methods to minimize soil compaction, preserve topsoil, control noxious weeds and invasive species, maintain the existing drainage conditions through appropriate maintenance and repair of existing drain tile, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use.
- Section 4.3.20 requires the permittee to develop an Invasive Species Management Plan to prevent introduction and spread of invasive species during construction of the project.
- Section 4.3.21 requires the permittee to take reasonable precautions against the spread of noxious weeds.
- Section 4.3.29 requires the permittee to fairly restore or compensate landowners for damages to crops, fences, drain tile, etc. during construction.

Gopher State Solar indicates that best management practices (BMPs) would be implemented during construction in order to minimize and mitigate long-term impacts to agricultural lands, including: [164]

- Separating the topsoil from the other subgrade/subsoil materials during earthmoving, excavation, or trenching,
- Temporarily halting construction if weather conditions could cause adverse impacts to soil, pose a risk to worker safety, or heavy equipment would cause significant soil compaction or rutting,
- Remaining flexible and implementing new practices and procedures to ensure the quality of the project land while maintaining safety of the workers,
- Stripping topsoil to store on site and spreading new loosely compacted and/or "tracked" topsoil to employ wind and stormwater erosion prevention BMPs,
- When performing foundation work, stripping and storing topsoil for later use. Once construction is complete, topsoil piles will be distributed in a thin layer adjacent to the structure (i.e., substation, inverter, etc.) and the topsoil revegetated with an approporiate seed mix
- Silt fencing or other similar VMP to use on the downside of all hills, near waterways, and near tile inlets to minimize erosion
- Committing to preserve soil drainage performance on neighboring, nonparticipating properties and restoring drain tile systems on participating properties as needed during operation, or upon decommissioning if tiles are not deemed necessary during solar operations,
- Removal of construction-related debris and unused material by the applicant and the contractor.

Following construction, Gopher State Solar indicates that disturbed areas would be repaired and restored to pre-construction conditions as much as practicable, and reseeded as outlined in the Vegetation Management Plan (VMP).[165]

4.5.2 Tourism

The ROI for tourism is the project area. Impact intensity is expected to be minimal, and short-term in duration. There may be potential for impacts to local recreational activities during construction, however, impacts will be temporary.

Tourism in the local area is primarily limited to outdoor recreational activities, including snowmobile trails, parks, and a shooting range.

POTENTIAL IMPACTS

Impacts to tourism and recreation are anticipated to be minimal. Tourism attractions located within one mile of the project area include the Renville County Drift Runner trail and the Renville Rangers Shooting Club Range. Short-term impacts to outdoor recreational activities could occur during

[164] SPA, pp. 48-49.
[165] SPA, p. 48

construction due to noise and traffic increases, however, these impacts will be temporary and short-term in duration. Access to the snowmobile trail will remain open throughout the operation of the project.[166]

Mitigation

Because significant impacts are not anticipated, no additional mitigation measures are proposed. If project construction occurs during snow cover, Gopher State Solar will coordinate with Renville County Drift Runners to minimize or avoid impacts to trail use. Similarly, Gopher State Solar will communicate with the operator of the shooting range along with other landowners near the project area.

4.6 Archeological, Cultural, and Historic Resources

The ROI for archeological and historic resources is the project area. The impact intensity level is anticipated to be negligible to minimal. Impacts would be localized. Impacts can be mitigated through prudent siting.

Archeological resources include mounds and earthworks, ancient burial grounds, prehistoric ruins, or historical remains.[167] Historic resources are sites, buildings, structures, or other antiquities of state or national significance.[168]

Gopher State Solar conducted a desktop investigation and literature review using information from the Minnesota State Historic Preservation Office (SHPO) and the Minnesota Office of the State Archeologist (OSA). The review queried the area within one mile of the project area. The sources of the SHPO and OSA datasets include previous professional cultural resources surveys and otherwise reported archaeological sites and historic structures. These datasets can include, but are not limited to, Native American mounds and earthworks, prehistoric burial grounds and habitation sites, remains of Euro-American farmsteads, logging camps or other industrial land use, and standing buildings, bridges, or other features of the built environment.[169] In addition, Gopher State Solar also sponsored an archeological survey for portions of the project area assessed as having greater probability to contain significant archeological sites.

Construction and operation of the project has the potential to impact resources that are important to American Indian Tribes with ties to the region. Siting of large energy facilities in a manner that respects historic and cultural ties to the land requires coordination with tribes.

Potential Impacts

Gopher State Solar conducted a desktop investigation and literature review using information from the Minnesota State Historic Preservation Office (SHPO) and the Minnesota Office of the State Archeologist (OSA). The review queried the area within one mile of the project area. As a result of this

[166] SPA, p. 50.
[167] Minnesota Statutes, Section. 138.31, subd. 14.
[168] Minnesota. Statutes, Section 138.51.
[169] SPA, pp. 50-51.

survey, no previously recorded archaeological sites or recorded historic structures were identified in the project area or within one mile of the project area.[170]

Gopher State Solar also sponsored an archeological survey of portions of the project area assessed as having a greater probability of containing significant archaeological sites, with separate surveys occurring in May and November 2023. Surveyed areas include portions of the project that are within the following:

- Within 500 feet of an existing or former water source of 40 acres or greater in extent, or within 500 feet of a former or existing perennial stream;
- Located on a topographically prominent landscape features;
- Located within 300 feet of a previously reported site; or
- Located within 300 feet of a former or existing historic structure or feature

Areas assessed as low potential for containing archeological resources included inundated areas, former or existing wetland areas, poorly drained areas, and areas with a 20 percent or greater slope. Low potential areas in addition to areas in which Holocene (less than 10,000 years old) deposits have been significantly disturbed were excluded from the intensive field survey. A total of 1,088 acres (62 percent) of the total 1,769 acres within the study area were surveyed, and no archeological resources were identified during the field surveys.[171]

MITIGATION

Prudent siting to avoid impacts to archaeological and historic resources is the preferred mitigation.

- Section 4.3.23 of the DSP (**Appendix C**) address archeological resources and require the permittee to avoid impacts to archaeological and historic resources where possible and to mitigate impacts where avoidance is not possible. If previously unidentified archaeological sites are found during construction, the permit requires the permittee to stop construction and contact SHPO to determine how best to proceed. Ground disturbing activity will stop, and local law enforcement will be notified should human remains be discovered.

Additionally, Gopher State Solar indicated that an Unanticipated Discoveries Plan will be prepared for reference during construction, and should an NRHP-eligible site be encountered, the applicant will coordinate with SHPO and OSA to avoid, minimize, or mitigate adverse effects. Efforts may include, but not limited to, project design changes (avoidance), engineering or construction controls (minimization) or data recovery excavation (mitigation). In the event that archaeological materials and/or human remains are identified during construction, activities will cease in the immediate area, and a professional archaeologist will be contacted to investigate the find. In the event of a confirmed archaeological site, steps will be taken to record and evaluate the site in consultation with SHPO and the OSA. Consultation among these parties will determine any procedures for avoidance, minimization, or mitigation if a site is determined as eligible for inclusion on the NRHP. Should human remains be identified, the applicant indicates the

[170] SPA, pp. 50-51.
[171] Id. ; SPA - Appendix H: Phase 1 Cultural Resource Inventory.

procedures as outlined in United States Code, Title 25, Section 3001 "Native American Graves and Repatriation Act" and Minnesota Statute Ch. 307, "Private Cemeteries" will be followed in coordination with the OSA and Minnesota Indian Affairs Council.[172]

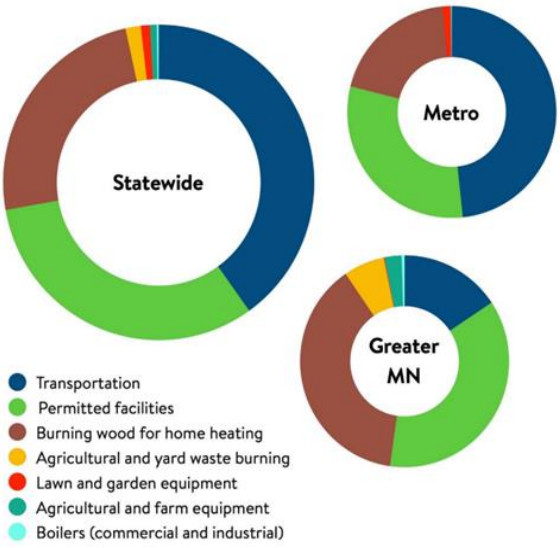
4.7 Natural Resources

Solar facilities can impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, maintained, and decommissioned. Other factors, for example, the environmental setting, influence potential impacts. Impacts can and do vary significantly both within, and across, projects.

4.7.1 Air Quality

The ROI for air quality and climate change is the region. Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts can be mitigated. Once operational, the solar array will not generate criteria pollutants or carbon dioxide. Negligible fugitive dust and exhaust emissions would occur as part of routine maintenance activities. Impacts are unavoidable and do not affect a unique resource. Impacts can be minimized.

Figure 13. Air Pollution Sources by Type



Air quality is a measure of how pollution-free the ambient air is and how healthy it is for humans, other animals, and plants. Emissions of air pollutants will occur during construction and operation of the project. Overall air quality in Minnesota has improved over the last 20 years, but current levels of air pollution still contribute to health impacts. As illustrated in **Figure 13,** today, most of our air pollution comes from smaller, widespread sources such as our vehicles, local businesses, heating and cooling, and yard and recreational equipment.[173]

In Minnesota, air quality is tracked using air quality monitoring stations at 59 sites across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI) on an hourly basis, for ozone (O3), particulate matter (PM10/PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). The AQI is used to categorize the air quality of a region as one of five levels: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy.[174]

The nearest air quality monitor to the project is in Marshall, Minnesota, approximately 50 miles southwest of the project area. Air quality in the area has been considered "good" between 289 and

[172] SPA, pp. 52-53.
[173] MPCA *The State of Minnesota's Air Quality, January 2023 Report to the Legislature*, https://www.lrl.mn.gov/docs/2022/mandated/221697.pdf
[174] 2025 Air Monitoring Network Plan for Minnesota. https://www.pca.state.mn.us/sites/default/files/aq10-24a.pdf

329 days of the year from 2017-2021. During the same time period, the number of days classified as moderate varied between 31 and 65. Air quality was considered unhealthy for sensitive groups for three days in 2021. Air quality was classified as unhealthy for two days in 2021. There were no days recorded as very unhealthy during this time period. [175] The increase in the number of days of moderate or worse air quality in 2021 was statewide and largely attributable to drought conditions and wildfire smoke in the upper Midwest. [176]

Potential Impacts

Minimal intermittent air emissions are expected during construction of the project. Air emissions associated with construction are highly dependent upon weather conditions and the specific activity occurring. For example, traveling to a construction site on a dry gravel road will result in more fugitive dust than traveling the same road when wet. Once operational, the generating facility is not expected to generate criteria pollutants or carbon dioxide.

