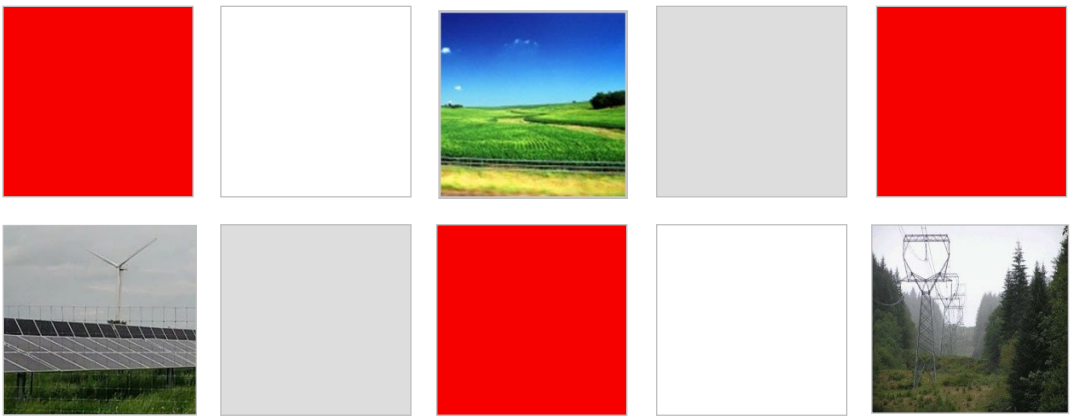

GOPHER STATE SOLAR, LLC

Site Permit Application for the Gopher State Solar Project

Renville County, Minnesota

GOPHER STATE SOLAR
A RANGER POWER PROJECT

Docket No. IP7127/GS-24-106

PREPARED BY

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LIST OF TERMS AND ABBREVIATIONS

Term	Definition
AADT	Annual Average Daily Traffic
AC	alternating current
AIMP	Agricultural Impact Mitigation Plan
ANSI	American National Standards Institute
Application	Site Permit Application
AQI	air quality index
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BMP	best management practice
BWSR	Minnesota's Board of Water and Soil Resources
CAA	Clean Air Act
CFS	carbon-free standards
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
CREP	Conservation Reserve Enhancement Program
CSW	construction stormwater
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibels
DC	direct current
DESRI	D.E. Shaw Renewable Investments, LLC
DOC	Minnesota Department of Commerce
DWSMA	Drinking Water Supply Management Area
ECS	Ecological Classification System
EERA	Energy Environmental Review and Analysis
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	U.S. Department of Transportation Federal Highway Administration
gen-tie	generation interconnect
GHG	greenhouse gas
GIA	Generator Interconnection Agreement
GIS	geographical information system
Gopher State Solar	Gopher State Solar, LLC
HIFLD	Homeland Infrastructure Foundation-Level Data

Term	Definition
HUC	hydrologic unit code
IPaC	Information for Planning and Consultation
L_{10}	sound level that is exceeded 10% of the hour
L_{50}	sound level that is exceeded 50% of the hour
LEPGP	large electric power generating plants
Leq	equivalent continuous sound level
LRR	Land Resource Region
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDLI	Minnesota Department of Labor and Industry
Merjent	Merjent, Inc.
mG	milligauss
MISO	Midcontinent Independent System Operator
MLCCS	Minnesota Land Cover Classification System
MLRA	Major Land Resource Area
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPC	native plant communities
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O&M	operations and maintenance
O_3	ozone
OSA	Office of the State Archaeologist
Pb	lead
Phase I ESA	Phase I Environmental Site Assessment
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POI	Point of Interconnection

Term	Definition
PPA	Power Purchase Agreement
Project	Gopher State Solar Project
Preliminary Development Area	Approximately 1,135 acres located within the Project Area occupied by the solar panels and associated infrastructure and needed for construction and operation of the Project based on the preliminary design
Project Area	Approximately 1,645 acres located in Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota proposed for the Project location
PV	photovoltaic
PWI	Public Waters Inventory
Ranger Power	Ranger Power LLC
RES	renewable energy standards
RIM	Reinvest in Minnesota
SCADA	supervisory control and data acquisition
SDS	State Disposal System
SES	solar energy standards
SHPO	Minnesota State Historic Preservation Office
SNA	scientific and natural areas
SO_2	sulfur dioxide
SOBS	sites of biodiversity significance
Survey Area	Approximately 2,145 acres, including the Project Area and a buffer, utilized for wetland and other waterbody surveys
SWPPP	Stormwater Pollution Prevention Plan
U.S. Census	2020 United States Census Bureau
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
WCA	Minnesota Wetland Conservation Act
WHPA	Wellhead Protection Areas
WMA	Wildlife Management Areas
WP	watt peak

1.0 INTRODUCTION

Gopher State Solar, LLC (Gopher State Solar) proposes to construct and operate a 200 megawatt (MW) photovoltaic (PV) solar energy generating facility and associated infrastructure, known as the Gopher State Solar Project (Project). The proposed Project will be located in Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota. The Project Area is approximately 1,645 acres in size (see Figure 1), 977 acres of which will be occupied by the solar panels and associated infrastructure (see Figure 2).

The Project requires a Site Permit from the Minnesota Public Utilities Commission (Commission). Gopher State Solar respectfully submits this Application to the Commission for a Site Permit in accordance with the Minnesota Power Plant Siting Act (Minn. Stat. § 216E) and Minn. R. Chapter 7850.

On March 1, 2024, Gopher State Solar submitted formal notice to the Commission of the Project's intent to submit an application using the alternative review process found in Minnesota Statutes § 216E.04 and Minnesota Rules 7850.2800-7850.3900. Additionally, on March 1, 2024, Gopher State Solar provided a written request to the Minnesota Department of Commerce (DOC), Energy Environmental Review and Analysis unit (EERA) for a solar energy generating system size determination in accordance with Minn. Stat. § 216E.021. The size determination response from EERA was issued on March 18, 2024 (see Appendix G).

The Project will use bi-facial PV modules affixed to tracking systems that allow the PV modules to track the sun from east to west and will be constructed on a schedule that facilitates an in-service date in 2027.

Gopher State Solar proposes to interconnect the Project at Great River Energy's existing Panther Substation in Renville County, Minnesota (see Figure 3). Gopher State Solar filed a queue position with the Midcontinent Independent System Operator (MISO) in the MISO DPP 2021 West study cycle as J1846. It is anticipated that Gopher State Solar will execute a Generator Interconnection Agreement (GIA) with MISO for 200 MW; Gopher State Solar will notify the Commission when the GIA has been executed. This interconnection will provide sufficient outlet to accommodate all of the solar energy generation from the Project.

1.1 PURPOSE AND NEED

The Project will provide up to 200 MW of capacity annually of reliable, renewable energy. Gopher State Solar is siting and permitting the Project to meet or exceed applicable local and state requirements, including the prime farmland exclusion rule to the extent practicable.

The Project will support the state's carbon-free standards (CFS), renewable energy standards (RES), and solar energy standards (SES) in Minn. Stat. § 216B.1691, which requires Minnesota utilities to provide 100% of their retail energy sales from carbon-free energy sources by 2040, as well as setting other interim renewable energy and solar energy targets. As such, the Project will support the state's growing demand for renewable energy and for utilities, independent power purchasers and corporations seeking to use renewable energy for business growth. In addition, the Project will diversify electricity sources, address environmental concerns, meet anticipated growth in electrification (e.g., vehicles, heating, etc.), and address CFS, RES, SES, and policy goals, as described above. The Project will also benefit the local community through investment in construction spending, operation of the Project, property and business taxes, and landowner lease payments.

Gopher State Solar is working towards securing a Power Purchase Agreement (PPA) or other enforceable mechanism to sell the electricity generated by the Project. The power generated by the Project will be offered for sale to wholesale customers, including Minnesota utilities and others that have identified a need for additional renewable energy and capacity.

1.2 APPLICANT INFORMATION

The Permittee for the Site Permit will be:

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1.2.1 Ownership at Time of Filing

Gopher State Solar is the owner of the Project at the time of filing this Application and has obtained all necessary land rights for construction and operation of the Project.

The applicant is Gopher State Solar, LLC. Ranger Power LLC, a Delaware limited liability company specializing in the development of utility-scale renewable energy projects in the United States, is developing the Project on behalf of Gopher State Solar. Gopher State Solar's indirect parent company is D.E. Shaw Renewable Investments, LLC (DESRI). DESRI and its affiliates acquire, own, and manage long-term contracted renewable energy assets in North America.

1.2.2 Proposed Ownership after Commercial Operations

Gopher State Solar will own, operate, and maintain the Project after starting commercial operations. While not planned at this time, Gopher State and DESRI may sell or assign the Project

to another qualified entity at any time, before, during, or after the Project is constructed. A sale of the Project would require approval by the Commission to transfer the Site Permit to the new owner, and any future buyer would be required to meet the conditions of the Site Permit as well as any other conditions at the local, state, or federal level.

1.3 PROJECT SCHEDULE

TABLE 1.3-1

Preliminary Project Construction Schedule

Activity	Date
Secure Land Rights	Complete
PV/Equipment Procurement	Q4 2025
Obtain Site Permit from the PUC	Q3 2025
Obtain Other Permits	Q1 2026
Mobilization/Civil Grading	Q2 2026
Begin Racking Installation	Q2 2026
Begin PV Module Installation	Q1 2027
Begin PV Commissioning	Q4 2027

1.4 POTENTIALLY REQUIRED PROJECT PERMITS, APPROVALS, AND PLANS

Construction and operation of the proposed Project will likely require permits, approvals, and plans at the federal, state, and local levels. Potential permits, approvals, and plans are described in Table 1.4-1.

TABLE 1.4-1

Potential Permits/Approvals/Plans

Agency	Permit/Approval/Plan	Applicability	Status and Timing	Permit Required?
FEDERAL				
U.S. Army Corps of Engineers (USACE)	Section 404 Permit (Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act)	Dredging or filling jurisdictional Waters of the United States (wetlands/waterways).	To be obtained prior to construction as needed.	Potentially - TBD
U.S. Environmental Protection Agency (EPA)	Spill Prevention, Control, and Countermeasures Plan	Project facilities with oil storage of more than 1,320 gallons.	To be prepared prior to construction as needed for construction related storage of fuel. To be prepared prior to operation for operation related storage of fuel if storage exceeds applicability thresholds.	Potentially - TBD
STATE				
Minnesota Public Utilities Commission	Site Permit	Required for large electric power generating plants (LEPGP) 50 MW or greater.	To be obtained prior to construction.	Required
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits.	To be obtained prior to construction as needed.	Potentially - TBD

TABLE 1.4-1

Potential Permits/Approvals/Plans

Agency	Permit/Approval/Plan	Applicability	Status and Timing	Permit Required?
MPCA	National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acre of land.	To be obtained/prepared prior to construction.	Required
MPCA	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons	To be obtained prior to operation if storage tanks exceeding registration thresholds are installed.	Potentially - TBD
Minnesota Department of Health (MDH)	Well Construction permit	Installation of a water supply well.	To be obtained prior to construction of a well (if needed for O&M building), as needed.	Potentially - TBD
Minnesota Department of Labor and Industry (MDLI)	Request for Electrical Inspection	Necessary to comply with state electrical codes.	Inspection to be conducted after installation of electrical equipment during construction and prior to operation.	Required
Minnesota Department of Natural Resources (MNDNR)	Water Appropriation Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering).	Temporary Water Appropriation Permit, for Temporary Dewatering: To be obtained, as needed, if water withdrawals exceed 10,000 gallons per day or 1 million gallons per year.	Potentially - TBD
MNDNR	Public Water Work Permit	Placement of structures in public waters.	To be obtained prior to construction of structures in public waters, as needed.	Potentially - TBD
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review; State and National Register of Historic Sites Review	Projects that require State permits or affect State registered properties or require Section 106 compliance	Obtain concurrence on Phase 1 inventory prior to construction.	Required
Minnesota Department of Transportation (MnDOT)	Application for Utility Accommodation on Trunk Highway Right of Way	Installing utilities along, across, or within trunk highway right of way.	To be obtained prior to installation of utilities within MnDOT right of way, as needed.	Potentially - TBD
MnDOT	Access (driveway) Permit	Required for construction of a driveway/access road using MnDOT rights of way.	To be obtained prior to construction of driveway on MnDOT right of way, as needed.	Potentially - TBD
MnDOT	Oversize/Overweight Permit	Vehicles delivering equipment, materials, and supplies that exceed applicable MnDOT height/length and weight limits.	To be obtained prior to equipment deliveries, as needed.	Potentially - TBD
COUNTY/LOCAL				
Renville County, MN	Minnesota Wetland Conservation Act (WCA) Approval (in conjunction with Renville County Soil and Water Conservation District)	Activities affecting water resources.	To be obtained prior to construction in jurisdictional waters, if needed.	Potentially - TBD