Air emissions from project construction activities would primarily consist of carbon dioxide (CO2), nitrogen oxides (NOx) and other particulate matter. Motorized equipment will emit exhaust. This includes construction equipment and vehicles travelling to and from the project. Exhaust emissions, primarily from diesel equipment, would vary according to the phase of construction.

All projects that involve movement of soil, or exposure of erodible surfaces, generate some type of fugitive dust emissions. The project will generate fugitive dust from travel on unpaved roads, grading, and excavation. Dust emissions would be greater during dry periods and in areas where fine-textured sols are subject to surface activity.

Emissions associated with maintenance are dependent upon weather conditions and the specific activity occurring. Vehicle exhaust will be emitted during maintenance visits to the generating facility. The applicant indicates that, over the life of the project, fugitive dust emissions will be reduced by the elimination of farming and establishment of perennial native plantings and other vegetative cover.[177]

Mitigation

Exhaust emissions can be minimized by keeping vehicles and equipment in good working order, and not running equipment unless necessary. Gopher State Solar states that, when necessary, dust from construction traffic will be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speeds.

Gopher State Solar indicates that because soils are the project site are not susceptible to wind erosion, which may create dust, construction-specific mitigation measures and BMPs related to dust control have not been proposed. If wind erosion becomes an issue during construction, standard industry

[175] MPCA. *Annual AQI Days by Reporting Region*, https://public.tableau.com/app/profile/mpca.data.services/viz/MinnesotaAirQualityIndex_0/AQIExternal
[176] MPCA. The Air We Breathe: The State of Minnesota's Air Quality in 2021, 2023, https://www.lrl.mn.gov/docs/2022/mandated/221697.pdf p. 4,
[177] SPA, p. 53.

practices may be implemented, including mulching exposed soils, wetting exposed soils, maintaining vegetable cover (both cover crops and permanent vegetation), and reducing vehicle speeds.[178]

Construction of the Gopher State Solar Project will disturb more than 50 acres of soil. As a result, Gopher State will prepare and submit a National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Construction Stormwater (CSW) Permit application and Storm Water Pollution Prevention Plan (SWPPP) to MPCA for review and approval prior to construction in order to obtain coverage under the General Construction Stormwater Permit Program. Implementing this plan prior to construction can minimize the potential for fugitive dust emissions.

The AIMP identifies construction best management practices related to soils and vegetation that will help to will take to avoid, minimize, mitigate, and/or repair potential negative agricultural impacts that may result from the construction, operation, and eventual decommissioning of the Gopher State Solar Project. Several sections of the draft plan indirectly mitigate impacts to air quality, including sections related to construction and vegetation removal, soils, erosion and sediment control, and restoration of the site to pre-construction conditions.[179]

4.7.2 Geology and Groundwater

The ROI for geology and groundwater is the land control area. Impacts to domestic water supplies are not expected. Impacts to geology are not anticipated. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long-term. Indirect impacts from surface waters might occur during construction. Impacts can be mitigated through use of BMPs for stormwater management.

The geology of a project area can influence the anticipated impacts of construction and operation. Surficial geology features within Renville County are derived from glacial origin as a result of the Des Moines lobe during the last glaciation approximately 10,000 years ago. Surface deposits within the project area consist of Pleistocene-aged sand, gravel, silt, clay, cobbles, and boulders, resulting from till and outwashes associated with glacial activity in the region.[180]

Groundwater in Minnesota is largely a function of local geologic conditions that determine the type and properties of aquifers. Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The project site is within the Province 5, the Western Province, and is characterized by moderate surficial sands and limited buried sands. Province 5 is underlain by fractured bedrock buried deeply beneath glacial sediment, and is of limited use as an aquifer. In this province, sediment is relatively fine grained with higher amounts of clay and silt, and aquifers are less common.[181]

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[178] Id.
[179] SPA - Appendix D: AIMP.
[180] SPA, p. 55.; DNR, Plate B: Surficial Geology, Renville County, Minnesota. (2003). https://files.dnr.state.mn.us/lands_minerals/re_plateB.pdf
[181] DNR, Minnesota Groundwater Provinces (2021) https://www.dnr.state.mn.us/waters/groundwater_section/mapping/provinces.html

Pollution sensitivity of near-surface materials in the project area ranges from the "very low" to "moderate" and "high" categories in certain areas.[182] The sensitivity to pollution of near-surface materials is an estimate of the time it takes for water to travel through the unsaturated zone to reach the water table, which for the purposes of the model was assumed to be 10 feet below the land surface.[183] This means that the project area is generally expected to have varying groundwater pollution sensitivity. Low sensitivity indicates that contaminants from the land surface would not reach groundwater for months to a year, whereas high sensitivity indicates that contaminants could travel within hours to a week.[184] Low sensitivity does not guarantee protection. Leakage from an unsealed well, for example, may bypass the natural protection, allowing contamination to directly enter an aquifer.

Depth to bedrock beneath the project is estimated to be greater than 200 ft. Bedrock is overlaid by glacial deposits, and the depth to bedrock generally decreases to the south near the Minnesota River. Karst features such as sinkholes, springs, and stream sinks are not known to be present in the project area. The nearest karst feature is a stream sink, located approximately 18 miles southwest of the project area.[185] Depth to water table in the project area ranges from just below the surface to more than 20 feet depending on the soil type.[186] Depth to water table is shallower in the mapped hydric soils and areas delineated as wetland, and deeper in the non-hydric soil units. The project is located within an area heavily used for agricultural purposes, where subsurface drainage is common to manage soil moisture. Subsurface drainage systems can alter the depth to groundwater.[187]

The project area was reviewed for EPA designated sole source aquifers, wells listed on the Minnesota Well Index (MWI) and MDH Wellhead Protection Areas (WHPAs).[188] The MDH maintains the Minnesota Well Index (MWI), which provides basic information (e.g., location, depth, geology, construction, and static water level) for wells and borings drilled in Minnesota. The MWI does not identify any documented wells within the project area, however, within one mile of the project area there are 36 domestic wells documented as of 2022.[189]

Under the Safe Drinking Water Act, each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well. Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the

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[182] DNR, Pollution Sensitivity – Near Surface Materials (Minnesota Natural Resource Atlas), retrived from https://mnatlas.org/gis-tool/.
[183] Adams, R. (June 2016) Pollution Sensitivity of Near-Surface Materials, retrieved from: https://www.leg.state.mn.us/docs/2017/other/170839.pdf , page 3.
[184] DNR, Methods to Estimate Near-Surface Pollution Sensitivity, retrieved from: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/gw/gw03_ps-ns.pdf .
[185] SPA. p. 55.
[186] USDA Web Soil Survey, retrieved from: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx; DNR Water Table – Depth (Minnesota Natural Resource Atlas), retrived from https://mnatlas.org/gis-tool/.
[187] SPA, p. 56.
[188] SPA, p. 77.
[189] MDH (n.d.) *Minnesota Well Index* https://www.health.state.mn.us/communities/environment/water/mwi/index.html .

Wellhead Protection program. WHPAs for public and community water-supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by MDH (2023b). A search for WHPAs in the MDH database indicated that the project area is located entirely outside of any WHPA. The nearest WHPA is the 320.52-acre Bird Island WHPA, surrounded by the 892.59-acre Bird Island DWSMA, located approximately 1.25 miles southwest of the project area. The City of Bird Island's DWSMA is ranked as low vulnerability, due to at least 10 feet or more of clay-rich geological material that covers the source aquifer.[190]

POTENTIAL IMPACTS

Potential impacts to geology and groundwater can occur directly or indirectly. Impacts to geological resources are likely to be minimal, due to the anticipated depth of construction being relatively shallow, and the absence of karst features. Gopher State Solar will complete a geotechnical study closer to the construction date to further inform the project design, engineering, and construction techniques.[191]

Direct impacts to groundwater are generally associated with construction, for example, structure foundations that could penetrate shallow water tables or groundwater usage. Indirect impacts could occur through spills or leaks of petroleum fluids or other contaminants that contaminate surface waters, which could ultimately contaminate groundwater. The disturbance of soil and vegetative cover could affect water quality in groundwater resources. Impacts to groundwater resources, including aquifers, are not anticipated as water supply needs will be limited and aquifers are not common in the area.

Construction of the project will not require subsurface blasting, and newly fractured bedrock causing groundwater flow is not anticipated. There are no active wells within the project area, and no Wellhead Protection Areas (WHPAs) or Drinking Water Supply Management Areas (DWSMAs). The nearest DWSMA is the 892.59-acre Bird Island DWSMA surrounding the 320.52-acre WHPA, located approximately 1.25 miles southeast of the project area.[192] DWSMAs are assigned vulnerability assessments, which refers to the likelihood that activities at the land surface may degrade drinking water quality at a public water supply well.[193] The City of Bird Island's DWSMA is ranked as low vulnerability, due to at least 10 feet or more of clay-rich geological material that covers the source aquifer. The vulnerability to the city wells is low due to each well being adequately sealed into the borehole and that they do not pump water that contains human-caused contaminants.[194] If potable water is required for the O&M building, a domestic well is likely to be installed. Gopher State Solar will acquire a domestic water permit and will hire an approved well drilling contractor prior to O&M building construction.[195]

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[190] SPA, p. 56.
[191] Id.
[192] MDH, Source Water Protection Unit. https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html.
[193] Id.
[194] SPA, pp. 55-57.
[195] Id.

Solar panels, roads, and gravel surfaces associated with the project are considered impervious surfaces by MPCA. Therefore, the project will increase the amount of impervious surface in the area, potentially impacting groundwater recharge. Gopher State Solar indicates that the project will have minimal increase of impervious surfaces, and the increased amount of perennial vegetation that will be established within the project area and stormwater basins will facilitate groundwater infiltration.[196]

The variables from the applicant's geotechnical study will be used to further inform the project's design, engineering, and construction techniques.[197] Typically, the foundation is a steel pile, which is driven into the ground with a hydraulically powered high-frequency hammer mounted on a tracked carrier. Concrete foundations are not expected to be used for the solar array as the steel pier rack foundations will likely be driven; however, some concrete foundations may be required. Final depths of the pier rack foundations will be determined after the geotechnical analysis of the project area.[198]

The storage of large quantities of hazardous material creates the potential for spills or leaks into groundwater. Gopher State Solar indicates if hazardous materials are used or stored during construction and operation they will be labeled, stored, and disposed of in accordance with applicable requirements, as well as have the appropriate containment required by regulations. PV solar module washing activities will use ionized water, and herbicide applications for vegetation management will follow applicable regulatory use and management requirements.[199]

Some solar panels can be considered hazardous waste if they exhibit toxicity, ignitability, reactivity, or corrosivity, or leach heavy metals. Final solar panel selections have not been made for the project; however, Gopher State Solar indicates that if the panels contain heavy metals, a Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed to address releases should panels break or become damaged.[200]

MITIGATION

Stormwater management is important to ensure that structure foundations maintain their integrity and that rainwater and surface runoff drain away from the project structures and roads in a way that does not adversely affect existing drainage systems, roads, or nearby properties. Appropriate permanent stormwater management measures, including minimizing the area of impervious surfaces at the site to reduce the volume and velocity of the stormwater runoff and the establishment of stormwater ponds, can address drainage from the newly established impervious areas. Gopher State Solar included permanent stormwater ponds in the project design, in accordance with MPCA requirements. Stormwater ponds will be located completely outside of wetland areas.[201]

The construction of the Gopher State Solar project will disturb more than 50 acres of soil. Gopher State Solar must obtain coverage under the General Construction Stormwater Permit Program and prepare and submit a National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Construction Stormwater (CSW) Permit and Stormwater Pollution Prevention Plan

[196] Id.
[197] Id.
[198] Id.
[199] Id.
[200] Id.
[201] Id.

(SWPPP) to the MPCA. The CSW Permit will identify BMPs for erosion prevention and sediment control. The SWPPP describes construction activity, temporary and permanent erosion and sediment controls, BMPs, permanent stormwater management that will be implemented during construction and through the life of the project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion and detail stormwater management methods during construction and operation of the facility. Section 4.3.11 of DSP (**Appendix C**) requires the permittee to obtain a MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control. Impacts to groundwater can also be minimized by mitigating impacts to and soils and surface waters as discussed in Sections 4.7.3 and 4.7.4.

Gopher State Solar indicates that in accordance with the MPCA-approved SWPPP, the project's construction contractor will implement BMPs such as silt fencing, or other erosion control devices, revegetation plans, and management of exposed soils to prevent erosion.[202]

Gopher State Solar may install a well to supply water to the O&M building. Any new wells require notification to MDH and would be constructed by a well borer licensed by MDH. If any previously unmapped wells are discovered, Gopher State Solar should cap and abandon the well in place in accordance with MDH requirements.

Any dewatering required during construction will be managed in accordance with the SWPPP and DNR temporary dewatering permit by discharging to the surrounding surface. If dewatering of more than 10,000 gallons per day or 1,000,000 gallons per year, a Water Appropriations Permit from DNR is required. Gopher State Solar will obtain a Water Appropriation Permit if dewatering that will exceed permit thresholds occurs during construction.[203]

4.7.3 Soils

The ROI for the soils is the land control area. Impacts to soils will occur during the construction and decommissioning of the project. The impact intensity level is expected to be minimal. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur. Because the soil at the solar facility will be maintained with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve.

The soils in the project area are made up of nearly level, deep, poorly drained, predominately fine loamy soils (**Table 15**). Topsoils in the preliminary development area are mostly comprised of relatively thick topsoil with a depth of greater than 12 inches (944 acres, 82 percent). Other soils characterized by the presence of relatively thin topsoil less than 12 inches deep (205 acres, 18 percent) may be shallower to bedrock or have stones at the soil surface or within the soil profile. Very few soils within the project area are highly erodible, with only 50.4 acres (3 percent) of the total 1,677.53 acres of soil being highly erodible by water, and zero acres being highly erodible by wind.[204]

The majority of soils within the preliminary development area are prone to compaction (71 percent) or rutting during wet conditions (100 percent) due to the hydric texture of the soil. A small percentage

[202] Id.
[203] Id.
[204] SPA – Appendix D: AIMP.

of soils within the preliminary development area are considered susceptible to drought (less than one percent). Most of the soils within the solar facility preliminary development area are designated prime farmland if drained (69 percent) and prime farmland (26 percent), with small areas of prime farmland of state importance (2.5 percent) and prime farmland if protected from flooding or not frequently flooded during the growing season (1.8 percent).[205]

Table 15. Soil Types in Solar Facility Project Site[206]

Soil Texture	Acres	Percent of Project Area
Fine	472.2	28.2%
Fine-Loamy	1086.8	64.8%
Fine-Silty	15.7	0.9%
Course Silty	3.5	0.2%
Course Loamy	11.9	0.7%
Loamy	0.0	0.0%
Fine-Loamy over Sandy or Sandy-skeletal	79.5	4.7%
Sandy	7.9	0.5%
Solar Facility Subtotal	**1677.5**	**100%**

Drainage Class	Acres	Percent of Project Area
Excessively drained	0.0	0.0%
Somewhat excessively drained	7.9	0.5
Well drained	79.4	4.7%
Moderately well drained	249.7	14.9%
Somewhat poorly drained	188.1	11.2%
Poorly drained	932.5	55.6%
Very poorly drained	219.9	13.1%
Solar Facility Subtotal	**1677.5**	**100%**

Potential Impacts

The impact intensity level is expected to be low to moderate. Primary impacts to soils include compaction from construction equipment, soil profile mixing during grading and pole auguring, rutting from tire traffic, and soil erosion. Impacts to soils are likely to be greatest with the below-ground electrical collection system. Potential impacts will be positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could

[205] Id.

[206] Soil data gathered from: SPA at p. 54, and at Appendix D: AIMP; Table 4.3-1; USDA National Cooperative Soil Survey Soil Series Soil Survey Geograhpic Database (NRCS SSURGO).

occur, such as from rutting. Because the soil at the solar facility would be maintained with native perennials and other beneficial vegetation, soil health would likely improve over the life of the project.[207]

Construction of the solar facility will potentially disturb approximately 1,149.1 acres of soil within the land control area, and 977 acres of that will be used for the solar facility project site.[208] As with any ground disturbance, there is potential for soil compaction and erosion. Heavy rainfall events during construction or prior to the establishment of permanent vegetation increase the risk that significant sedimentation and erosion could occur.

The soils within the site are generally loamy in texture and poorly drained. During wet conditions, all soils within the site are prone to rutting, and most of the soils are prone to compaction. The soils are largely not susceptible to drought, and less susceptible to wind erosion during dry periods due to the level nature. However, areas with higher slopes may be more susceptible. Existing drain tiles may be used or new tiles installed to ensure proper drainage.

Soil cover and management at the solar facility will change from cultivated cropland to a mixture of pervious areas with native perennial and other beneficial ground cover plantings, and semi-impervious surfaces. Once permanent vegetation is properly established, stormwater management, as well as general soil health, will improve due to the use of native perennial plants.

MITIGATION

Gopher State Solar is committed to ensuring the vitality of the soils during the construction, operation, and eventual decommissioning of the project. Gopher State Solar indicates that operation guidelines will be developed in the SWPPP to mitigate heavy traffic on soils when wet to minimize potential compaction and rutting.[209]

Gopher State Solar also indicates that implementing the project VMP and AIMP will further minimize and mitigate soil impacts. Additionally, in accordance with MPCA requirements, permanent stormwater ponds are included in the project design.[210]

In addition, several sections of the DSP (**Appendix C**) address soil-related impacts

- Section 4.3.9 requires protection and segregation of topsoil;
- Section 4.3.11 requires the permittee to obtain a MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control.
- Section 4.3.16 requires the permittee to implement “site restoration and management” practices enhance “soil water retention and reduces storm water runoff and erosion”.
- Section 4.3.17 requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates

[207] SPA, p. 54.
[208] SPA – Appendix D: AIMP
[209] Id.
[210] SPA, pp. 54-55.

and timing of revegetation will stabilize soils and improve overall soil health. Gopher State Solar has included a draft VMP as Appendix E of its site permit application.

- Section 4.3.18 requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Gopher State Solar has included a draft AIMP as Appendix D of its site permit application.

4.7.4 Surface Water and Floodplains

The ROI for surface water resources is the land control area. The impact intensity level is anticipated to be minimal. Direct impacts to surface waters are not expected. Indirect impacts to surface waters might occur, such as during increased rain events. These impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

Solar farm projects have the potential to impact surface water resources and floodplains. These projects could directly impact water resources and floodplains if these features cannot be avoided through project design. Projects also have the potential to adversely impact surface waters through construction activities that move, remove, or otherwise handle vegetative cover and soils. Changes in vegetative cover and soils can change runoff and water flow patterns.

Project components within the western area of the site are planned to be constructed within the Buffalo Creek Watershed District, a component of the South Fork of the Crow River Watershed. This watershed includes many lakes, streams and wetlands, and eventually outlets to the Mississippi River near Dayton, Minnesota.[211] The majority of project components are planned to be constructed within the Hawk Creek watershed within the Minnesota River Basin.[212] This watershed contains several lakes, and lake recreational activities such as fishing, swimming, and boating are common in the area.[213] There are no lakes or ponds within the project site. The closest body of open water is Lake Lillian, located approximately 7.7 miles north of the project area.[214] The surface waters within the project site are limited to ditches, including four Public Ditches located within the project area. Ditches include Beaver Creek East Fork and County Ditch 63 located in the south and west central portions of the project, and Judicial Ditch 9 and an unnamed stream are located in the northeast portion of the project.[215]

Under Section 303(d) of the Clean Water Act, states are required to assess all waters of the state to determine if they meet water quality standards, list waters that do not meet standards and update the list biannually and conduct total maximum daily load studies to set pollutant-reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses. The list, known as the 303(d) list, is based on violations of water quality standards. The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota. There is one impaired

[211] Buffalo Creek Watershed District. https://bcwatershed.org/location/; MPCA, South Fork Crow River. https://www.pca.state.mn.us/watershed-information/south-fork-crow-river.
[212] Minnesota DNR, Minnesota's watershed basins. https://www.dnr.state.mn.us/watersheds/map.html
[213] MPCA, Minnesota River – Yellow Medicine River/Hawk Creek. https://www.pca.state.mn.us/watershed-information/minnesota-river-yellow-medicine-river-hawk-creek.
[214] SPA, pp. 59-60.
[215] Id.

waterbody within the project area, Judicial Ditch 9. This waterbody was listed as having an impaired designated use of aquatic life.[216]

Floodplains are flat, or nearly flat, land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood, but which do not experience a strong current. Floodplains prevent flood damage by detaining debris, sediment, water, and ice. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. The base flood that FEMA uses, known as the 100-year flood, has a one percent chance of occurring during each year.

At the state level, the DNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in floodplain areas in order to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The DNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are also regulated at the local level.

Within the project area, no 100-year floodplains are present, and the entire project area is designated as Zone X - an area of minimal flood hazard.[217] Due to Minnesota's warmer and wetter climate, there is increased risk for damaging rain events and more frequent flooding. These events could impact the project (Section 4.7.9).