TABLE 1.4-1

Potential Permits/Approvals/Plans

Agency	Permit/Approval/Plan	Applicability	Status and Timing	Permit Required?
Renville County, MN	Public ditches	Activities crossing public ditches	To be obtained prior to construction	Potentially - TBD
Renville County, MN	Individual Sewage Treatment Systems Permit	Required prior to installation of any individual sewage treatment system in Renville County.	To be obtained prior to construction of septic system, as needed.	Potentially - TBD
Renville County, MN	Driveway/Entrance Permit	Required for constructing new driveway access to county roads.	To be obtained prior to construction of new driveway access, as needed.	Potentially - TBD
Renville County, MN	Utility Permit	Required for installation of utility infrastructure in a county road right of way.	To be obtained prior to installation, as needed.	Potentially - TBD
Renville County, MN	Work in the Right of Way Permit	Required to work within public road right of way.	To be obtained prior to work within right of way, as needed.	Potentially - TBD
Renville County, MN	Oversized/Overweight Permit	Use of overweight/oversized vehicles on county roadways.	To be obtained prior to equipment deliveries, as needed.	Potentially - TBD
Renville County, MN	Drainage Policy	Required if project is within 60' of the drain tile corridor or overtop of tile	To be obtained prior to construction, as needed.	Potentially - TBD

1.4.1 Local Approvals

Pursuant to Minn. Stat. § 216E.10, subd. 1, the issuance of a Site Permit for a large electric power generating plant is the sole site approval required to be obtained. The Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

Gopher State Solar has consulted with local officials early in the development process and will strive to incorporate feedback and reasonable recommendations from local stakeholders into the final design of the Project. A summary of public and regulatory outreach is described in Section 5.0.

1.4.2 Certificate of Need

Pursuant to Minn. Stat. § 216B.243, subd. 2, no large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Commission. However, in accordance with Minn. Stat. § 216B.243, subd. 8, solar energy generating systems, for which a site permit application is submitted by an independent power producer under Chapter 216E, are exempt from the Certificate of Need process.

1.4.3 Site Permit

The Project meets the definition of a Large Electric Power Generating Plant (LEPGP) as defined in the Power Plant Siting Act and requires a Site Permit from the Commission prior to construction. In accordance with Minn. Stat. § 216E.04, subd. 2(8), Gopher State Solar seeks approval of its Application under the alternative review process provided for under Minn. Stat. § 216E.04 and

Minn. R. 7850.2800-7850.3900. The Applicant filed a Notice of Intent to Submit a Site Permit Application under the Alternative Permitting Process to the Commission on March 1, 2024.

1.4.4 Route Permit

The proposed 230 kV generation interconnect (gen-tie) line will connect the new Project substation to Great River Energy's existing Panther Substation. The gen-tie line will be approximately 1,300 feet long and will not exceed 1,500 feet in length. As such, the gen-tie line will not meet the definition of a high voltage transmission line as found in Minn. Stat. § 216E.01, subd. 4, and a route permit is not required.

1.4.5 Other Potential Permits and Approvals

Gopher State Solar will obtain all permits, licenses, and approvals that are required following issuance of the Site Permit. The potentially applicable permits or approvals for the construction and operation of the Project are shown in Table 1.4-1. Copies of agency correspondence concerning approvals are included in Appendix G, Agency and Tribal Coordination and Correspondence.

2.0 PROJECT INFORMATION

The following sections provide a description of the Project Area, Preliminary Development Area, and proposed Project infrastructure including land control, Project design, interconnection, prohibited areas, alternatives, and costs.

2.1 LOCATION

Gopher State Solar is proposing to build the solar facility in Kingman, Osceola, and Bird Townships, in Renville County, Minnesota. Figure 1 shows the location of the proposed Project facilities and Table 2.1-1 below provides the township, range, and sections of areas included within the respective political boundaries.

TABLE 2.1-1

Project Location

Township	Range	Section(s)
115N	34W	1, 2
116N	33W	19, 30
116N	34W	23, 24, 25, 26, 34, 35, 36

2.2 OVERALL PROJECT DESCRIPTION

The Project Area is comprised of approximately 1,645 acres of agricultural land located within Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota (see Figure 1). Gopher State Solar has worked with landowners and secured site control for the proposed Project (the landowner list is provided in Appendix L). The final Project design is anticipated to occupy approximately 977 acres, with the additional acreage allowing for required buffers and flexibility in design. The Project is adjacent to Great River Energy's existing 230 kV Panther Substation, which will be the Project's Point of Interconnection (POI). Connecting the Project to the POI will require an approximately 1,300-foot-long gen-tie line between the proposed new Project substation and the Panther Substation (see Figure 3). The proposed gen-tie line will not exceed 1,500 feet in length.

Gopher State Solar has designed an up to 200 MW solar PV system using single-axis trackers. Energy loss and electrical wiring have been minimized by optimizing the inverter locations and the electrical collector line system.

Equipment for the Project has not been finalized; however, Gopher State used the Meyer Burger Glass Utility (550-to-565-watt peak [WP]) solar module for the proposed design, which is for ground-mounted solar power plants. The Meyer Burger solar module consists of 144 half cells with bifacial technology that is extremely durable and yields more energy over the same area even on cloudy or hot days. While the current design anticipates Meyer Burger technology, other panels and manufactures are under consideration. Any changes in technology moving forward are anticipated to build upon current Project efficiencies presented in this Application.

The Project's main components include PV panels mounted on a single axis tracking system, solar inverters, an operations and maintenance (O&M) building, and a substation. The racking system foundations will be pile driven, with the depth varying depending on the geotechnical investigation. The racking system foundations are not anticipated to require concrete; however, some concrete foundations may be needed depending on location and specific soil conditions. Associated facilities include electrical cables, conduit, switchgear, step up transformers, supervisory control and data acquisition (SCADA) system, and metering equipment. The solar facility will be fenced and gated for security. After construction is complete, disturbed areas will be seeded with a beneficial seed mix to enhance soil and water retention and reduce stormwater runoff and erosion throughout the Project Area. The Applicant will work collaboratively with the Minnesota Department of Natural Resources (MNDNR) to maximize the opportunity to establish and manage the vegetation at the Project site pursuant to the Agricultural Impact Mitigation Plan (AIMP) (see Appendix D) and the Vegetation Management Plan (VMP) (see Appendix E).

Gopher State Solar proposes to interconnect the Project at Great River Energy's existing Panther Substation. Gopher State Solar will build a new substation and 230 kV gen-tie line to connect the Project to the Panther Substation. The gen-tie line will be supported by several wood or direct embedded steel posts that are anticipated to consist of a standard horizontal braced post. This interconnection will provide sufficient outlet to accommodate all of the solar energy generation from the Project.

Because the Commission's Site Permit supersedes local permits, no township or county land use permits are required for development or construction of the Project. Based on the Renville County Zoning Map (Renville County, 2019), the entire Project Area is zoned as (A) Agricultural, and the Project is not located within any areas zoned as a shoreland district. The county's Land Use Ordinance includes Zoning Regulations (Renville County, 2021a) and Renewable Energy Regulations (Renville County, 2021b) that outline standards for "Solar Energy Conversion Systems (large and small)." Solar farms greater than 100 kilowatts are listed as a conditional land use in the agricultural district. Renville County's Renewable Energy Regulations outline performance standards, setbacks, and outline 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. The county has determined that these types of land uses are acceptable in the Agricultural district upon approval of a conditional use permit, when not superseded by the Commission's Site Permit. See Section 1.4.1 regarding the site permit and preemption of local permits and zoning.

2.3 PROJECT, ASSOCIATED FACILITIES, AND INTERCONNECTION DESCRIPTION

2.3.1 Project and Associated Facilities

As further detailed in Section 3.0 below and shown on Figure 4, the Project and associated facilities and equipment include:

- PV solar modules;
- Inverters;
- Step-up transformers (connecting solar panel inverters to collector lines/Project substation);
- Electrical wiring (connecting PV solar modules to solar panel inverters);
- Single-axis trackers;
- Collector lines (connecting solar panel inverters to Project substation);
- Security fencing and gates;
- Access roads;
- Stormwater treatment areas (associated with the Project);
- O&M building;
- Project substation;
- Power transformer(s);
- Overhead 230 kV Project gen-tie line (Project substation to Great River Energy's Panther Substation);
- Switchgear;
- Metering equipment; and
- Ancillary equipment or buildings as necessary.

2.3.2 Interconnection Description

The proposed 230 kV gen-tie line will be approximately 1,300 feet long and not longer than 1,500 feet and will connect the new Project substation to Great River Energy's existing 230 kV substation.

2.3.3 Size and Capacity

Gopher State Solar anticipates that approximately 977 acres of the 1,645-acre Project Area is necessary to accommodate the final design and engineering of the Project. This includes the access roads, O&M building, solar panels, collector lines, and inverters.

Gopher State Solar has secured 100% land control within the Project Area as either a lease or easement. The Project Area is comprised entirely of private land.

Gopher State Solar filed a Solar Size Determination Request with DOC EERA on March 1, 2024. DOC EERA provided a written response on March 18, 2024 and determined that the Project is not associated with any other planned or existing solar projects, which would require them to be combined into a single project (see Appendix G). Based on the size of the proposed Project, Gopher State Solar must obtain a Site Permit from the Commission. Figure 3 shows the Project POI and preliminary facility design, including associated infrastructure. Additional information on the facility design is provided in Section 3.1 and the preliminary site plan is provided in Appendix C.

2.4 PROHIBITED AND EXCLUSION SITES

Minnesota Rules 7850.4400, subp. 1 prohibits power generating plants from being sited in prohibited areas, including: national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic and recreational riverways; state wild, scenic, and recreational rivers and its land use districts; state parks; nature conservancy preserves; state scientific and natural areas (SNA); and state and national wilderness areas. The Project is not located in any of the aforementioned prohibited areas (see Figure 5).

In addition, Minnesota Rule 7850.4400, subp. 3 requires applicants to avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include state registered historic sites; state historic districts; state Wildlife Management Areas (WMA); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The proposed Project facilities are not located within any of the listed exclusion areas (see Figure 5).

2.4.1 Prime Farmland

Subject to certain exceptions, Minnesota Rule 7850.4400, subp. 4 prohibits large energy power generating plants from being sited on more than 0.5 acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. The Project Area is sited on approximately 416 acres of prime farmland, 1,035 acres of prime farmland if drained, and 125 acres of prime farmland if protected from flooding or not frequently flooded during the growing season (see Figure 6 and Section 4.3.1). Given the 200 MW net generating capacity of the Project, this rule would allow use of up to 100 acres of prime farmland for the Project. According to the Soil Survey Geographic Database, of the 1,135 acres of development area, a total of approximately 1,107 acres (98%) are considered prime farmland: 299 acres (26%) are prime farmland, approximately 787 acres (69%) are prime farmland if drained, approximately 21 acres (2.0%) are prime farmland if protected from flooding or not frequently flooded during the growing season), and approximately 28 acres (2%) are farmland of statewide importance (see Figure 6) (USDA NRCS, 2023). These acreages of prime farmland will be taken out of production for the anticipated 40-year life of the Project but will not be permanently removed.

In May 2020, the Minnesota DOC issued *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternatives* (DOC, 2020). The only exception to Minnesota Rules 7850.4400, subp. 4 is if there is no “feasible and prudent” alternative. The guidance document is intended to assist solar developers in defining feasible and prudent siting alternatives. Gopher State Solar completed an evaluation of potential alternatives in an attempt to find a location for the Project that would use fewer acres of prime farmland and documentation is provided in Appendix B to show that there is not a feasible and prudent alternative to the Project that satisfies the prime farmland exclusion rule.

2.5 ALTERNATIVES CONSIDERED BUT REJECTED

In accordance with Minn. Stat. 216E.04, subd. 2(8), the Project qualifies for the alternative review process under Minnesota Rules 7850.2800-7850-3900 because it is a large electric power generating plant that is powered by solar energy. As such, Gopher State Solar is not required to analyze alternative sites pursuant to Minnesota Rules 7850.3100 unless it rejected alternative sites. Gopher State Solar did seek and analyze other areas in Minnesota where the Project could be sited to be compliant with the prime farmland exclusion rule (see Section 4.3.1.1 and Appendix B). These alternatives were determined to not be feasible or prudent for siting the Project and were not carried forward as Project alternatives (see Appendix B). Gopher State Solar selected the proposed Project Area due to minimal environmental and prime farmland impacts, proximity to the electrical grid and existing transmission infrastructure, willing landowners, and available capacity of the grid to which the Project will interconnect.

2.6 COST ANALYSIS

Estimated project costs are included in NONPUBLIC Appendix M.

2.7 FUTURE EXPANSION

Gopher State Solar does not currently plan to expand the proposed Project. Land that is proposed for development will be leased from landowners for a term of 40 years.

3.0 ENGINEERING AND OPERATIONAL DESIGN

The following describes the Project design, facility equipment, associated facilities, O&M building, security fencing, and access to the Project. The Preliminary Facility Design is shown on Figure 4 (see also the Preliminary Site Plan in Appendix C).

3.1 DESIGN

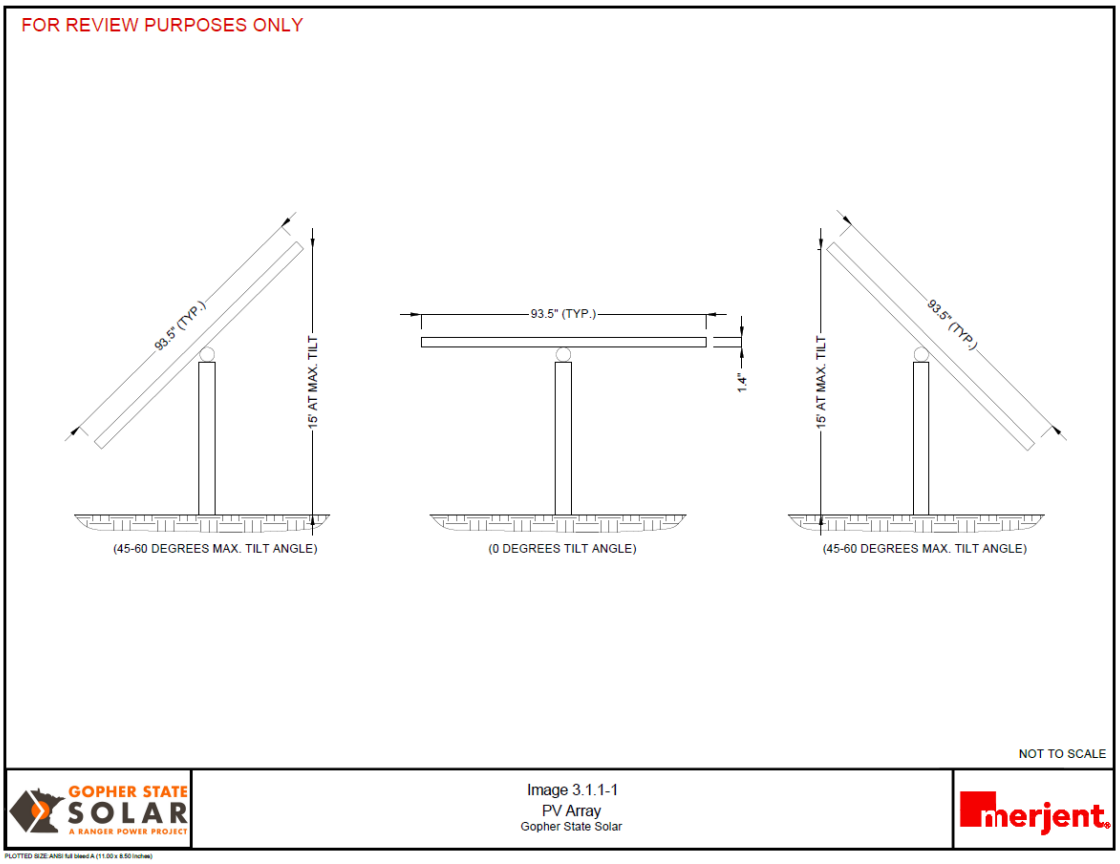
The Project's primary components include PV solar modules mounted on a single axis tracking system, inverters, a Project substation, Project gen-tie Line, electrical collector lines, an O&M building, fencing, and access roads (see Figure 4 and Appendix C). One meteorological tower, less than 15 feet high, is proposed and will be used to collect relevant weather data that correlates to the plant's performance.

The current design includes use of Meyer Burger Glass Utility (550 to 565 WP) panels and SunGrow SG4400UD-MV-US inverters. The final selection of equipment will be dependent upon equipment that is available at the time of construction. An individual tracker row is used as a basic unit of the Project and is made up of modules mounted on a flat beam oriented north-south, with a break in the middle where the gear box is located. The tracker rows tilt east-west to follow the sun throughout the day. The racking system consists of all the components involved in fastening the modules to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations.

3.1.1 Photovoltaic Arrays and Solar Field

For descriptive purposes, an individual tracker row is used as a basic unit of the Project. A tracker row is made up of modules mounted on a flat beam that is oriented north-south, with a break in the middle where the gear box is located. Gopher State Solar is proposing to use bi-facial modules affixed to tracking mechanisms that will allow the modules to follow, or track, the sun from east to west on a daily basis. The modules and tracking rack system are generally aligned in rows

oriented north and south with the PV solar modules facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The modules are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day (see Image 3.1.1-1). The tracking rack system allows the Project to optimize the angle of the modules in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.



When the sun is directly overhead, the PV solar modules will be at a zero-degree angle (level to the ground) and approximately 4 to 7 feet off the ground. The tracker rows will follow the sun from a maximum of approximately 60 degrees east to 60 degrees west through the course of the day (the design tilt may vary). 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, as determined by site specific constraints. The design will involve no spinning machinery (except for the tracker motor), no thermal cycle, and no water use (except for possible infrequent module washing and dust control). The racking system consists of all the components involved in fastening the modules to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations. The Project will require approximately 454,517 PV panels to provide 200 MW of solar energy.

To the extent practical, the racking system foundations will be installed on piers and will not require concrete. Gopher State Solar will complete a geotechnical investigation prior to construction to determine if some concrete foundations will be required. The depth of pier foundations will vary based on the geotechnical investigation and final design. A final PV solar module has not yet been selected for the Project. The proposed module at the time of this Application submittal is the Meyer Burger Glass Utility (550 to 565 WP) panels. It is possible that new solar modules could be introduced to the market prior to construction and those modules

could increase the efficiency or cost-effectiveness of the Project (e.g., higher efficiency or higher wattage per module options). As such, it is important to maintain as much flexibility in the individual supplier and technology choice as possible to ensure selection of the best equipment to fit the Project at the time of procurement. Selection of newer, higher wattage equipment that may become available before the Project goes to construction could potentially reduce the overall footprint of the Project while increasing efficiency and performance. Gopher State Solar will consider the costs and performance of each technology option, as well as environmental and safety standards, when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, timeframe, or budget.

3.1.2 Project Substation

The Project substation is proposed for an area west of 380th Street and south of the existing Great River Energy Panther Substation (see Figure 3). The Project substation is estimated to occupy approximately 1.65 acres of land and will connect the Project to the transmission grid. It 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 using the Project's access roads. It will consist of supporting structures for high voltage electrical structures, breakers, transformers, lighting protection, and control equipment. The Project substation location will be graded and the ground surface dressed with crushed rock. Secondary containment areas for the transformer will be installed as necessary. The fenced area of the Project substation footprint will be approximately 72,000 square feet in size (subject to final substation layout) and be surrounded by a minimum 20-foot buffer. Underground 34.5 kV collector lines from the Project will deliver solar generated energy to the Project substation. The collector system voltage will then 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.

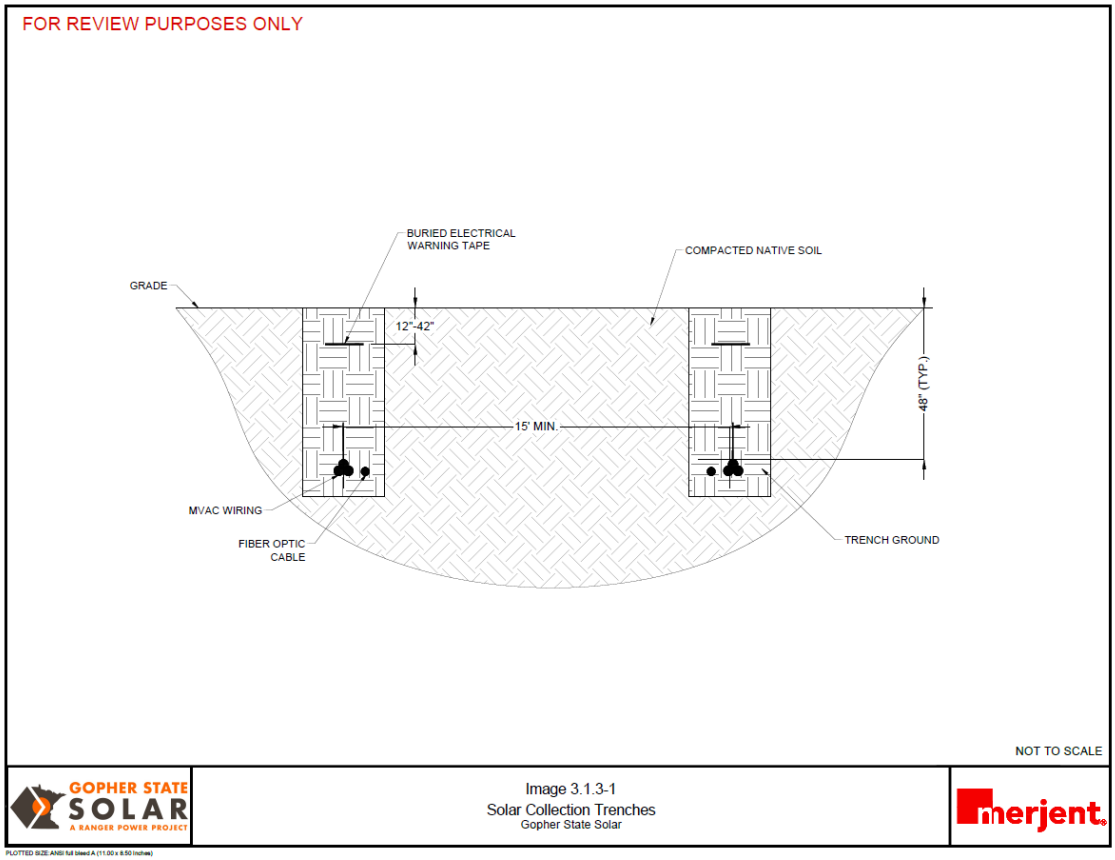
Per MNDNR recommendations regarding other recent solar and substation projects, the Project substation's lighting will follow the Minnesota Department of Transportation's (MnDOT) approved products for luminaries, which recommends using shielded and downward facing lighting and lighting that minimizes blue hue. LED lights tend to emit blue light, which can be harmful to 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.

The area within the Project substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substation will be fenced with a 7-foot-high chain-link fence for security and safety purposes.

3.1.3 Associated Facilities

The solar panels deliver power to the inverters through underground collector lines. The collector line system will either be buried in a trench or conduit or may be 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 belowground. Buried collector lines will be at least 4 feet deep and 1 to 2 feet wide (see Image 3.1.3-1) in accordance with the AIMP. The electrical collector line 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 trench excavations, the topsoil and subsoil will be removed and stockpiled separately. Once the 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 ensure restoring the

trench to the original grade after settling. Best management practices (BMP) that will be used during earthmoving activities are described in detail in the AIMP.