POTENTIAL IMPACTS

The South Fork Crow River watershed is an area that historically can be impacted by issues such as water pollution, mainly from phosphorus causing algae blooms in the summer months, as well as other pollutants such as bacteria, turbidity, and low dissolved oxygen. The main use of land in the watershed is agricultural, accounting for approximately 83% of the overall watershed.[218] The watershed falls within the Buffalo Creek Watershed District, where many projects have been completed within this district to help alleviate water problems, enhance the living conditions of the area, and maintain or improve the economic well-being of residents.[219]

The Hawk Creek watershed is an area that has been largely dominated by agriculture, with 98% of the original wetlands in the watershed having been drained for agricultural opportunities. Agriculture depends on the watershed's extensive network of drainage ditches, open tile intakes, and sub-surface tile systems to move water off the landscape to make it suitable for row crop farming.[220]

Gopher State Solar indicates that solar infrastructure will not be placed within delineated streams, including public waters and ditches. However, there will be four crossings where collector lines will

[216] MPCA, MPCA Impaired Waters Viewer. https://gisdata.mn.gov/dataset/impaired-waters-viewer
[217] SPA, p. 58.
[218] MPCA, South Fork Crow River. https://www.pca.state.mn.us/watershed-information/south-fork-crow-river.
[219] Buffalo Creek Watershed District. https://bcwatershed.org/.
[220] MPCA, Minnesota River – Yellow Medicine River/Hawk Creek. https://www.pca.state.mn.us/watershed-information/minnesota-river-yellow-medicine-river-hawk-creek.

be bored under three of the public ditches within the project area, creating the potential for indirect impacts. Direct impacts to rivers and streams are not anticipated.

Construction of the project creates a potential for indirect impacts if sediment or fugitive dust created by excavation, grading, vegetation removal, and construction traffic reaches nearby surface waters.

Overall, and due to the establishment of native perennials and other vegetation at the solar facility, the project is expected to have a long-term positive impact on water quality.

MITIGATION

Standard construction management practices, including, but not limited to containment of excavated soils, protection of exposed soils, stabilization of restored soils, and controlling fugitive dust, would minimize the potential for eroded soils to reach surface waters.

Gopher State Solar will obtain the necessary permits, implement best management practices, and comply with the NPDES Construction General Permit during construction and will perform construction activities in compliance with local and state permits to prevent erosion and sedimentation near streams and surface waters.[221] Best management practices to minimize the impact on surface waters can be utilized as a part of the SWPPP, including but not limited to sediment control, revegetation plans, and management of exposed soils to prevent sediment from entering waterbodies.

The DSP (**Appendix C**) has two standard conditions that address potential impacts to surface waters:

- Section 4.3.11 requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls. This section also requires implementation of erosion and sediment control measures, contours graded to provide for proper drainage, and all disturbed areas be returned to pre-construction conditions. Gopher State Solar will also develop a Stormwater Pollution Prevention Plan (SWPPP) that complies with MPCA rules and guidelines. The SWPPP describes construction activity, temporary and permanent erosion and sediment controls, BMPs, permanent stormwater management that will be implemented during construction and through the life of the project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.
- Section 4.3.16 requires the permittee to implement "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".

4.7.5 Wetlands

The ROI for wetlands is the land control area. The impact intensity level is anticipated to be minimal. Although there is a potential for wetlands to be indirectly affected, direct impacts are not expected. These impacts will be short-term, of a small size, and localized. Impact can be mitigated.

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated during much of the growing season). Wetland types include

[221] SPA, p. 60.

marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.[222]

Wetlands are important to the health of waterways and communities that are downstream. Wetlands can be one source of hydrology in downstream watercourses and water bodies, detain floodwaters, recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetland health also has economic impacts because of their key role in fishing, hunting, agriculture, and recreation. Infrastructure projects can temporarily or permanently impact wetlands if these features cannot be avoided through project design. During construction, temporary disturbance of soils and vegetative cover could cause sediment to reach wetlands which could in turn affect wetland functionality.

This EA uses the National Wetland Inventory for Minnesota (NWI-MN) to allow for comparison of wetland types across the solar facility (**Table 16**). This includes portions of wetlands that have been delineated for this project, as well as additional wetland areas such as ditches that are mapped within the project area. The NWI-MN is a publicly available GIS database that provides information on the location and characteristics of wetlands in Minnesota. Wetlands listed on the NWI-MN may be inconsistent with local wetland conditions on the ground; however, the NWI-MN provides an accurate and readily available reference database of wetland resources within the land control area that can be used to identify wetlands at the solar facility.

There are 10.64 acres of NWI wetlands in the project area (**Table 16**). Wetland types include Freshwater Emergent Wetlands (Seasonally Flooded/Saturated), Freshwater Forested/Shrub wetlands (Hardwood and Shrub), and Riverines.

Table 16. NWI-MN Wetlands in Project Footprint[223]

Wetland type	Acres
Freshwater Emergent	0.29
Freshwater Forested/Shrub	0.37
Riverine	9.98
Total	10.64

Gopher State Solar contracted with Merjent and completed an onsite wetland delineation in May and October of 2023 delineating wetlands across approximately 2,145 acres, including the project area and a buffer, utilized for wetland and other waterbody surveys totaling approximately 1.63 acres.[224] The initial wetland survey submitted with the Site Permit Application was amended to include additional wetlands, per request by Renville County. The updated wetland data is provided in

[222] USEPA. 2022. *What is a Wetland* https://www.epa.gov/wetlands/what-wetland
[223] DNR. National Wetland Inventory of Minnesota. (2015). https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/water_nat_wetlands_inv_2009_2014/metadata/metadata.html#Distribution_Information
[224] SPA, p. 61.

Appendix D, in which Gopher State Solar identifies 2.93 acres of wetland in the project area.[225] **Table 17** summarizes delineated wetlands within the survey area, using updated data provided by Gopher State Solar.

Table 17. Delineated Wetlands in Project Footprint

Wetland type (Eggers and Reed Classification)	Circular 39 Classification	Acres in project area
Seasonally Flooded Basin	Type 1: Inland Seasonally Flooded	2.29
Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.04
Hardwood Swamp	Type 7: Inland Wooded Hardwood Swamp	0.6
Total		**2.93**

Potential Impacts

The NWI-MN mapping identified approximately 10.64 acres of Freshwater Emergent, Freshwater Forested/Shrub, and Riverine wetland. Most of this is comprised of Riverine wetlands that flow along the border of the project area, including around the solar array blocks and collector lines, crossing through the northeastern block of the project, throughout the center blocks, and running along the southern border of the project area. Outside of these Riverine wetlands, small pockets of Freshwater Emergent and Freshwater Forested/Shrub wetlands are found sparingly throughout the land control area.

Gopher State Solar's updated wetland delineation report identified approximately 2.93 acres of wetlands within the project site, including Seasonally Flooded Basins (Type 1: Inland Seasonally Flooded), Fresh (Wet) Meadows (Type 2: Inland Seasonally Flooded) and Hardwood Swamp (Type 7: Inland Wooded Hardwood Swamp).

Although wetlands have been identified within the project area, the preliminary site layout for the solar facility avoids locating solar arrays and associated facilities in wetlands, including access roads. There may be potential for temporary, short-term impacts to wetlands that occur during installation of the electrical collection lines. Direct impacts to wetlands are not anticipated.

Mitigation

The project site layout has been designed to avoid placing solar generation facility infrastructure in wetlands.[226] If wetland impacts are required for the final layout, coordination with the appropriate agency, such as the USACE under Section 404 and 401 of the Federal Clean Water Act (CWA) and Renville County under the Minnesota Wetland Conservation Act (WCA), would need to occur prior to

[225] Appendix D – Gopher State Solar Response to Data Request.
[226] SPA, p. 61.

construction. If unavoidable wetland impacts take place, impacts should be replaced in accordance with Section 404 of the Federal CWA and the Minnesota WCA.

- Section 4.3.13 of the DSP (**Appendix C**) generally prohibits placement of the solar energy generating system or associated facilities in public waters and public waters wetlands. The permit condition does allow for electric collector or feeder lines to cross or be placed in public waters or public waters wetlands subject to permits and approvals by the DNR and the USACE, and local units of government as implementers of the WCA.

4.7.6 Vegetation

The ROI for vegetation is the project area. The solar facility will convert row crop farmland to perennial vegetation for the life of the project. Potential impacts of the solar facility can be mitigated through the development of a VMP.

The solar facility project area is located in the Minnesota River Prairie subsection of the North Central Glaciated Plains Section of the Prairie Parkland Province. This subsection consists of gently rolling ground moraine about 60 miles wide. The Minnesota River occupies a broad valley, splitting the subsection in half, created by Glacial River Warren, which drained Glacial Lake Agassiz. Ground moraine topography is level to gently rolling. Well- to moderately well-drained loamy soils are dominant. Native Vegetation at Time of the Public Land Survey (1847-1907) was primarily tallgrass prairie, with many islands of wet prairie. Forests of silver maple, elm, cottonwood, and willow grew on floodplains along the Minnesota River and other streams.[227] There were also portions of dry and dry-mesic prairie along the Big Stone Moraine and dry gravel prairies on kames.

Little of the natural vegetation from pre-European settlement is present today, as the current land use in the project area is predominately agricultural. The subsection is known as the heart of the Minnesota corn belt. Upland prairie species are found to be common throughout most of the subsection, remnant stands of tallgrass prairie are rare. Fire was the most common natural disturbance before settlement. Fire suppression has allowed woodlands to develop from what were originally oak openings or brush prairies. Other causes of disturbance are floods and tornadoes.[228]

In Minnesota, native prairie is defined as grass-dominated communities with a diversity of forbs and wildlife. They are grasslands dominated by native prairie vegetation, usually occurring where the sod has never been broken.[229] Unbroken pastureland used for livestock grazing can be considered native prairie if it has predominantly native vegetation originating from the site and conservation practices have maintained biological diversity. Gopher State Solar partnered with Merjent to conduct a desktop assessment and preliminary field review to identify potentially undisturbed grasslands within the project area that may contain native prairie. The desktop review used publicly available sources including aerial imagery and information from the Minnesota DNR, and identified one area of potential prairie. This area where potential prairie was recorded appeared to have been tilled in the

[227] DNR, Minnesota River Prairie Subsection. https://www.dnr.state.mn.us/ecs/251Ba/index.html#:~:text=This%20subsection%20consists%20of%20a,which%20drained%20Glacial%20Lake%20Agassiz.