The specific electrical collector line technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collector line system. The Project is anticipated to have approximately 37.6 miles of collector lines.

A specific inverter has not been selected for the Project. The proposed inverter at the time of the Application submittal is the SG4400UD-MV-US. Gopher State Solar will select a final inverter based on availability at the time of procurement. Gopher State Solar will consider the cost and performance of each option, as well as environmental and safety standards, when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, schedule, or budget. The Project will require approximately 72 inverters.

Each inverter will be located on a mounded gravel pad. Inverters convert the DC output of the PV modules to AC, which is required for delivery to the electrical grid. After the inverter has converted the electricity, it is stepped-up via a transformer from low voltage to medium or intermediate voltage (stepped up to 34.5 kV). The final number of inverters for the Project will depend on the inverter size, inverter and module availability, as well as the final array configuration.

3.1.4 Operations and Maintenance Building

The Project will include construction and use of an O&M building (see Figures 2-4 and Appendix C). The O&M building will be located within the Project Area, near the proposed substation, in an upland area. The O&M building is anticipated to be up to 29,400 square feet and

will be used to conduct maintenance and repair of Project equipment and solar module components, store parts and other equipment and store other operation and maintenance supplies (e.g., materials for cleaning PV panels, etc.). The O&M building will be locked when not in use by Project staff and it will also store the SCADA system that will remotely monitor Project facilities.

3.1.5 Fencing

Permanent security fencing will be installed along the perimeter of each grouping of the solar arrays (see Figure 4 and Appendix C). Fencing will consist of a lightweight agricultural woven wire fabric secured to wooden posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. The fencing will extend a maximum total height of approximately 7 feet above grade.

Warning signs, including “high voltage keep out” signs, will be placed in accordance with MNDNR and National Electrical Safety Code (NESC) requirements along the fence line. This 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.

To comply with the NESC, security fencing around the Project substation will consist of 7-foot-high chain-link fence. Fence posts will be spaced a maximum of 10 feet apart and high voltage warning signs will also be installed on the Project substation fence. As indicated above, a lockable gate will be installed with the Project substation site fencing. This fencing and gate will be designed to prevent the public and wildlife from gaining access to electrical equipment which could cause injury.

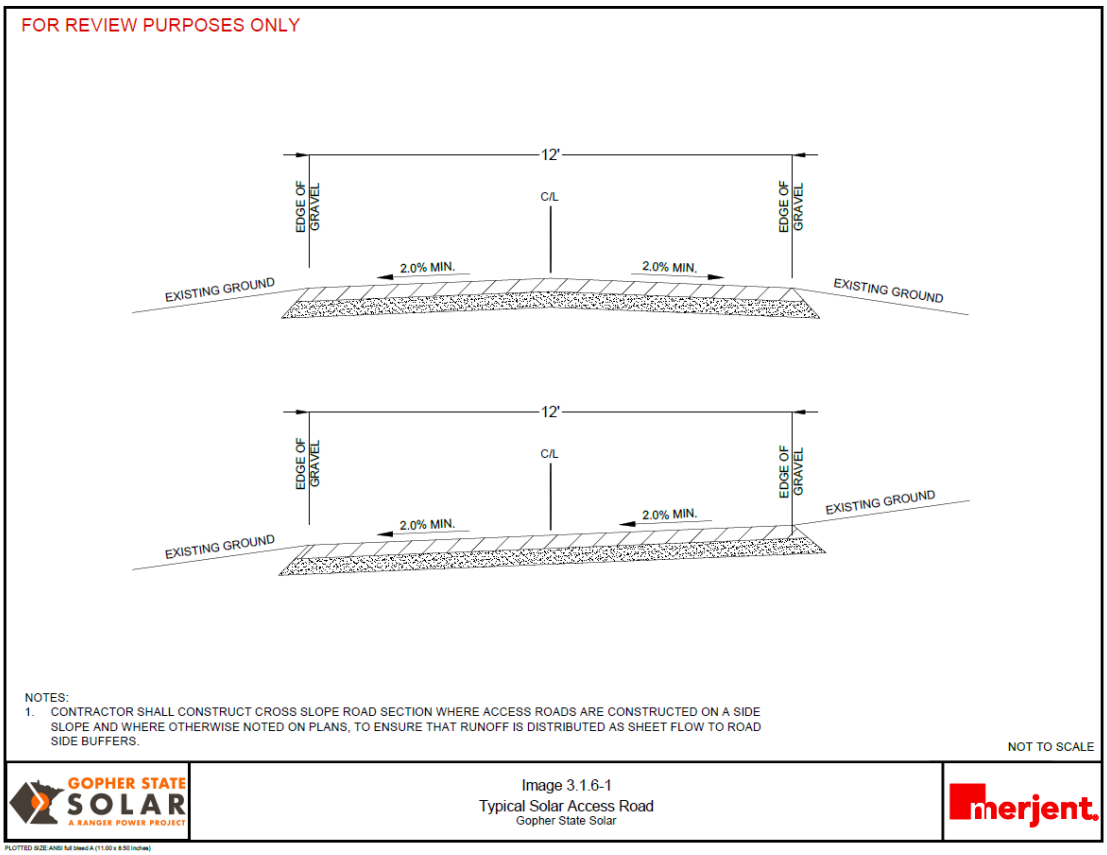
3.1.6 Access Roads/Transportation System

The Project will include approximately 8.95 miles of graveled access roads that lead to the inverters and the O&M building (see Figures 3 and 4). The final length of the access roads will depend on the equipment selected and final engineering. These roads are typically 12-16 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet) as indicated in Image 3.1.6-1.

During construction, access roads may be temporarily wider and then 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.

Upgrades or other changes to the public roads, which may include but are not limited to road improvements, additional aggregate, and driveway changes, may be required for construction or operation of the Project. Gopher State Solar will work with Renville County to facilitate upgrades to meet required standards and with landowners for final design considerations as needed.

Gopher State Solar will continue to coordinate with county and state road authorities as the Project develops. Gopher State Solar will obtain driveway and/or access permits from relevant road authorities relating to access to the Project through public roads, as well as installation of temporary facilities that may be proposed to occupy portions of public road rights-of-way during the construction process. Gopher State Solar will also obtain relevant permits and/or authorizations from road authorities relating to electric cables and/or feeder lines that may be placed in or across a public road right-of-way.



3.1.7 Pipeline System

No pipeline system will be built, accessed, or needed to accomplish the Project. As no pipelines will be needed for the Project, this section is not applicable to the Application.

3.2 PROJECT LAYOUT

The final layout will minimize environmental impacts and optimize electrical generation. While not required (see Section 1.4.1), Gopher State Solar has sited the Project to comply with the county's published setbacks for solar facilities, where possible, and will comply with other local, state, and federal regulations as required. In addition, all MNDNR buffer requirements under Minn. Stat. § 103F.48 have been met. The preliminary Project layout is provided on Figure 4.

3.2.1 Setbacks

The Project is considered a Large Electric Power Facility as defined in Minn. Stat. § 216E.01, subd. 6 and Minn. R. 7850.1000, subp. 10; therefore, as described in Section 1.4.1, the Site Permit issued by the Commission supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

While not required, Gopher State Solar has attempted to incorporate Renville County setbacks and applicable ordinance standards in addition to meeting applicable State requirements. Chapter 15, Renewable Energy Regulations of Renville County's Land Use Ordinance contains setbacks for solar projects under their jurisdiction. Renville County's setbacks are included in Table 3.2.1-1.

TABLE 3.2.1-1

Renville County Setback Requirements

Setback Type	County Setback Distance (feet)	Project Design Setback (feet) – closest to array [a]
Dwelling Sites	200 feet	>200 from non-participating property boundaries
Cemeteries	200 feet	>200
Road Right-of-Way	67 feet	>75
Drainage Ditch	67 feet	>67
County Tile Line	40 feet from centerline (80-foot corridor)	38 minimum
Side Yard Property Line	20 feet	0
Rear Yard Property Line	20 feet	0
Waterbodies	16.5 feet	>125
U.S. Highway 212 corridor	200 feet from the road centerline	1.5 miles

[a] Based on current preliminary design and currently built infrastructure within the Project Area. Final distances may vary but, in any case, Gopher State Solar will work with the county to meet minimum setback requirements where feasible.

Additionally, Gopher State Solar implemented their own setbacks and best management practices into the design of the Project (see Table 3.2.1-2 and Figure 4). Setbacks are calculated from the nearest solar array.

TABLE 3.2.1-2

Gopher State Solar Initiated Setbacks

Setback Type	Project Design Setback (feet) – closest to array
Wetlands	5
Transmission lines	110

3.2.2 Project Development Area

Table 3.2.2-1 provides the Project's estimated acreages for each component, based on preliminary design (see Figure 4). The Preliminary Development Area is 1,135 acres. Approximately 977 acres are currently designated as a possibility to host proposed Project infrastructure.

TABLE 3.2.2-1

Estimated Project Component Acreages

Project Component	Acres
Access Roads	16.22
Inverters	0.33
Project Substation	1.65
Project O&M building	0.67
Solar Modules (excludes vegetated spacing between modules)	299.5
Collector Line System	44.6
Stormwater Facilities	22.1
Unused Area (acreage within the Preliminary Development Area with no facilities, including vegetated spacing between modules)	1,264.2
TOTAL	**1,649** [a]

[a]The total is larger than Project Area due to overlap in project infrastructure

3.3 CONSTRUCTION, COMMISSIONING, RESTORATION, OPERATION AND MAINTENANCE

A variety of activities must be completed to carry the Project through construction and into operation. Below is a preliminary list of activities necessary to develop the Project. Pre-construction activities will be completed between submittal of this Application and the start of construction. Pre-construction, construction, and post-construction activities for the Project include:

- Pre-construction
    - Perform Geotechnical analysis;
    - Identify and locate underground utilities;
    - Design Project substation;
    - Design solar array, access roads, electric collector line system; and
    - Procure necessary facility components (e.g., solar modules, tracking system, inverters, and transformers).
- Construction
    - Prepare site, including grubbing, grading, and vegetation establishment;
    - Construct laydown areas and set up temporary job site trailers;
    - Civil construction of access roads;
    - Construct fencing;
    - Drive PV pile foundation posts;
    - Install tracker;
    - Install PV solar module;
    - Install below-ground collector line system;
    - Install electrical enclosure/inverters;
    - Construct Project substation;
    - Construct O&M building; and
    - Construct Project gen-tie Line
- Post-construction
    - Restore disturbed areas not intended for permanent above-ground facilities (Permanent above-ground facilities include the Project substation, O&M building, and access roads);

- Test facility; and
- Begin commercial operation.

3.3.1 Construction and Construction Management

Project construction will begin with workforce mobilization and the initial site preparation work, including grading, vegetation removal, and any necessary tree removal. A preliminary grading acreage estimate was generated using the proposed O&M building site, substation site, and preliminary access roads. This preliminary grading area is 977 acres.

Typical construction equipment such as scrapers, bulldozers, dump trucks, watering trucks, motor graders, vibratory compactors, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- Skid steer loader;
- Pile driver;
- Medium duty crane;
- All-terrain forklift;
- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

Upon completion of construction, heavy equipment will be removed from the Project site.

3.3.2 Commissioning

Equipment inspections will be conducted prior to commercial operations of the proposed Project, and in compliance with applicable Site Permit requirements. Inspection and testing will occur for each component of the solar array, as well as the 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.

3.3.3 Restoration

As portions of the Project near completion, temporary staging and laydown areas and other temporary disturbance areas will be restored. The Project will be graded to natural contours, where possible, and soil will be de-compacted in accordance with the Project AIMP (see Appendix D). Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the VMP (see Appendix E) and the 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 (area under the arrays and the laydown yards) 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 through 5, with long-term maintenance practices occurring from year 6 onward.

The VMP provides a guide to preparation of the site, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The

VMP outlines vegetation management tasks during the establishment and maintenance phases, including monitoring for and treating invasive species, mowing, and re-seeding, as needed.

The Project will use an adaptive management approach for vegetation maintenance as outlined in the VMP. Monitoring vegetation during the active growing season (June-September) is a key aspect of adaptive management. Consequently, site evaluations are planned during the vegetation establishment and maintenance phases. Monitoring will be useful in identifying issues, tracking progress, and reevaluating management needs.