[228] DNR, *Ecological Classification System: Ecological Land Classification Hierarchy*. https://www.dnr.state.mn.us/ecs/index.html

[229] Minnesota Statute 84.02 Subd. 5. Native Prairie.

past such that the native vegetation was disturbed. Gopher State Solar indicates that native prairie will be avoided during project design.[230]

Potential Impacts

Construction of the solar facility will temporarily eliminate vegetative cover, and create some additional impermeable surfaces. Removal of vegetative cover exposes soils and could result in soil erosion. Temporary or permanent removal of vegetation also has the potential to affect wildlife habitat. Most of the current land use within the project area is in cultivated, agricultural land (96 percent) with some areas of deciduous forest present primarily as windbreaks for residences. Gopher State Solar expects to avoid most forested areas, minimizing any required tree removal. There is also the presence of land that potentially contains native prairie within the project area, which Gopher State Solar indicated will be avoided during the design of the project.[231]

Agricultural land within the solar facility would be converted to perennial, low-growing vegetative cover, and will include native perennial seed mixes in addition to other vegetation that will be compatible with the project's operations and beneficial to the site's native ecosystem, resulting in a net increase in vegetative cover for the life of the project. Through the project's vegetation management plan (VMP), vegetation maintenance was designed following best practice guidance from Minnesota's Board of Water and Soil Resources (BWSR).[232]

Under the arrays, short-statured non-native perennial vegetation will be used including grasses and wildflowers (clovers, etc.) that provide nectar sources for native pollinators. Along the perimeter, shortgrass, native species that remain shorter than three feet tall, including grasses and diverse forbs, will be planted providing high-quality native prairie habitat. Perimeter mixed-height vegetation will be primarily outside the fenced area and may include some areas within the fenced area near ditches, and will have native grasses and diverse forbs that include some species taller than four feet, providing high-quality native prairie habitat. If necessary, wetland areas will be comprised of native vegetation within existing wetlands, including species adapted to saturated soils and periods of shallow inundation, creating an area of high diversity of native plant species.[233] A recent Minnesota study found that utility-scale solar habitats with pollinator vegetation increased native bee abundance, resulting in increased pollination visits to bordering agricultural fields.[234]

Construction activities at the solar facility could introduce or spread invasive species and noxious weeds and the early phases of site restoration and seeding of native species can result in populations of non-native and invasive species on site.

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[230] SPA, p. 63.
[231] Id.
[232] SPA – Appendix E: VMP.
[233] Id.
[234] Walston, L., Hartmann, H., Fox, L., Macknick, J., McCall, J., Janski, J., & Jenkins, L. (2023). *If you build it, will they come? Insect community responses to habitat establishment at solar energy facilities in Minnesota, USA*, retrieved from: https://iopscience.iop.org/article/10.1088/1748-9326/ad0f72

MITIGATION

Several sections of the DSP (**Appendix C**) address impacts to vegetation:

- Section 4.3.17 requires the permittee to develop a vegetation management plan (VMP) in coordination with state agencies and to file the VMP prior to construction. The applicant has prepared a draft VMP as Appendix E of the Site Permit application. The VMP must include the following:
    - Management objectives addressing short term (Year 0-3, seeding and establishment) and long term (Year 4 through the life of the permit) goals.
    - A description of planned restoration and vegetation management activities, including how the site will be prepared, timing of activities, how seeding will occur (broadcast, drilling, etc.), and the types of seed mixes to be used.
    - A description of how the site will be monitored and evaluated to meet management goals.
    - A description of the management tools used to maintain vegetation (e.g., mowing, spot spraying, hand removal, fire, grazing, etc.), including the timing and frequency of maintenance activities.
    - Identification of the third-party (e.g., consultant, contractor, site manager, etc.) responsible for restoration, monitoring, and long-term vegetation management of the site.
    - Identification of on-site noxious weeds and invasive species (native and non-native) and the monitoring and management practices to be utilized.
    - A site plan showing how the site will be revegetated and that identifies the corresponding seed mixes.

    Best management practices should be followed concerning seed mixes, seeding rates, and cover crops.
- Section 4.3.18 requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated, and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Gopher State Solar has included a draft AIMP as Appendix D of its application.
- Section 4.3.15 requires the permittee to minimize the number of trees removed and to leave existing low growing species in the ROW undisturbed to the extent possible, or to replant to blend in with adjacent areas following construction.

4.7.7 Wildlife and Habitat

The ROI for non-avian wildlife and their habitats is the project area, the ROI for birds is the local vicinity. Potential impacts may be positive or negative and are species-dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species, for example, deer, will be negligible. Significant negative impacts could occur to individuals during the construction and operation of the project.

Once restored, the land control area will provide native habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. The introduction of PV panels and fencing creates the potential for bird collisions and funneling wildlife towards roads in certain areas. Potential impacts can be mitigated in part through design and BMPs. The impact intensity level is expected to be minimal.

The project area landscape is dominated by agriculture and developed areas (roads, homes, and farmsteads). Landscape types and vegetation communities vary throughout the local vicinity. Small areas of deciduous forest, mostly along fence lines, and pockets of wetlands and grassland provide habitat for terrestrial and avian wildlife.

Species of mammals that may use agricultural and grassland areas within the project area as habitat include white-tailed deer, striped skunk, red fox, Virginia opossum, eastern cottontail, raccoon, and thirteen-lined ground squirrel. Reptile and amphibian species that may occur in agricultural lands and grasslands within the project area include great plains toad, western chorus frong, painted turtle, spiny softshell, snapping turtle, prairie sink, western fox snake, red-bellied snake, plains garter snake, and the common garter snake. Four existing streams within the project area may provide habitat for fish. Species that may be present in small streams through agricultural lands include the creek chub, fathead minnow, white sucker, and common carp.[235]

The Project is located within the Mississippi Flyway, which is a major north-south migration route between migratory bird nesting and wintering habitat. The site is located within the Prairie Potholes Bird Conservation Region (BCR). Gopher State Solar consulted with the United States Fish and Wildlife Service (USFWS) to identify species within the area. The USFWS identified 26 species of birds that breed within the Prairie Potholes BCR as Birds of Conservation Concern (BCC), representing the agency's highest conservation priorities. BCC species that breed within the Prairie Potholes BCR and may nest or forage around agricultural lands include the bobolink, chimney swift, and grasshopper sparrow. Other avian species that may occur near the project area include the mourning dove, killdeer, chimney swift, eastern kingbird, American crow, tree swallow, cliff swallow, American robin, American goldfinch, brewer's blackbird, and common grackle.[236] There are no Important Bird Areas (IBA) designated by the National Audubon Society within the site; the Upper Minnesota River Valley state IBA is the closest IBA located approximately 14 miles southwest of the project.[237]

Potential Impacts

The impact intensity level is expected to be minimal. Impacts could be positive or negative and depend on species type. Potential impacts will be short- and long-term and can be mitigated.

Non-Avian Wildlife Individuals will be displaced to adjacent habitats during construction. Because the land control area does not provide critical habitat, this should not impact life cycle functions, for

[235] SPA, pp. 64-65.
[236] Id.; Audubon Minnesota and UMN NRRI, 2023.
[237] Audubon Society, Important Bird Areas. Minnesota Natural Resource Atlas. https://mnatlas.org/resources/birds-important-areas/.

example, nesting. Direct significant impacts to individuals might occur, that is, small species might be crushed or otherwise killed during construction. Population level impacts are not anticipated.

The largest impact to wildlife associated with solar facilities is fencing. Although deer can jump many fences, they can become tangled in both smooth and barbed-wire fences, especially if the wires are loose or installed too closely together.[238] Predators can use fences to corner and kill prey species.[239] Gopher State Solar indicates that consistent with DNR guidelines, fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment that could cause harm or injury.[240] However, fencing does not negatively impact all wildlife. Smaller animals who can move through fence openings may be protected within facility fences,300 giving them a safe refuge for shelter or rearing their young.[241]

Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact wildlife populations. Wildlife entanglement and death from plastic netting and other plastic materials has been documented in birds, fish, mammals, and reptiles. The DNR recommends using non-plastic netting as a wildlife-friendly erosion control, along with other BMPs.[242]

Reduced pesticide use, as compared to agricultural production, has the potential to benefit insects, including pollinators, and smaller wildlife such as rodents, birds, insects, and reptiles. Revegetating the site with pollinator friendly species will also benefit these species.

Birds Bird injuries or mortality may occur due to lack of fencing visibility. Raptors in pursuit of prey may be vulnerable to the nearly invisible wire strands, although other low flying birds such as grouse and owls are also vulnerable to fence collisions.

Risks to birds have been identified near PV solar facilities. Preliminary findings in one report, based on limited data, suspect the danger is this appearance of water causing migrating birds to attempt to land, consequently incurring trauma and related predation.[243]

Habitat There are no DNR WMAs or migratory waterfowl feeding and resting, or USFWS Waterfowl Production areas within one mile of the site. The closest WMA is the Dalton Johnson WMA located approximately 6.5 miles north and east of the project site. There is also the USFWS Waterfowl Production Area Litchfield Wetland Management District located approximately 3.5 miles northeast

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[238] Colorado Division of Wildlife. *Fencing with Wildlife in Mind.* (2009). https://cpw.state.co.us/Documents/LandWater/PrivateLandPrograms/FencingWithWildlifeInMind.pdf, p.. 3.

[239] Marcel Huijser, et al. *Construction Guidelines for Wildlife Fencing and Associated Escape and Lateral Access Control Measures.* (April 2015). http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25%2884%29_FR.pdf, page 27.

[240] SPA, p. 64.

[241] Brooks, M.L. 1999. *Effect of protective fencing on birds, lizards, and black-tailed hares in the western Mojave Desert.* DOI: 10.1007/s002679900194

[242] DNR. *Wildlife-friendly Erosion Control*. (2013).http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.

[243] USFWS Forensics Lab. *Avian Mortality at Solar Energy Facilities in Southern California*. (2014). http://www.ourenergypolicy.org/wp-content/uploads/2014/04/avian-mortality.pdf

of the project, which DNR characterizes as an MBS site of moderate biodiversity significance.[244] Other nearby ecological resources, including MBS sites and DNR and BWSR managed areas, are identified in the Ecological Resources Map in **Appendix B**. These resources are not anticipated to be impacted by the construction or operation of the project.

Land use in the project area is primarily agricultural (96 percent). Because of this, wildlife habitat in the area is currently fragmented. Land use for agriculture can have temporary non-diverse vegetative cover that may be used by some wildlife that adapt to frequently disturbed land with low plant diversity. The majority of the preliminary development area, including under the PV arrays, will be revegetated to perennial grasses and forbs that will result in a more consistent and permanent vegetative cover throughout the year, creating more diverse species that wildlife can use for cover, foraging, hunting, or reproduction. Gopher State Solar indicates that the seed mix within the solar arrays will consist of short-statured grasses and forbs that are adapted to full sun and partial shade. Outside of the arrays and adjacent to the fence line, the seed mix will contain greater plant diversity to benefit pollinators throughout the spring, summer, and fall. The applicant also notes that the use of perennial ground cover and diverse grasses and forbs will also reduce the use of herbicides and pesticides, decreasing surface run-off into adjacent waterbodies, which will reduce soil erosion and restore soil health, while also benefitting wildlife.[245]

Overall, the project does not contribute to significant habitat loss or degradation, or create new habitat edge effects, and is anticipated to result in higher quality of habitat for wildlife, including pollinator species.