The VMP outlines several vegetation maintenance strategies that may be implemented at the Project, including mowing and selective herbicide use (see Appendix E). Mowing may be used 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 and 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.

3.3.4 Operation and Maintenance

Following commissioning and during commercial operation, the care, custody, and control of the Project facilities will transfer from the construction team to the operations staff. The construction manager will work with the operations staff, the equipment suppliers, and other construction and maintenance personnel to ensure a smooth transition from the start of construction to the commercial operation date of the Project. The operations staff will have full responsibility for the facility to ensure operations and maintenance are conducted in compliance with approved permits, prudent industry practices, and the equipment manufacturer's recommendations.

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.

The expected service life of the Project is 40 years or longer based on the useful commercial lifespan of modules. 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. A maintenance plan will be created for the Project to ensure the performance of the solar facilities. Once construction is complete, the solar facility is expected to see two maintenance trucks and up to six commuter vehicles on-site weekly with potentially more personnel on site at intervals associated with scheduled maintenance. The main scheduled activities are described in more detail in Appendix J.

All maintenance activities will be performed by qualified personnel and will be performed 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 in areas where residents are present. It may be desirable to perform certain maintenance functions after sunset to minimize loss of power production.

The operation of the Project is partitioned, to a certain extent, to minimize the effect of unscheduled maintenance on overall energy production. As an example, if a module needs repair, that section of the array can be disconnected from the array by opening the combiner box circuit. The module can then be replaced and the combiner box circuit closed. Because of the way the facility is designed, a temporary shutdown such as this would result in only a minimal loss of production capability during that time. Additionally, the power production circuits are separated from the

tracking circuits. This allows the PV solar modules to operate during an unscheduled outage of the tracker system.

The generating facility will be operated through a real-time control system for most operations functions, discussed further below.

3.3.4.1 Supervisory Control and Data Acquisition System

Performance monitoring of the Project will consist of real-time and continuous assimilation of the data acquired by the onsite meteorological station. A 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 solar arrays will communicate directly with the SCADA system for remote performance monitoring, energy reporting, and troubleshooting. Any anomaly will be identified immediately and could be addressed by action from the Control Center or by dispatching local technicians to the site. In addition to real time monitoring and support, analysts can analyze trends in operating data to predict anomalies or failures before they arise. Operators will be notified immediately of any abnormalities allowing for timely corrective action.

3.3.4.2 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, as outlined below and in Appendix J, including:

- PV solar modules: visual check of the modules, tracking system and surrounding grounds to verify the integrity of the modules and tracking structure, determine the presence of animals and nests, etc.;
- Inverters, transformer(s), and electrical panels: visual check of the devices including connection equipment and the grounding network - check for presence of water and dust;
- Electrical check: check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds;
- Cabling and wiring: visual check of electrical lines (where visible) and connection box to verify its status;
- Routine visual inspection of the gen-tie line, structures, and components; and
- Project substation: scheduled visual inspections.

3.4 DECOMMISSIONING AND REPOWERING

At the end of the Project's useful life, Gopher State Solar will either take necessary steps to continue operation of the Project (such as re-permitting and retrofitting) or will decommission the Project and remove facilities. A draft Project Decommissioning Plan is included in Appendix F and a final Decommissioning Plan will be provided to the Commission prior to Project construction.

3.4.1 Decommissioning

At the end of commercial operations, Gopher State Solar will be responsible for removing all of the solar arrays and other associated facilities. At the end of the Site Permit term, Gopher State

Solar reserves the right to extend operations of the Project by applying for an extension of the Site Permit, if necessary, and continuing operation. Should Gopher State Solar decide to continue operation, a decision would be made as to whether the Project would continue with the existing equipment or to upgrade the facilities with newer technologies.

Decommissioning of the Project would include removing the solar arrays (modules, racking and foundation posts), inverters, fencing, access roads, cables and lines, and the O&M building. Standard decommissioning practices will be used, including dismantling and repurposing; salvaging, recycling, or disposing of the solar energy improvements; and restoration. A detailed draft Decommissioning Plan outlining the decommissioning process for the Project is provided in Appendix F and is generally summarized below.

3.4.1.1 Timeline

Decommissioning is estimated to take approximately 40 weeks to complete, and the decommissioning crew(s) will ensure that all equipment and materials are recycled or disposed of properly.

3.4.1.2 Financial Resource Plan

Gopher State Solar will be responsible for all costs to decommission the Project and associated facilities. Because of the uncertainty in predicting future decommissioning costs and salvage values, Gopher State Solar will review and update the decommission estimate every 5 years as described in the draft Decommissioning Plan included in Appendix F. Gopher State Solar will either secure a financial surety, such as a surety bond agreement, an escrow account, or letter of credit, or create a reserve fund to create adequate financial reserves for decommissioning purposes. Gopher State will post the financial security prior to construction. Gopher State Solar will abide by the applicable Site Permit condition(s) and ensure the Project is decommissioned in accordance with the Site Permit and the Decommissioning Plan. In addition to Site Permit conditions, Gopher State Solar has included an obligation to decommission the Project components in the Project's real estate agreements.

3.4.1.3 Removal and Disposal of Project Components

The removal and disposal details of the Project components are found below:

- Modules: Modules will be inspected for physical damage, tested for functionality, and disconnected and removed from racking. Functioning modules will be packed, palletized, and shipped to an offsite facility for reuse or resale. Non-functioning modules will be shipped to the manufacturer or a third party for recycling or disposal.

- Racking: Racking and racking components will be disassembled and removed from the steel foundation posts, processed to appropriate size, and sent to a metal recycling facility.

- Steel foundation posts: All structural foundation steel posts will be pulled out to full depth, removed, processed to appropriate size, and shipped to a recycling facility. The posts will be removed using back hoes or similar equipment. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be decompacted in a manner to

adequately restore the topsoil and sub-grade material to a density consistent for vegetation.

- Underground cables and lines: All underground cables and conduits will be removed to a depth of 4 feet so as to not impede the reintroduction of farming. If soil is excavated during decommissioning, topsoil will be segregated and stockpiled for later use prior to any excavation and the subsurface soils will be staged next to the excavation. The subgrade will be compacted per AIMP standards. Topsoil will be redistributed across the disturbed area.

- Inverters, transformers, and ancillary equipment: All electrical equipment will be disconnected and disassembled. All parts will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Gopher State's sole discretion, consistent with applicable regulations and industry standards.

- Equipment foundation and ancillary foundations: The ancillary foundations are pile foundations for the equipment pads, if needed. As with the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated up to four feet below ground surface, if any are present. All unexcavated areas compacted by equipment used in decommissioning will be decompacted pursuant to the AIMP in a manner to adequately restore the topsoil and sub-grade material to a density similar to the surrounding soils. All materials will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the Gopher State's sole discretion, consistent with applicable regulations and industry standards.

- Fence: All fence parts and foundations will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Gopher State's sole discretion, consistent with applicable regulations and industry standards. The surrounding areas will be restored to pre-Project conditions to the extent feasible.

- Access roads: Facility access roads will be used for decommissioning purposes, after which removal of such roads will be discussed with applicable landowners, using the following process:

    - After final clean-up, access roads may be left intact through mutual agreement of the landowner and Gopher State Solar unless otherwise restricted by federal, state, or local regulations; and

    - If an access road is to be removed, aggregate will be removed and shipped from the site to be reused, sold, or disposed of appropriately, at Gopher State Solar's sole discretion, consistent with applicable regulations and industry standards. Clean aggregate can often be used as "daily cover" at landfills for no disposal cost. All internal service roads are currently anticipated to be constructed with geotextile fabric and eight inches of aggregate over compacted subgrade. Any ditch crossing connecting an access road to public roads will be removed unless the landowner requests it remain. The subgrade will be de-compacted to a depth of approximately 18 inches using a chisel plow or other appropriate subsoiling equipment.

All rocks larger than four inches will be removed. Topsoil that was stockpiled during the original construction will be distributed across the open area. The access roads and adjacent areas that are compacted by equipment will be de-compacted.

3.4.2 Repowering

As the solar market continues to produce less expensive and more efficient solar modules, repowering the Project may be a viable option as the Project ages. Potential triggers for initiating a repower may be aging or faulty equipment, maintenance costs, extending the useful life of the Project, or increasing the generation output of the Project. Gopher State Solar will continually evaluate the Project's generation output, maintenance costs, and other contributing factors in conjunction with available technology upgrades to determine if repowering the Project is a worthwhile investment. Any proposed repowering of the Project will abide by all local, state, and federal regulations. A new or amended Site Permit may be necessary and will be sought if required.

4.0 ENVIRONMENTAL INFORMATION

This section provides an overview of the natural environment and cultural resources within and surrounding the 1,645-acre Project Area and an assessment of potential Project impacts to those resources. The Project Area is also used as a reference for discussions of resources that are located outside of the Project Area (such as parks, trails, and other natural resources).

The Preliminary Development Area was used as the basis for estimating the temporary impacts that may result from the proposed Project. The Preliminary Development Area is the area needed for construction and operation of the Project based on the preliminary design. The Preliminary Development Area encompasses, in part, project components within the fenced area including PV arrays, inverter station, transformers, access roads, collector lines, and Project substation. The Preliminary Development Area also includes collector lines and access roads, portions of which may be outside the fenced area.

4.1 ENVIRONMENTAL SETTING

The Project is located within the boundaries of Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota (see Figure 1). It is approximately 1.2 miles north of the City of Bird Island, Minnesota and approximately 2.55 miles northeast of the City of Olivia, Minnesota. Land use in the Project Area consists primarily of relatively flat agricultural fields (row crops), with rural residences adjacent to the Preliminary Development Area. At the time of this Application, no large energy projects are present within the vicinity of the Project. Roads within and surrounding the Project Area are county state aid highways, county roads, or township roads. The Project Area 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.

According to the Natural Resources Conservation Service (NRCS) Land Resource Region (LRR) and Major Land Resource Area (MLRA), the Project is located within the Central Feed Grains and Livestock Region and Central Iowa and Minnesota Till Prairies (USDA NRCS, 2022). This MLRA is characterized by flat to gently rolling till plains, with some morainic hills in the east.

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify,

describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, 1993). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located in the North Central Glaciated Plains Section within the Minnesota River Prairie Subsection, which are in the Prairie Parkland Province. This Minnesota River Prairie Subsection is made up of large till plains along the Minnesota River and consists of gently rolling moraine.

The Minnesota River Prairie Subsection is primarily covered by glacial drift, ranging from 100 to 400 feet deep. Bedrock commonly includes cretaceous shales, sandstones, and clays. Dominant soils in the subsection are well- to moderately well-drained loamy soils formed in gray calcareous till of Des Moines lobe origin. Annual precipitation in the area typically ranges from 25 to 30 inches, with 11 to 13 inches of precipitation during growing season, and a growing season length ranging from 147 to 152 days. Pre-settlement vegetation was primarily tallgrass prairie, with islands of wet prairie. Forests grew along floodplains associated with the Minnesota River and other streams that included silver maple, elm, cottonwood, and willow (MNDNR, 2023a).

4.2 HUMAN SETTLEMENT

The Project is located in rural Kingman, Osceola, and Bird Island Townships, Renville County, Minnesota. According to the 2020 United States Census Bureau (U.S. Census), Kingman Township has a population of 172 people, Osceola Township has a population of 129 people, and Bird Island Township has a population of 201 people (U.S. Census, 2020a). The municipal boundary of the City of Bird Island is approximately 1.2 miles south of the Project and the municipal boundary of the City of Olivia is approximately 2.5 miles southeast of the Project. Refer to Figure 1 for proximity to municipal areas.

4.2.1 Public Health and Safety

4.2.1.1 Existing Environment

Public health and safety issues during construction and operations potentially include injuries due to falls, equipment use, and electrocution. If emergency personnel were needed at the Project, multiple agencies would likely respond, depending on the situation. These include the Renville County Sheriff, Olivia and Bird Island volunteer fire departments, and emergency medical services, all of which are within 4 miles of the Project Area.

During construction and operation of the proposed Project, public safety will be a priority. Safety concerns may include slow moving construction equipment on public roads, construction equipment crossing public roads, and construction operations. Other potential health and safety concerns include hazardous materials, electric shock and arc flash, and fire safety.

According to the Phase I Environmental Site Assessment (Phase I ESA) completed for the Project Area, there is one listed Minnesota Department of Agriculture (MDA) Agricultural Chemical Incident in the Project Area (Merjent, 2023). There is also a Minnesota Pollution Control Agency (MPCA) Unpermitted Landfill, MPCA Site Assessment, MPCA Agency Interest, and multiple MPCA Animal Feedlots database listings within 1 mile of the Project Area.

As identified in the Phase I ESA, the MDA Agricultural Chemical Incident site is located in the northwest ditch at the intersection of Country Road 11 and 405th Street. Approximately 200 gallons of liquid fertilizer spilled into the ditch from a tank being hauled by a semi-truck. As part of the MDA-approved remediation action, impacted soil was excavated and field-applied at Section 28 in Kingman Township, Renville County, outside the Project Area, for fertilizer use. The excavation

area was then backfilled with clean soil. The release occurred on May 5, 2018, and has a status of closed in the MDA's regulatory database.

Other properties within 1 mile of the Project Area, with a potential hydrological connection to the Project Area, are listed in Table 4.2.1.1-1. These properties were evaluated during the Phase I ESA and do not have the potential to impact soil or groundwater in the Project Area.

TABLE 4.2.1.1-1

Recorded Releases Within 1 Mile of the Project Area with a Potential Hydrological Connection

Site	Database	Location (distance and location from Project Area)	Status	Listing(s)
Farmers Coop Elevator	MDA Agriculture Chemical Incident	Road right of way, east and west adjoining Subject Property.	Closed	MDA Agriculture Chemical Incident, (96-0242) - Fertilizer spill on County Road 5.
Bird Island Dump Bird Island, MN	MPCA Unpermitted Landfill and Site Assessment.	South adjoining Subject Property Parcel IDs 19 and 20 across 830th Avenue.	Closed	MPCA Unpermitted Landfill and Site Assessment (SA0008477)/Agency Interest ID: 191555 • Unknown material disposed of at the unpermitted landfill. • HIG Database Report lists this as active; however, the link to the updated MPCA What's in My Neighborhood site shows this is inactive.
Bird Island Soil Service Center Bird Island, MN	MDA Agriculture Chemical Incident	0.20 miles east, side gradient. HIG report indicates that it is adjoining; however, the HIG report is based off a previous design. Road right of way, on the northwest portion of County Road 5 and County Road 11 intersection.	Closed	MDA Agriculture Chemical Incident (CF-10739)

Source: Merjent Inc., Phase I Environmental Site Assessment, Gopher State Solar Project, May 19, 2023.

4.2.1.2 Impacts on Public Health and Safety

Photovoltaic technologies and solar inverters are not known to pose significant health dangers to the public. Public health and safety issues during construction and operations include increased highway traffic during the relatively short construction period and dangers posed to trespassers making contact with high voltage equipment.

Risks of site contamination from solar construction are less than for most other industrial uses because PV technologies employ few toxic chemicals used in very small quantities. Due to the reduction in pollution and greenhouse gas emissions from fossil-fuel-fired electric generators as a result of more solar energy production, the overall impact of solar development on human health can be viewed as positive. Pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free electricity, which reduces harmful sulfur dioxide (SO_2), nitrogen oxides (NO_X), and particulate matter (PM) less than 2.5 microns in diameter ($PM_{2.5}$) (NC Clean Energy Technology Center, 2017).

PV systems do not emit any material during their operation; however, they do generate electromagnetic fields (EMF). EMF is further discussed in Section 4.2.2.

There is potential for electric shock to personnel entering any of the electrical equipment cabinets or otherwise coming in contact with equipment carrying voltages. Arc flash is another electrical

hazard, which is an explosion of energy that can occur during a short circuit. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is an inherent risk of injury when hazardous voltages and/or currents are present.

The incidence of fires resulting from or intensified by PV systems is limited because only a small portion of panel components are flammable, and those components cannot self-sustain a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer backsheets, plastic junction boxes on the rear of the panel, and insulation on wiring. Other panel components are non-flammable and include one or two layers of protective glass comprising over three-quarters of the panel's weight. Heat from a small flame is not adequate to ignite a PV panel, but heat from a more intense fire or energy from an electrical fault can ignite a PV panel. While it is possible for electrical faults in PV systems to start a fire, this is extremely rare (NC Clean Energy Technology Center, 2017).

Construction and operation of the Project will have minimal impacts on the health and safety of the local population, and the level of emergency services potentially needed by the Project is expected to be low. The Project is being developed will be constructed to meet applicable NSC, MISO, state, and local electrical standards, including fencing and locked gates to exclude people who are not authorized to access the Project, and therefore will pose minimal safety and security risks to the public.

While it is possible that Project infrastructure (e.g., arrays) could be damaged or affected by extreme weather events, the Project will be designed and constructed such that Project materials are not expected to leave the Project Area. Gopher State Solar and/or their maintenance contractor will regularly inspect the infrastructure for damage, and if found, will repair or replace impacted materials and dispose of generated waste in accordance with applicable requirements to prevent risk to public safety.

Gopher State Solar’s established safety procedures, as well as industry safety procedures, will be followed during construction and operation of the Project.

4.2.1.3 Mitigation

During active construction, measures will be made to ensure the safety of local residents, including but not limited to signage where active construction is occurring, flaggers at roads, and barriers around active construction zones.

Properly trained and equipped technicians and electricians will be responsible for safely installing, testing, and repairing PV systems. The NESC requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The NESC further requires the site to be secured from unauthorized visitors with either a six-foot chain link fence with three strands of barbed wire or an eight-foot fence, with adequate hazard warning signs to deter trespassing.

New solar-specific building code requirements also mitigate fire concerns. Concern for firefighting a PV system can be reduced with proper fire fighter training, system design, and installation.

4.2.2 Electromagnetic Field

4.2.2.1 Existing Environment

The term electromagnetic field refers to electric and magnetic fields associated with the use of any electrical device (e.g., power lines, electrical wiring, and electrical equipment). Electric fields arise from the voltage or electrical charges. Magnetic fields are from the flow of current through wires that increase in strength as the current increases. The strength of an EMF will dissipate rapidly with increasing distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2022a). Overhead electric distribution lines are currently present within the Project Area and are an existing source of EMF.

There are no state or federal standards for EMF exposure; however, the Environmental Quality Board (EQB) developed a standard of a maximum electric field limit of 8 kV/m measured at 1 meter (3.28 feet) above the ground, and the standard is typically adopted by the Commission for projects under its jurisdiction (Minnesota State Interagency Working Group, 2002). The standard was designed to prevent serious hazards from shocks due to induced voltage under powerlines (NIEHS, 2002b).

4.2.2.2 Impacts

Since the 1970s, research has been ongoing to determine biological responses and health effects as a result of exposure to EMF. In 1992, Congress established the U.S. EMF Research and Public Information Dissemination Program to study whether exposure to EMF from the generation, transmission, or use of electric power posed a risk to human health. The expert working group reviewed EMF studies and generally concluded that "(t)he scientific evidence suggesting that extremely low frequency EMF exposures pose any health risk is weak" (NIEHS, 2002b).

The U.S. National Cancer Institute summarized the research on *Electromagnetic Fields and Cancer* as follows:

> Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (13–15). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects). Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found (National Cancer Institute, 2022).

The NIEHS provides typical EMF levels for varying voltage transmission lines as measured at 1 meter above ground. For a 230 kV overhead transmission line, typical electrical fields were reported at 2.0 kV/m directly below the line before dissipating to 1.5 kV/m at 50 feet and 0.3 kV/m at 100 feet. In addition, the average magnetic fields directly below a 230 kV transmission line were calculated at 57.5 milliGauss (mG) before dissipating to 19.5 mG at 50 feet and 7.1 mG at 100 feet (NIEHS, 2002b). Refer to Table 4.2.2.2-1 below.

TABLE 4.2.2.2-1

Typical EMF Levels for a 230 kV Power Transmission Line

EMF Type (units)	Below line	50 feet (15 m)	100 feet (30 m)
Electric field (kV/m)	2.0	1.5	0.3
Mean magnetic field (mG)	57.5	19.5	7.1

Note: kV/m = kilovolt per meter, m = meter, and mG = milligauss
Source: NIEHS, 2002b. Electric and Magnetic Fields Associated with the Use of Electric Power. Available online at: https://www.niehs.nih.gov/health/topics/agents/emf/index.cfm

Magnetic fields will also be produced by collector lines. A study of magnetic fields associated with collector lines was completed by Canadian researchers at a wind facility. The researchers measured magnetic fields of 27.5 kV collector lines that have a slightly lower voltage than the collector lines proposed for Gopher State Solar's Project (34 kV). Magnetic fields measured 1 meter above buried 27.5 kV collector lines were consistently found to be within study area background levels (0.2 to 0.3 mG). Measurements were also taken directly below 27.5 kV overhead collector lines; magnetic field levels immediately below ranged from 0.3 to 16.5 mG, and within 10 to 25 meters offset distance levels decreased to background levels (McCallum et al., 2014).

In combination, multiple studies have concluded that the strength of EMF present at the perimeter of a solar facility is lower than the typical American's average EMF exposure. In addition, studies of typical electrical fields have found measurements to be well below the Commission's maximum electric field limit of 8 kV/m measured at 1 meter above the ground, as noted in the NIEHS study mentioned above.

Within Gopher State Solar's Project Area, the nearest residence to solar arrays is approximately 340 feet away, and the nearest residence to an electrical collector line is approximately 89 feet away (see Figure 7). At these distances, electric and magnetic fields would be expected to have dissipated to background levels.

4.2.2.3 Mitigation

EMF impacts as a result of the Project will be negligible; as such, no mitigation measures are proposed beyond adherence to equipment and construction standards and accepted industry practices.

4.2.3 Displacement

4.2.3.1 Existing Environment

The Project is located in an agricultural area with a few rural residences, farmsteads, and outbuildings distributed largely along existing roadways (see Figure 7).

4.2.3.2 Impacts

Project infrastructure has been designed with applicable setbacks as discussed in Section 3.2.1. In addition, the landowners of the parcels containing farmsteads or structures are participants in the Project. The Project will not result in the displacement of residential homes, farming operation buildings, or business structures, as they have been excluded from the Preliminary Development Area. Gopher State Solar will continue to work with landowners to inform them of the Project

design and construction process, in order to ensure the Project will not interfere with existing residences, farmsteads, or outbuildings.

4.2.3.3 Mitigation

Impacts resulting from displacement are not anticipated; therefore, no mitigation is proposed.

4.2.4 Noise

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more weight. The A-weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

4.2.4.1 Pre-Construction Noise

Common sound sources within a rural, agricultural environment such as the Project Area include, but are not limited to, farm equipment such as tractors and combines; farm support vehicles and equipment; grain handling, storage, and drying operations; traffic on surrounding roadways; birds; and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has continuous sound levels (L_{eq}), which is an energy-based time-averaged noise level, ranging from 30 dBA to 60 dBA. Rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA (American National Standards Institute, 2013). A comparison of typical noise-generating sources is outlined in Table 4.2.4.1-1 below (Federal Aviation Association, 2022).

TABLE 4.2.4.1-1

Typical Noise-Generating Sources

Source	Noise Level (dBA)
Rock band	110
Car horn at 3 feet	110
Inside subway train (New York)	105
Gas Lawnmower at 3 feet	95
Garbage disposal or shouting at 3 feet	85
Noisy urban	80
Vacuum cleaner at 10 feet	78
Busy highway at 50 feet	73
Normal speech at 3 feet	68
Commercial area	65
Quiet urban	58
Quiet rural	45
Bedroom at night	29
Threshold of hearing	12

Source: Federal Aviation Administration (FAA). 2022. Fundamentals of Noise and Sound. Available online at: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics. Accessed November 2023.

4.2.4.2 Construction Noise

During construction, intermittent noise will be emitted by the construction vehicles and equipment, including pile drivers for installation of piers. These noise impacts will be temporary, and the amount of noise will vary based on what type of construction is occurring at the Project on a given day, and the distance from the receptor to the noise source. Table 4.2.4.2-1 below shows the typical sound pressure levels in dBA at 50 feet for various construction equipment (U.S. Department of Transportation Federal Highway Administration [FHWA], 2017a).