4.7.7.1 MITIGATION

Gopher State Solar indicates that in addition to implementing the project's SWPPP, AIMP, and VMP, all streams will be buffered by 16.5 feet per the Minnesota Buffer Law administered by BWSR. This buffer will manage run-off and erosion to reduce the amounts of pollutants that enter the stream, such as phosphorus, nitrogen, and sediment, further benefitting aquatic wildlife. Gopher State Solar also indicates that fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment that could cause harm or injury.[246]

Several sections of the DSP (**Appendix C**) specify measures that will minimize impacts to wildlife:

- Section 4.3.16 requires the permittee to implement "site restoration and management practices that provide for native perennial vegetation and foraging habitat beneficial to gamebirds, songbirds, and pollinators".
- Section 4.3.32 requires the permittee to coordinate with the DNR to ensure that the fence used in the project minimizes impacts to wildlife
- Section 8.14 requires permittees to report "any wildlife injuries and fatalities" to the Commission on a quarterly basis.

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[244] DNR, USFWS Waterfowl Production Areas. https://arcgis.dnr.state.mn.us/portal/home/item.html?id=6de3eb66e7e2494ebe3669a29f22ad42.
[245] SPA, p. 65.
[246] Id.

Other potential mitigation measures include:

- Siting facilities away from wildlife movement corridors can avoid or minimize impacts to wildlife movement.
- Checking open trenches and removing any wildlife caught in trenches before backfilling mitigates impacts.
- Once permanent vegetation is established, restricting mowing from April 15 to August 15 to improve the potential for ground nesting habitat.

4.7.8 Rare and Unique Resources

The ROI for rare and unique resources is the local vicinity. The impact intensity level is anticipated to be minimal. Impacts could be both short and long term and could be positive (e.g., through introduction of habitat), or negative (e.g., by removing trees during nesting season). Impacts can be mitigated.

Construction and operation of solar facilities may adversely impact rare and unique resources through the taking or displacement of individual plants or animals, invasive species introduction, and habitat loss. Conversely, in some cases solar sites can be managed to provide habitat. For example, the introduction of native vegetation into a landscape otherwise dominated by cultivated row crops could create habitat for pollinators, such as the rusty patched bumble bee.

The Minnesota DNR classifies rare plant or animal communities across the state. These include Scientific and Natural Areas, High Conservation Value Forest, Minnesota Biological Survey (MBS) Native Plant Communities, and MBS Sites of Biodiversity Significance

The Division of Ecological and Water Resources within DNR manages the Natural Heritage Information System (NHIS). The NHIS "provides information on Minnesota's rare plants, animals, native plant communities, and other rare features. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and conservation of these features."[247] NHIS data includes federally endangered, threatened, or candidate plant species, and endangered or threatened animal species. The system also includes state endangered, threatened, or special concern species.

The Minnesota DNR and the Minnesota Board of Water and Soil Resources (BWSR) administer conservation easements for the state. The purpose of a conservation easement is to protect critical natural resource land throughout Minnesota, allowing landowners to participate by stopping crop/grazing of the land, and establishing conservation practices such as native grass and forbs, trees, or wetland restorations.[248] The Minnesota Conservation Reserve Enhancement Program (CREP) is a voluntary, federal-state funded natural resource conservation program that places land into conservation easements, targeting environmentally sensitive land such as riparian areas and marginal

[247] Department of Natural Resources (n.d.) *Natural Heritage Information System*, http://www.dnr.state.mn.us/nhnrp/nhis.html.
[248] BWSR, What are Conservation Easements? https://bwsr.state.mn.us/what-are-conservation-easements.

agricultural land.[249] Minnesota's Reinvest in Minnesota (RIM) reserve program accomplishes conservation goals by placing lands in perpetual conservation easements, restoring certain marginal and environmentally sensitive agricultural land to protect soil and water quality and support fish and wildlife habitat.[250]

The EA does not map federal- or state-listed species found in the NHIS database, because DNR requires that public display of NHIS data either mask the identity or location of rare features due to the vulnerability of some species to exploitation. Moreover, the NHIS database masks the occurrence of rare species of by randomly incorporating their location into a larger map polygon. Additional existing ecological resources are identified in the Ecological Resources Map in **Appendix B.** This map identifies MBS sites, DNR managed lands, and BWSR conservation easements within the project area, and extending 5 miles outside the project area.

POTENTIAL IMPACTS

Natural Communities

The Minnesota Biological Survey (MBS) systematically collects, interprets, and provides baseline data on the distribution and ecology of rare plants, rare animals and native plant communities.[251] The MBS uses four classifications denoting the level of biological diversity to rank sites:[252]

- **Below**. Sites lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher- quality natural areas, areas with high potential for restoration of native habitat, or open space.
- **Moderate**. Sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.
- **High**. Sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.
- **Outstanding**. Sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.

There are no MBS sites of moderate, high, or outstanding biodiversity significance within the project area. There is the USFWS Waterfowl Production Area Litchfield Wetland Management District located

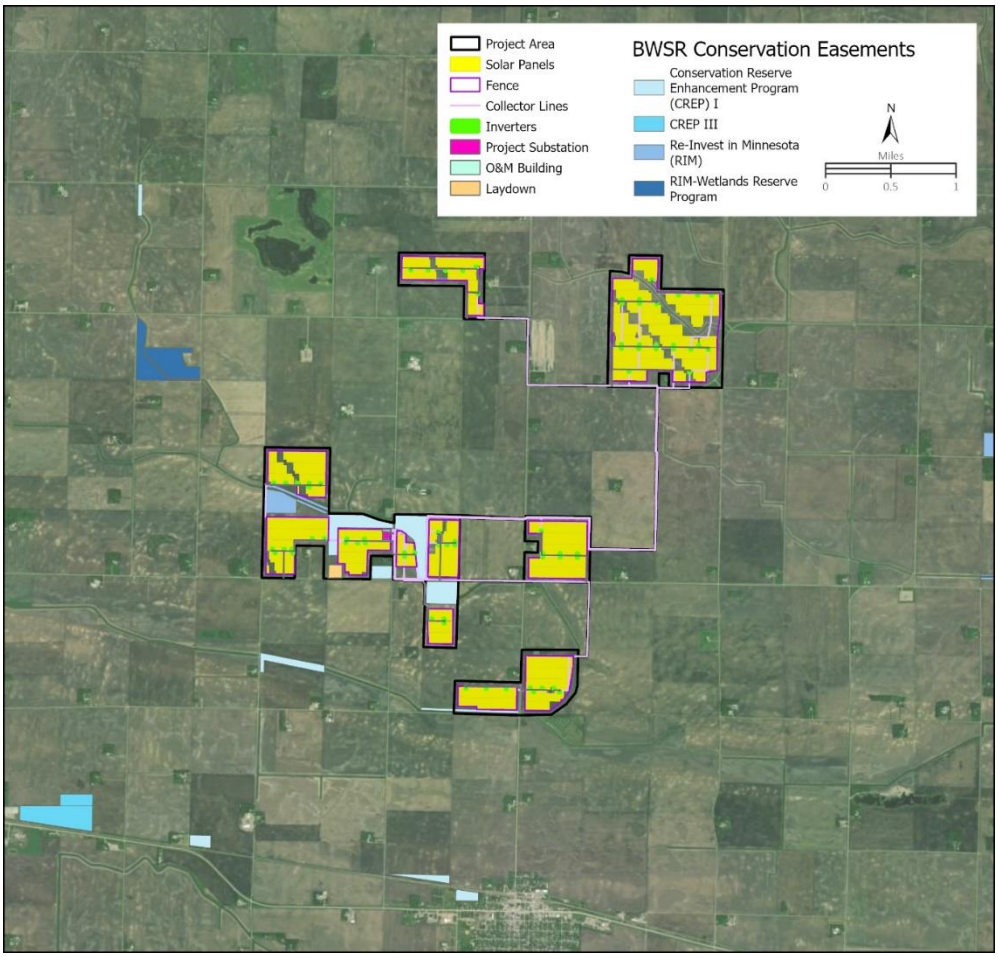
[249] BWSR, MN CREP, https://bwsr.state.mn.us/mn-crep-landowners.
[250] BWSR, Reinvest In Minnesota Reserve, https://bwsr.state.mn.us/sites/default/files/2019-01/RIM_overview_0.pdf.
[251] DNR. *Minnesota County Biological Surveys*, http://www.dnr.state.mn.us/eco/mcbs/index.html.
[252] DNR, *Minnesota Biological Survey*, MBS Site Biodiversity Significance Ranks, https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.

approximately 3.5 miles northeast of the project, which DNR characterizes as an MBS site of moderate biodiversity significance.[253]

Conservation Easements

For this project, Gopher State Solar has secured 100% land control within the project area through leases or easements, and the project area is comprised entirely of private land. However, there is the presence of state-administered conservation easements on some properties within the project area, including BWSR-administered CREP and RIM easements. **Figure 14** shows existing Conservation Easements near the project area.

Figure 14: Conservation Easements near the Project Area



Gopher State Solar indicates that all RIM easements within the project area have been avoided, and all CREP easements have been avoided, with the exception of those that will be crossed by underground collector lines. Gopher State Solar plans to avoid impacts to the CREP easement lands by installing the collector lines beneath the ground surface using a directional bore. Gopher State

[253] DNR, USFWS Waterfowl Production Areas. https://arcgis.dnr.state.mn.us/portal/home/item.html?id=6de3eb66e7e2494ebe3669a29f22ad42.

Solar also indicates that it will coordinate with landowners and BWSR to develop an installation plan that will comply with the conditions of the CREP easements.[254]

Rare Species

Northern Long-Eared Bat (Myotis septentrionalis)

The Northern Long-Eared Bat (NLEB) is a federally listed species and state-listed species of concern. During the winter this species hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark or in cavities or crevices of both live and dead trees. The spread of white-nose syndrome across the eastern United States has become a major threat to the species. Activities that might impact this species include but are not limited to, any disturbance to hibernacula and destruction or degradation of habitat including tree removal.

While the project area is primarily made up of agricultural lands with little forested habitat, the NLEB is limited to shelterbelts or windbreaks. The USFWS determined that no critical habitat has been designated for this species.[255] Potential impacts to individual northern long-eared bats may occur if clearing or construction takes place when the species is roosting in its summer habitat, in trees outside of the hibernacula. Bats may be injured or killed if occupied trees are cleared during this active window. Tree clearing activities conducted when the species is in hibernation and not present in the landscape will not directly impact bats, however, could result in indirect impacts due to the removal of suitable roosting habitat.[256] The preferred mitigation strategy to avoid impacts to the NLEB is avoidance of tree-clearing to the extent possible. When tree clearing is necessary, it should be done outside the pup rearing season from June 1 to July 31 and outside the active NLEB season from April 1 to October 31.

Monarch Butterfly (Danaus plexippus)

The monarch butterfly is a federal candidate species. The species is common throughout Minnesota during summer months and is most frequently found in habitats where milkweed and native plants are common, including roadside ditches, open areas, wet areas, and urban gardens.[257] Suitable habitat for monarchs may be present within the project area. Gopher State Solar indicates that should the USFWS determine the species should be listed and protections for the species coincide with project planning, permitting, and/or construction, Gopher State Solar will review project activities for potential impacts to the species and develop appropriate avoidance and mitigation measures.