TABLE 4.2.4.2-1

Typical Sound Levels from Construction Equipment

Equipment	Max Sound Pressure Level 50 feet (dBA)
Backhoe	80
Compactor	82
Concrete Mixer	85
Dozer	85
Generator	81
Grader	85
Loader	85
Pile Driver (Impact)	101
Truck	88

4.2.4.3 Noise Standards

The State of Minnesota has established noise standards under Minn. R. 7030.0040 and 7030.0050. These rules quantify noise level limits for various Noise Area Classification (NAC) categories. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) hours. Limits for residential areas, which fall under NAC 1, are the most stringent. These limits are listed in Table 4.2.4.3-1 below.

TABLE 4.2.4.3-1

Minnesota Rules Chapter 7030 NAC 1 Noise Limits

Noise Level Metric	Daytime Limit (dBA)	Nighttime Limit (dBA)
L_{50}	60	50
L_{10}	65	55

These limits are expressed as L_{50} and L_{10}, which are statistical noise level metrics representing the sound level that is exceeded 50% and 10% of the measurement period, respectively. The MPCA provides guidance on noise propagation and attenuation in its manual, “A Guide to Noise Control in Minnesota” (MPCA, 2015). This guidance states that over distance, sound attenuates, or is reduced in amplitude, and is perceived as becoming quieter. This occurs as the sound travels outward to an increasingly larger sphere or cylinder, and the energy per unit of area decreases. When the distance from a point source is doubled, the sound level decreases by 6 dBA. Similarly, when the sound energy doubles, such as having two sources of 50 dBA instead of one source of 50 dBA, the sound level increases by 3 dBA. The human ear can usually tell the difference when sound changes by 3 dBA, and a 5 dBA change is clearly noticeable.

4.2.4.4 Operational Noise

Noise calculations were conducted using a desktop analysis to calculate cumulative Project sound at all occupied residences within 0.25 mile of the Project fence line. As described below, predicted maximum total sound levels as a result of Project operation do not exceed the applicable nighttime limit of 50 dBA set forth in Minn. R. 7030.0040. Accordingly, minimal sound impacts, within regulatory limits, are expected from Project operation.

Project equipment and layout configuration details are shown below in Table 4.2.4.4-1, along with overall A-weighted sound pressure levels. Levels represent the maximum sound output for Project components, which is at the source of the sound. The sound levels will decrease as distance increases, as shown in the Table 4.2.4.4-1 below.

TABLE 4.2.4.4-1

Project Equipment Estimated Sound Levels

Sound Source	# of Units	Equipment Model/Reference	Sound Pressure Level @ 3 feet (Single Unit)	Distance to Sound Pressure Level of 40 dBA (Single Unit)
Solar Inverter	67	Sungrow SG4400	83 dBA	450 feet
Main Power Transformer	1	Eaton Pad-Mounted (NEMA TR1)	56 dBA	19 feet

The Project Area is mainly rural, so the “very quiet suburban and rural residential” residential land use category background ambient noise level of 40 dBA was assumed according to ANSI 12.9-2013 Table C.1. In order to determine predicted total sound levels, the assumed background ambient level of 40 dBA was added to the predicted sound levels. These summed levels represent the predicted total sound level at each receptor.

4.2.4.5 Impacts

As stated, the Project will create some intermittent noise during construction and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. Construction associated noise will likely be perceptible at nearby residences. According to the FHWA Construction Noise Handbook, the majority of the construction equipment that could be used on the site, such as grading equipment and backhoes, is anticipated to generate noise between 81 and 85 dBA. Sound levels from grading equipment are similar to the typical tractors and larger trucks used in agricultural communities during planting or harvest. Gopher State anticipates impact driving of the piles for rack supports (foundations for the solar panels) to be the most significant source of construction noise at roughly 101 dBA at 50 feet (FHWA, 2017a). Installation of each rack support takes between thirty seconds to a few minutes depending on the soil conditions. Gopher State Solar anticipates this activity will take up to 3 to 6 months (depending on construction crew size); however, construction noise will not be concentrated in the same location but will rotate around the Project site during that time as each stage of construction is completed in sequence. For example, site preparation at some array locations may occur while pile driving is occurring at others. The noise from construction activities will dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor.

As shown in Table 4.2.4.5-1 and on Figure 7, there are 33 homes within 3,200 feet of the proposed Project Area arrays. Gopher State Solar will provide notice of construction to all properties adjacent to the Project prior to the commencement of construction. The notice will

include the contact information for a dedicated project contact person to answer questions about construction.

TABLE 4.2.4.5-1

Receptors Located Near the Project Area[a]

Distance from Project (feet)	Number of Receptors
50	0
100	1
200	3
400	6
800	10
1600	0
3200	13
TOTAL	**33**

[a] Residences were identified using the ESRI 2021 basemap and MnGeo 2021 aerial to complete a desktop review. 2021 was the most up-to-date aerial for the Project Area at the time this Application was prepared.

The results of noise modeling conducted by technology manufacturers outlined in Table 4.2.4.4-1 show that operational noise levels will be less than 40 dBA at least 450 feet from an inverter. The nearest inverter to a residence will be 535 feet away. As a result, the noise from the inverters are not projected to have any impact on nearby residences.

The noise levels will be less than 40 dBA at least 19 feet from the transformer. The transformer will be 926 feet away from the closest residence; at that distance 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, the project will not generate an increase in ambient noise levels near the project that exceed state noise standards.

4.2.4.6 Mitigation

During construction, the Project will generate a temporary increase in ambient noise levels in the vicinity of the project that may exceed state noise standards. Gopher State Solar will mitigate potential noise impacts by limiting construction to daylight hours and using construction equipment and vehicles with properly functioning mufflers and noise-control devices.

The solar panels, once installed, will act as a barrier and provide some sound mitigation by nature of their design (FHWA, 2017b). During operation, the Project will not generate an increase in ambient noise levels in the vicinity of the project that exceed state noise standards; therefore, no operational mitigation measures are necessary.

4.2.5 Radio and Television Interference

Existing Environment

No cellular, AM, FM, microwave, television, or other broadcast transmission towers were identified in the Project Area or located within 1 mile of the Project Area boundary according to publicly available Homeland Infrastructure Foundation-Level Data (HIFLD, 2021).

4.2.5.1 Impacts

Corona from transmission line conductors can generate electromagnetic noise at the same frequencies that radio and television signals are transmitted, which may cause interference with radio and television reception. This interference can increase as a result of loose hardware on a transmission line.

Transmission line corona disruption of radio and television signals typically depends on the frequency and strength of the radio or television signals.

- Interference of AM radio frequency typically occurs under a transmission line and dissipates rapidly within the right-of-way to either side.
- FM radio receivers usually do not pick up interference from transmission lines. Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and the range is quite small in the FM broadcast band (88 to 108 megahertz). The interference rejection properties that are inherent in FM radio systems make them limit amplitude type disturbances.
- Television interference is uncommon but may occur when a large transmission structure is located between the receiver and a weak distant signal, creating a shadow effect. Television interference can also result from loose and/or damaged hardware.
- A two-way mobile radio situated behind or adjacent to a large metallic structure (i.e., steel tower) may experience interference because of signal-blocking effects. Communication can be restored by moving the two-way radio so that the metallic tower is not immediately between the two units. This can generally be resolved by moving the radio less than 50 feet.

4.2.5.2 Mitigation

The Project is not expected to impact radio or television reception of nearby receptors; therefore, no mitigation measures are proposed. In addition, Gopher State Solar will complete regularly scheduled maintenance such that reception interference from loose hardware is not expected for the Project. If radio or television interference occurs due to the Project, Gopher State Solar will work with the affected landowner or business to restore reception to pre-Project quality.

4.2.6 Aesthetics

4.2.6.1 Existing Environment

The Project Area is located in a rural, agricultural setting (see Figures 1 and 6). The topography of the Project Area is generally flat with elevations ranging from 1,073 to 1,131 feet above sea level (see Figure 8). Farmsteads in the area often include a house, outbuildings, and grain storage and average 4 to 6 rural residences within a square mile. Most farms have planted windbreaks consisting of trees and shrubs around them. Paved and gravel roads form grids around farm fields separated by 0.5 to 1 mile with U.S. Highways 212 and 71 approximately 1.5 mile south of the southern edge of the Project Area. Surface water features within the Project Area primarily support removal of water from agricultural fields from numerous drain tiles and ditches. As discussed in Section 4.2.11, land use within the Project Area is predominantly agricultural. Corn

and soybeans are the most common agricultural crops grown. Some livestock is also raised in the area.

Nineteen rural residences are located within 0.25 mile of the Project Area, including one residence within the Project Area (see Figure 7). Table 4.2.6.1-1 below provides distances to the nearest residences from the Project Area, including approximate distance to the Preliminary Development Area, distance to substation, inverters, collector line and panels based on the preliminary site plan in Appendix C.

TABLE 4.2.6.1-1

Proximity of Residences within 0.25 mile of the Project Area

Residence ID [a]	Distance to Preliminary Development Area (miles)	Distance to Substation (feet)	Distance to Inverter (feet)	Distance to Collector Line (feet)	Distance to Panels (feet)
4	0.04	7545.1	624.8	624.8	432.0
5	0.23	5215.1	1734.6	1734.6	1396.3
6	0.11	4711.4	1624.5	1624.5	825.5
7	0.09	2242.9	1434.4	1434.4	1058.8
8	0.05	925.8	811.3	811.3	486.8
9	0.03	3124.7	535.1	535.1	312.4
10	0.22	1962.1	2681.7	2681.7	1888.8
11	0.19	6023.4	1644.8	1644.8	1171.1
19	0.22	9462.6	1903.0	1903.0	1377.3
20	0.07	6061.5	1413.5	1413.5	502.5
21	0.05	5405.8	1211.4	1211.4	442.5
22	0.03	5744.5	556.8	556.8	453.6
26	0.02	10361.4	1337.1	1337.1	606.6
27	0.02	8560.6	3582.4	3582.4	2960.1
28	0.07	8932.0	2859.9	2859.9	1807.2
32 [a]	0.00	10662.1	600.5	600.5	566.2
35	0.17	10775.3	1386.1	1386.1	1036.5
37	0.22	15780.0	2194.5	2194.5	1483.7
38	0.03	12706.3	1049.7	1049.7	339.0

[a] Residence 32 is within the Project Area.

4.2.6.2 Impacts to Aesthetics

The Project will convert predominately agricultural land (see Table 4.2.11.5-1 and associated discussion) to a solar facility for the life of the Project and will alter the current viewshed. Rows of PV solar modules together with perennial vegetation will be constructed over most of the Preliminary Development Area. PV solar modules use dark anti-reflective glass panels that are designed to absorb sunlight to produce electricity. PV solar modules commonly used for this type of project absorb up to 98 percent of the incoming sunlight depending on the angle of the sun, glass texture, and use of anti-reflective coatings. Therefore, during operation of the facility, there will be little glare from the PV solar modules used for the Project.

Solar arrays will occupy most of the disturbed area of the Project. Electrical transformers and inverters, a Project substation, an O&M building, and access roads will use the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile, typically less than 15 feet tall. While the proposed substation and O&M building are similar in visual impacts to

existing electrical facilities and buildings in the area, the Project solar arrays will create new aesthetic impacts, changing the viewscape in these areas from crops to solar arrays.

Since the Project Area is generally flat with existing trees around rural residences and outbuildings and with vegetative cover along wind rows, the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land.

4.2.6.3 Mitigation

Since the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land, it will be mitigated to an extent by existing vegetative screening at most residences and additional mitigative plantings pending finalization of landowner agreements. The feedback that Gopher State Solar has gathered from surrounding landowners or community for the Project to date has not indicated aesthetic or visual concerns associated with the Project. As stated above and in Section 5 below, the Project has garnered strong positive landowner involvement and support, as well as overall wide community support.