Bald Eagles and Golden Eagles

In Minnesota, the bald eagle nesting season is generally January through early July. Bald eagles are primarily found near rivers, lakes, and other waterbodies in remote and, more recently, within metropolitan areas.[258]

Bald eagles are afforded additional protections under the Bald and Golden Eagle Protection Act, which is administered by the USFWS. Bald eagle incidental take permits and nest removal permits are

[254] SPA - Appendix K: Protected Species Documentation.
[255] SPA, p. 81.
[256] SPA, p. 67.
[257] DNR, *Monarch Butterfly* https://www.dnr.state.mn.us/insects/monarchbutterfly.html
[258] DNR, *Bald Eagles in Summer*. https://www.dnr.state.mn.us/birds/eagles/summer.html

considered to be voluntary permits, meaning a project proposer must make the determination to pursue a permit based on the respective risk of their project's potential to take a bald eagle.

Bald eagles typically nest in mature trees near large lakes or streams. Nesting habitat suitable for bald eagles is not known to be present in the project site. However, if encounters with bald eagles do occur, consultation with the USFWS will be necessary. The USFWS will coordinate appropriate mitigation measures for bald eagles for the project. Mitigation measures may include setbacks from nests, timing restriction for construction activities, and possibly seeking a USFWS permit for removal of a nest.

Gopher State Solar coordinated with the Minnesota DNR to identify state-listed species, and received automated responses provided by the DNR that indicate the project will not negatively affect any known occurrences of state rare features. The responses are provided in Appendix K of the SPA.[259]

MITIGATION

Gopher State Solar outlines the following general measures to be followed that will help avoid or minimize impacts to area wildlife and rare natural resources during and after the completion of the proposed project:

- BMPs will be used to prevent erosion of the soils in the areas of impact.
- Sound water and soil conservation practices will be implemented during construction and operation of the project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Disturbed areas will be re-vegetated with native species and wildlife conservation species, where applicable if the landowner agrees.

Techniques for minimizing impacts to wildlife and vegetation also minimize impacts to rare species. Avoiding identified areas of species occurrence or preferred habitat is the preferred mitigation measure.

The DSP (**Appendix C**) proposes special conditions related to the NLEB and the Bald Eagle.

- Section 5.7 requires the permittee to comply with the USFWS guidance and requirements in effect regarding NLEB, including tree clearing restrictions if applicable.
- Section 5.8 requires the permittee to file documentation authorizing any Bald Eagle nest removal prior to construction.

4.7.9 Climate Change

The project will help to shift energy production in Minnesota and the upper Midwest toward carbon-free sources. Construction emissions will have a short- term negligible increase in greenhouse gases that contribute to climate change. Overall, the project will generate energy that can be used to displace energy otherwise generated by carbon-fueled sources. The total GHG emissions produced by construction and operation of the project will be minimal when compared to the reduction in GHG emissions long-term. The project's design incorporates design elements

[259] SPA, p. 67.

that minimize impacts from the increase in extreme weather events such as increased flooding, storms, and wind events that are expected to accompany a warming climate.

Climate change refers to any significant change in measures of climate lasting for an extended period. Greenhouse gases (GHG) are gaseous emissions that trap heat in the atmosphere and contribute to climate change. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide, methane, and nitrous oxide. A change in climate can have a wide range of impacts on living species, as well as infrastructure, and may create compounding weather-related events. An increase of extreme weather events, such as flooding, storms, and heat waves, is expected to accompany a warming climate.

Minnesota Statute 216H.02 sets statewide greenhouse gas emissions goals to reduce emissions from 2005 levels to net zero by 2050.[260] Minnesota has also set a carbon-free energy standard requiring 100% of the retail energy sales in Minnesota to come from carbon-free energy by 2040. In 2020, the electricity sector was the second largest source of Minnesota GHG emissions at 15.8 million tons of 137 million tons, or 11.5%.[261] GHG from electricity generation have decreased by about 60% in Minnesota since 2005 due to a shift in generation to lower- and non-emitting sources and an increase in end-use energy efficiency.[262]

The applicant indicates that the Gopher State Solar project will contribute to Minnesota's goal to reduce GHG emissions by providing a renewable source of energy as an alternative to more carbon-intensive sources of energy, such as coal and natural gas.[263]

Potential Impacts

General

The DNR Minnesota Climate Explorer Tool was used to determine current climate conditions for Renville County.[264] Annual average temperature trends show a temperature increase of 0.19 °F per decade from 1895 to present, and 0.48 °F per decade from 1970 to present. For precipitation, total annual precipitation has increased at a rate of 0.30 inches per decade from 1895 to present, and at a rate of 0.38 inches per decade from 1970 to present.[265]

The DNR Minnesota Climate Explorer tool was also used to project climate conditions for Renville County. Temperature models were created to project climate data for two scenarios, Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. RCP is a measure adopted by the Intergovernmental Panel on Climate Change to represent various GHG concentration pathways. The numbers (i.e., 4.5 and 8.5) represent the amount of net radiative forcing the earth receives in watts per meter squared, where a higher RCP signifies a more intense GHG effect resulting in a higher level of warming. RCP 4.5

[260] Minn. Statute 216H.02
[261] Minnesota Pollution Control Agency, Greenhouse gas emissions data. https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory
[262] Id.
[263] SPA, p. 68.
[264] DNR, Minnesota Climate Explorer Tool. https://arcgis.dnr.state.mn.us/climateexplorer/main/historical
[265] Id.

represents an intermediate scenario where emissions begin to decrease around 2040 and RCP 8.5 represents a scenario with no emissions reductions through 2100.[266]

The climate models predict that under RCP 4.5, the average temperature for Renville County is projected to increase by approximately 4 °F by Mid-Century (2040 to 2059) compared to current conditions (1980 to 1999). Late-Century (2080-2099) air temperature is projected to increase by approximately 6 °F for RCP 4.5, and approximately 10 °F for RCP 8.5. Mid-century annual precipitation is projected to increase by approximately one-quarter inch for RCP 4.5. Late-Century annual precipitation is projected to increase by approximately one inch for RCP 4.5, and three inches for RCP 8.5.[267]

Greenhouse gases

Construction and operation of the project will release Greenhouse Gases (GHG), contributing to the warming of the planet. The National Renewable Energy Laboratory released a 2012 report on PV solar project life cycles. It is estimated that approximately 60-70 percent of GHG emissions from solar projects are from the upstream process of manufacturing of the PV panels and construction, approximately 21-26 percent are from operational processes of power generation and maintenance, and the remaining 5-20 percent of emissions are from downstream processes of decommissioning and disposal.[268]

For the Gopher State Solar project, construction activities will result in short-term increases in GHG emissions from the combustion of fossil fuels in construction equipment and vehicles. Construction activities for the project are expected to produce a total of 3,636 tons of CO_2e. Gopher State Solar indicates that GHG emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Upon completion of the construction activities, emissions from heavy equipment, delivery vehicles, and construction personnel will cease. Generally, the project's estimated construction emissions are insignificant relative to Minnesota's overall emissions of approximately 137 million tons in 2020.[269] Potential impacts due to construction GHG emissions are anticipated to be negligible.

Once operational, the project will generate minimal GHG emissions. Emissions that do occur would result from vehicle usage to and from the solar array and substation for maintenance and operation. During the operational stage, up to six permanent full-time workers will staff the solar farm for maintenance activities, requiring the use of up to two maintenance trucks per day. Total emissions from commuter vehicles and maintenance trucks are estimated to be 8 tons of CO_2e annually. Other emissions generated from the operation of the solar farm will result from required utilities including

[266] Noe, Ryan R; Keeler, Bonnie L; Twine, Tracy E; Brauman, Kate A; Mayer, Terin; Rogers, Maggie. (2019). Climate change projections for improved management of infrastructure, industry, and water resources in Minnesota. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/209130.

[267] DNR, Minnesota Climate Explorer Tool. https://arcgis.dnr.state.mn.us/climateexplorer/main/historical

[268] National Renewable Energy Laboratory, Life Cycle Greenhouse Gas Emissions from Solar Photovoltaics. https://www.nrel.gov/docs/fy13osti/56487.pdf.

[269] MPCA, *Greenhouse gas emissions data*. https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory

electricity, water, and sanitation, estimated to be approximately 16 tons of CO_2e per year. GHG emissions for project operation are estimated to be approximately 25 metric tons of CO_2e annually.[270]

Total emissions from the life of the project area are estimated to be 3,661 tons of CO_2e. Emissions are comprised of CO_2 from off-road engine emissions (2,154 tons), construction worker and delivery vehicles (1,202 tons and 260 tons, respectively), from electrical consumption (16 tons), and from commuter and maintenance vehicles (8 tons).[271] Other emissions will result from land use change. The majority of land-use emissions will occur during construction due to the change from cropland to settlement, however, the establishment of perennial vegetation and prairie can reduce this impact.

If electrical energy from the project displaces energy that would otherwise be generated by carbon-fueled power plants (e.g., coal, natural gas), the project would reduce overall GHG emissions. Gopher State Solar indicates that the project supports the achievement of Minnesota's carbon-free and renewable energy standards, and notes that the project will contribute to this need for carbon-free energy.[272] In addition, the project will beneficially impact the climate through the reduction of more carbon-intensive sources of energy, and temporarily reduce emissions from agricultural activities such as combustion of farm equipment and use of agricultural herbicide and pesticides. Thus, compared to non-renewable energy generation, the project would be beneficial with respect to total GHG emissions. Total GHG emissions resulting from construction and operation of the project are anticipated to be minimal when compared to the long-term reduction in GHG emissions facilitated by the project.

Climate resilience

Assessing climate resilience allows an understanding of the risks related to a warmer, wetter climate on project construction and operation. For the purposes of this EA, online climate screening tools were used to determine the projected climate change and storm intensity impacts on the project area. The EPA Climate Resilience Evaluation and Awareness Tool was used to create a projected climate scenario for the project area in 2035, and 2060.[273] The tool expects the area to experience an increase in annual temperature of 2.5 degrees Fahrenheit (F) by 2035, and 7.6 degrees F by 2060. It is also projected that the area will have an increase in 100-year storm intensity of 15 percent by 2035, and 15 to 30 percent by 2060. Because of this, there is potential for waterways to be subject to more erosion. Periods of drought may also be possible, as precipitation is expected to change by 7.29 percent annually by 2035, and 2.33 percent annually by 2060.[274] The EPA Streamflow Projections Map anticipates a change in average streamflow of the Buffalo Creek/Judicial Ditch No. 2 and No. 7 by a ratio of 1.18 (90^{th} percentile) under wetter conditions, and a ratio of 0.95 (10^{th} percentile) under drier conditions from 2071 to 2100 (RCP 8.5) compared to baseline historical flow (1976 to 2005).[275]

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[270] SPA, pp. 68-69; SPA - Appendix L: GHG Calculations
[271] SPA - Appendix L: GHG Calculations
[272] SPA, pp. 68-69.
[273] EPA, Climate Resilience Evaluation and Awareness Tool. https://www.epa.gov/crwu/climate-resilience-evaluation-and-awareness-tool.
[274] Id.
[275] EPA, Climate Change Indicators: Streamflow. https://www.epa.gov/climate-indicators/climate-change-indicators-streamflow.

Because this creek is located approximately 2.5 miles east of the project, minimal impact from river flooding is anticipated.

A warming climate is expected to cause increased flooding, storms, and heat wave events. These events, especially an increased number and intensity of storms, could increase risks to the project. Changes in precipitation patterns, particularly greater storm intensities, may generate additional floods associated with high flow events. More extreme events can lead to combined sewer overflows and reduce the capacity of sewer systems already impacted by inflow and infiltration. More extreme storms also mean more frequent heavy rainfall events, which can cause localized soil erosion or flooding. These flooding events may challenge current infrastructure for water management and flood control.[276] Flooding could damage the project's electrical collection system, including inverters and collection wiring. The project has been sited and designed with resiliency in mind as climate continues to change in Minnesota, including resilience from impacts such as temperature, strong winds, and precipitation, however, a wetter climate may impact flood size and frequency in the area. Flooding events due to climate change could have the potential to impact project operations during heavy rainfall events. These heavier rainfall events due to climate change could also have an effect on stormwater management for the project.[277]

Based on local hydrology and topography, there is potential for soils to become rutted due to increased rain events. Gopher State Solar indicates that storm ponding onsite will be sized appropriately to account for the expected increase in precipitation and will store and treat any runoff before discharging off site. Existing drainage patterns will be maintained, and the increase in native perennial vegetation and other beneficial perennials will replace seasonal row crops across most of the site, creating deep root systems that can increase the uptake of water onsite and slow and reduce stormwater runoff.[278]

The FEMA National Risk Index[279] rates Renville County as having "very low" risk for hail and "relatively high" risk for strong winds. The solar panel modules selected for the project are designed to withstand weather events typically experienced in the project area, as well as potentially more severe storms and periods of drought due to climate change. Gopher State Solar will procure equipment designed to ensure operational reliability across the range of anticipated environmental conditions for the lifetime of the project (temperature, precipitation, wind, mechanical loading, etc.). The project will be designed to comply with all applicable state and local building codes and industry standards. The civil and structural design will include safety factors for increased snow and wind loads.[280] Tracking systems can also be designed to automatically stow the panels in the safest position based on the weather conditions (wind, hail, flooding, deep snow, etc.). For example, panels can be stowed in a nearly vertical position during hail events by re-orienting the trackers, which limits direct impacts between hailstones and the panels.

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[276] EPA's Creating Resilient Water Utilities initiative – epa.gov/crwu; 2014 National Climate Assessment – nca2014.globalchange.gov
[277] SPA, pp. 69 – 70.
[278] SPA, p. 69; Appendix E: VMP.
[279] FEMA National Risk Index. https://hazards.fema.gov/nri/
[280] SPA, p. 70.

MITIGATION

Mitigation to reduce emissions during construction is discussed in the Air Quality section of this EA. Strategies to reduce emissions include keeping vehicles in good working order, which will reduce the amount GHG emissions from diesel or gasoline.

Project developers can employ location, design, and construction strategies to mitigate impacts resulting from a warmer, wetter, and more energetic climate by:

- Avoiding sites with high probability for extreme weather events to the extent possible.
- Designing solar panels and solar arrays to withstand stronger storms and winds.
- Planning for the potential repair and replacement of solar arrays damaged by storms.
- Designing the project's stormwater system to prevent flooding during heavy rainfall events.
- Designing the project's electrical collection system to be resistant to flooding damage.

4.8 Unavoidable Impacts

Resource impacts are unavoidable when an impact cannot be avoided even with mitigation strategies.

Potential impacts and the possible ways to mitigate against them are discussed in this chapter. However, even with mitigation strategies, certain impacts cannot be avoided. Most adverse unavoidable impacts are associated with construction; therefore, they would be temporary.

Unavoidable adverse effects associated with construction of the project (in some instances a specific phase of construction) would last through construction and include:

- Fugitive dust.
- Noise disturbance to nearby residents and recreationalists.
- Visual disturbance to nearby residents and recreationalists.
- Soil compaction and erosion.
- Vegetative clearing (loss of shelter belts).
- Disturbance and temporary displacement of wildlife, as well as direct impacts to wildlife inadvertently struck or crushed.
- Minor amounts of marginal habitat loss, including temporary wetland impacts.
- Possible traffic delays.
- Minor GHG emissions from construction equipment and workers commuting.

Unavoidable adverse impacts associated with the operation would last as long as the life of the project, and include:

- Visual impacts of the project.

- Cultural impacts due to a change in the sense of place for local residents.
- Loss of land for agricultural purposes.
- Injury or death of birds that collide with PV panels.
- Injury or death of wildlife from fencing.
- Infrequent vehicle trips from maintenance vehicles.
- Potential decrease to property values.

4.9 Irretrievable or Irreversible Impacts

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations.

Irreversible and irretrievable resource commitments are primarily related to project construction, including the use of water, aggregate, hydrocarbons, steel, concrete, wood, and other consumable resources. Environmentally sensitive areas including wetlands and waterbodies have been avoided to the extent possible, and the applicant does not anticipate causing any irretrievable or irreversible impacts to these resources.[281] Some other impacts, like fossil fuel use, are irretrievable. Others, like water use, are irreversible. Still, others might be recyclable in part, for example, the raw materials used to construct PV panels would be an irretrievable commitment of resources, excluding those materials that may be recycled at the end of the panels' useful life. The commitment of labor and fiscal resources to develop, construct, and operate the project is considered irretrievable. However, the applicant indicates that these represent investments in sustainable development and clean energy infrastructure that will have a net positive effect on the economy and the environment.[282]

4.10 Resource Topics Receiving Abbreviated Analysis

Resource topics that will have negligible impacts from the project and that do not impact the Commission's site permit decision receive less study and analysis.

Many environmental factors and associated impacts from a project are analyzed during the environmental review process. However, if impacts are negligible and will not impact the permit decision, those resource impacts receive less study and analysis. The following resource topics meet this threshold, which is based on information provided by the applicant, field visits, scoping comments, environmental analysis, and staff experience with similar projects.

4.10.1 Displacement

Displacement can occur when residences or other buildings are located within a proposed site or right-of-way. If the buildings would potentially interfere with the safe operation of a project, they are typically removed from the site or ROW and relocated. Displacements from large energy facilities are rare and are more likely to occur in heavily populated areas where avoiding all residences and

[281] SPA, p. 71.
[282] Id.

businesses is not always feasible than in rural areas where there is more room to adjust site boundaries or ROWs to accommodate the proposed energy facility.

There are no residences, businesses, or structures such as barns or sheds located within the area of land control that will be displaced by the project. Landowners of parcels containing farmsteads or structures are participants in the project. Gopher State Solar will continue to work with landowners to inform them of the project design and construction process to ensure the project will not interfere with existing residences, farmsteads, or outbuildings.[283] No mitigation is proposed.

4.10.2 Communications

Electronic interference from the proposed project is not anticipated. The project area is served by about 24 AM and FM radio stations or digital television channels. There are no radio, microwave, or television towers located within the boundary of the solar facility. There are no cell phone towers located within one mile of the land control area. Cellular phone service in the service area is provided by national operators.

Because the solar facilities are relatively low (less than 20 feet tall), they are well below the line of sight used in many communication system signals. Electronic interference associated with communications infrastructure is related to a phenomenon known as corona. Impacts are not expected, because anticipated electric fields are below levels expected to produce significant levels of corona.

- Section 4.3.24 of the DSP requires the permittee to take whatever action is feasible to restore or provide equivalent reception should interference occur to "radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices" as a result of the project. Additional mitigation is not proposed.

4.10.3 Implantable Medical Devices

Electromagnetic fields (EMF) might interfere with implantable electromechanical medical devices, such as pacemakers, defibrillators, neurostimulators, and insulin pumps. Impacts to implantable medical devices and persons using these devices are not expected to occur, but, if they did occur, moving away from the project would return the pacemaker to normal operation.

- Section 4.3.30 of the DSP requires the permittee to provide educational materials about the project to adjacent landowners. Additional mitigation is not proposed.

4.10.4 Forestry

Active forestry operations, including commercial timber harvest, woodlots, or other forestry resources do not occur within the land control area. Impacts to forestry operations will not occur.

4.10.5 Mining

There are no gravel pits within the area of land control. The closest gravel pits are located approximately two miles west and southwest from the project site.

[283] SPA, p. 28.

Construction of the project will require the use of sand and aggregate for backfill and access roads. The demand for sand and gravel will be temporary and is not expected to require new or expanded sand or aggregate operations.

Impacts to mining will not occur and no mitigation is proposed.

4.10.6 Topography

While grading will occur, significant impacts to topography, such as the creation of abrupt elevation changes or modifications to natural drainage patterns, are not expected. The project will be graded to natural contours, where possible, and soil will be de-compacted in accordance with the project AIMP.[284] Appropriate permanent stormwater management measures will address drainage from the newly established impervious areas. Impacts to topography will be negligible.

4.11 Cumulative Potential Effects

Cumulative potential effects result from the incremental effects of a project in addition to other projects in the environmentally relevant area.

Minnesota Rule 4410.0200, subpart 11a, defines "cumulative potential effects," in part, as the "effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects ... regardless of what person undertakes the other projects or what jurisdictions have authority over the project."

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA.

Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that may be minimal in the context of a single project may accumulate and become significant when all projects are considered.

4.11.1 Analysis Background

The ROI for cumulative potential effects varies across elements and is consistent with the ROI identified in potential impacts and mitigation throughout this document. Cumulative potential effects—where they coincide—increase or decrease the breadth of the impact to the resources and elements studied in potential impacts and mitigation. This may or may not change the impact intensity level assigned to the resource or element.

Cumulative potential effects are impacts to the environment that results from "the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."[285]

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[284] SPA, p. 18.
[285] Minn. R. 4410.0200, subp. 11a

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA. Generally, this area includes the ROI for the different resource elements.

Gopher State Solar contacted local governments, as well as reviewed desktop resources including Renville County's website, MnDOT's district projects, and the Environmental Quality Board's interactive project database to identify foreseeable projects. This review did not reveal any projects proposed with similar timing and within close proximity to the project area that would be expected to interact negatively, or create significant cumulative impacts with the proposed project. Additionally, Gopher State Solar communications with state, Renville County, and township officials and local landowners have not identified other proposed or ongoing projects or activities in the area.[286]

Because there are no identified projects in the environmentally relevant area, the cumulative impacts of the project are those solely from project construction, operation, maintenance, and decommissioning as discussed in this EA. Since there are no anticipated cumulative impacts from the project, no mitigation is proposed.

[286] SPA, p. 70.

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