4.2.7 Socioeconomics

The Project is located in Kingman, Osceola, and Bird Island Townships in Renville County, Minnesota (see Figure 1). Data is provided at the state, county, and census tract levels for the purpose of comparing the demographics in the Project Area to a larger area. Data was retrieved from the U.S. Census Bureau's 2020 Decennial Census data, 2010 Decennial Census Data, U.S. Census QuickFacts, and the 2021 American Community Survey 5-Year Estimates.

This discussion does not address every socioeconomic measure, but instead addresses the most applicable statistics related to the Project. The socioeconomic statistics that best characterize the demographic and economic context within the vicinity of the Project that potentially could be affected by construction and operation of the Project include population, race, housing, income, and poverty.

4.2.7.1 Population and Race

Between April 1, 2010 and April 1, 2020, Minnesota had a population increase of 7.6 percent. In this same time period, Renville County had a population decrease of 6.4 percent and Census Tract 7902 had a population decrease of 7.0 percent. Renville County has a significantly lower population density at 15.0 individuals per square mile compared to Minnesota at 71.7 individuals per square mile. Population density information is not available at the census tract geographic level. The median age in Renville County (43.1 years) and Census Tract 7902 (50.5 years) are higher than the median age of Minnesota (38.2 years). Population and race characteristics in Minnesota, Renville County, and Census Tract 7902 are included in Table 4.2.7.1-1.

The total minority population in Renville County and Census Tract 7902 are lower than the total minority population in Minnesota (21.7 percent) at 13.4 percent and 2.9 percent, respectively. Detailed information about race and ethnicity can be found in Table 4.2.7.5-1.

TABLE 4.2.7.1-1

Population and Race Characteristics

Category	Minnesota	Renville County	Census Tract 7902
Population, Census April 1, 2020	5,706,494	14,723	1,821
Population, Census April 1, 2010	5,303,925	15,730	1,958

TABLE 4.2.7.1-1

Population and Race Characteristics

Category	Minnesota	Renville County	Census Tract 7902
Population Change (%) [a]	7.6	-6.4	-7.0
Population Density (per square mile) [b]	71.7	15.0	NA
Median Age	38.2	43.1	50.5
Total Minority (%) [c]	21.7	13.4	2.9

[a] Percent population change is based on Population Census April 1, 2020, as compared to Population Census April 1, 2010.
[b] Population density was not available at the census tract level. NA = Not Available.
[c] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.
Source: U.S. Census Bureau, 2010; U.S. Census Bureau, 2020a; U.S. Census Bureau, 2021a and 2021b.

4.2.7.2 Housing

The number of households in Minnesota is 2,229,100 with an average household size of 2.5 individuals. Renville County has 5,861 households with an average household size of 2.5 individuals. Census Tract 7902 has 762 households with an average household size of 2.2 individuals. The total number of housing units in Minnesota is 2,458,030 with 89.8 percent of housing units occupied and 10.2 percent of housing units vacant. Renville County has 7,334 housing units with 82.2 percent of housing units occupied and 17.8 percent of housing units vacant. Census Tract 7902 has 900 housing units with 83.0 percent of housing units occupied and 17.0 percent of housing units vacant. The housing characteristics are detailed in Table 4.2.7.2-1 below.

TABLE 4.2.7.2-1

Housing Characteristics

Category	Minnesota	Renville County	Census Tract 7902
Total Households	2,229,100	5,861	762
Average Household Size	2.5	2.5	2.2
Total Housing Units	2,458,030	7,334	900
Occupied Housing Units (%)	89.8	82.2	83.0
Vacant Housing Units (%)	10.2	17.8	17.0

Source: U.S. Census Bureau, 2021c; U.S. Census Bureau 2020b.

4.2.7.3 Income and Poverty

As shown in Table 4.2.7.3-1 below, the per capita income of Minnesota is $41,204 which is higher than the per capita income of Renville County ($31,831) and lower than the per capita income of Census Tract 7902 ($41,760). The median household income of Minnesota is $98,356 which is higher than the median household incomes of Renville County ($75,786) and Census Tract 7902 ($92,763). The unemployment rate of Minnesota is 4.0 percent which is higher than the unemployment rates of Renville County (3.4 percent) and Census Tract (3.1 percent). The percent of persons living below the poverty level in Minnesota is 9.2 percent which is lower than the percent of persons living below the poverty level in Renville County (9.7 percent) and higher than the percent of persons living below the poverty in Census Tract 7902 (6.2 percent).

The top three industries in Minnesota are educational services, and healthcare and social assistance; manufacturing; and retail trade. The top three industries in Renville County are educational services, and healthcare and social assistance; manufacturing, and agriculture,

forestry, fishing and hunting, and mining. The top industries in Census Tract 7902 are educational services, and healthcare and social assistance; agriculture, forestry, fishing and hunting, and mining, and transportation and warehousing, and utilities.

TABLE 4.2.7.3-1

Income and Poverty

Category	Minnesota	Renville County	Census tract 7902
Per Capita Income ($)	41,204	31,831	41,760
Median Household Income ($)	98,356	75,786	92,763
Unemployment Rate (population over 16 years) (%)	4.0	3.4	3.1
Persons Living Below Poverty Level (%)	9.2	9.7	6.2

Source: U.S. Census Bureau, 2021d and 2021e.

4.2.7.4 Environmental Justice

Environmental justice refers to 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 (MPCA, 2022a). In general, environmental justice is intended to ensure all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health (MPCA, 2022a).

Minority and/or low-income communities are often concentrated in small geographical areas within the larger geographically and/or economically defined population. Minority communities and low-income communities may constitute a very small percentage of the total population and/or geographical area, therefore, analysis was completed at the census tract and block group geographic level.

An environmental justice review for the Project was completed using the methodology outlined in Minn. Stat. § 216B.1691, subd. 1(e) that defines areas with environmental justice concerns in Minnesota:

> (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:
>
> (1) 40 percent or more of the area's total population is nonwhite;
>
> (2) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;
>
> (3) 40 percent or more of residents over the age of five have limited English proficiency; or
>
> (4) the area is located within Indian country, as defined in United State Code, title 18, section 1151.

The Project is located in Census Tract 7902. Renville County was used as a reference community to ensure that all affected environmental justice communities are correctly identified. Table 4.2.7.4-1 includes data on population, total minority, population at or below 200 percent of federal poverty level, and limited English proficiency of residents over the age of five. The most

recently available data was used for analysis: 2021 U.S. Census American Community Survey 5-Year Estimate File #B03002 and File #S1701.

TABLE 4.2.7.4-1

Environmental Justice Data for Project Area

State, County, Census Tract	2021 Population	Total Minority (%) [a]	Population at or Below 200 Percent of Federal Poverty Level (%)	Limited English Proficiency of Residents over the Age of Five (%)
Minnesota	5,670,472	21.7	22.7	4.5
Renville County	14,768	13.4	28.3	1.5
Census Tract 7902	1,712	2.9	16.9	0.3

[a] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.
Source: U.S. Census Bureau, 2021b and 2021e.

No federally designated Tribal reservations are crossed by the Project. As shown in Table 4.2.7.4-1, the Project is not located in an environmental justice community as defined by Minn. Stat. § 216B.1691, subd. 1(e).

An environmental justice review was also conducted in accordance with the U.S. Environmental Protection Agency's (EPA) Promising Practices guidance. Minority populations are groups that include Black or African American; American Indian or Alaska Native, Native Hawaiian/Pacific Islander, and Hispanic individuals. Following the Promising Practices guidance, the 50 percent and meaningfully greater analysis methods were used to identify minority populations. Using this method, minority populations are defined as either: the aggregate minority population of the block groups in affect area exceeds 50 percent or the aggregate minority population percentage in the block group affect is 10 percent higher than the aggregate minority population percentage in the county. Additionally, Promising Practices low-income threshold criteria method was used to identify low-income populations. Low-income populations are block groups where the percent of low-income population in the identified block group is equal to or greater than that of the county.

The Project is located in Census Tract 7902, Block Group 1 and Census Tract 7902, Block Group 2. Renville County was used as a reference community to ensure that all affected environmental justice communities are correctly identified. Table 4.2.7.5-1 includes race and ethnicity and low-income population data. The most recently available data was used for analysis: 2021 U.S. Census American Community Survey 5-Year Estimate File#B03002 and File #B17017.

As shown in Table 4.2.7.5-1, the block groups where the Project is proposed are not considered environmental justice communities.

4.2.7.5 Impacts to Socioeconomics

The Project is designed to be socioeconomically beneficial to the landowners and those who reside near the Project Area, local governments, and communities. The development of solar energy in this part of Minnesota has been important in diversifying, supporting, and strengthening the personal income tax base of Renville County. As no areas of concern for Environmental Justice were found within the Project Area, this Project will not negatively impact minority groups or other groups/areas of concern.

Construction of the Project will provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, transportation, and general supplies. The Project will also create new local job opportunities for various trade professionals who live and work in the area, and it is typical to advertise locally to fill required construction positions. Opportunity

exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes.

General skilled labor is expected to be available in Renville County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states. The relatively short construction duration often precludes special training of local or regional labor, and much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because much of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

Gopher State Solar will issue an RFP to contractors to construct the Project. Gopher State will include preferences for contractor bids that use local, construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. Gopher State 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 safely built on time and on budget.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities nearby. The operations 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.

The Project is expected to produce beneficial socioeconomic effects to the area. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. Easement agreement payments and purchase option payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production. The Project is expected to generate an estimated average annual solar energy production and property tax revenue over the life of the project of approximately $35,000,000 including approximately $4,879,289 total for the townships within which the Project is located.

TABLE 4.2.7.5-1

Minority Population by Race and Ethnicity and Low-Income Populations for Project Area

State / County / Census Tract	White Alone, Not Hispanic or Latino (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian/Pacific Islander Alone (%)	Some Other Race Alone (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Minority (%) [a]	Low-Income Households (%)
MINNESOTA	78.3	6.5	0.8	5.0	0.0	0.3	3.4	5.6	21.7	9.2
Renville County	86.6	0.4	1.0	0.7	0.0	0.1	2.0	9.2	13.4	10.0
Census Tract 7902, Block Group 1	96.2	0.0	0.0	0.0	0.0	0.0	0.0	3.8	3.8	3.2
Census Tract 7902, Block Group 2	97.7	1.5	0.0	0.0	0.0	0.1	0.2	0.5	2.3	9.1

[a] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

Source: U.S. Census Bureau, 2021b and 2021f.

Solar farms also generate a significant financial benefit to the local economy and local taxing bodies and create well-paid local jobs that will benefit the overall market demand of properties in the area. Any incremental impact to the local labor market will be positive: in addition to creating approximately two hundred temporary construction jobs, the Project is expected to create a handful of permanent maintenance jobs to service and maintain its components. It is currently unknown how many of the temporary or permanent jobs will be filled by the local workforce. To the extent the lease payments, additional tax revenues, and construction investments are subject to a local multiplier effect that adds robustness to the local economy, some incremental increase in local job opportunities would be expected to accompany that, but the Project has not conducted any specific studies and is not relying on any specific projected increase in jobs as part of this Application.

4.2.7.6 Mitigation

No measures to mitigate socioeconomic or Environmental Justice impacts are needed because the Project is not located in an environmental justice community and the Project is anticipated to achieve a positive socioeconomic benefit. Adverse socioeconomic impacts will be limited to the temporary loss of the agricultural production on the land currently farmed; however, these temporary losses are offset by the payments to the landowners from the Project. Owners of land where the Project will be constructed have entered into easement and lease agreements or purchase contracts with the Applicant and are compensated for the use and/or purchase of the applicable land based upon these agreements.

4.2.8 Cultural Values

4.2.8.1 Existing Environment

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community. According to the U.S. Census Bureau (2020a), the population of Renville County derives from a mostly European heritage, which accounts for approximately 85.8% of the population, followed by 10.2% Hispanic or Latino, 1.7% Native American, and 2.3% African American, Asian American, and Pacific Islander. The majority of the population in Renville County identifies as Caucasian with an ethnic background of European origin. The region surrounding the Project has cultural values tied to the area's German, Norwegian, and Native American heritage, and the agricultural economy.

Cultural representation in community events appears to be tied to geographic features, such as nearby lakes and parks, agricultural economy (e.g., farmer's markets), seasonal events, national holidays, and municipal events. Cultural representation in community events appears to be connected to community organizations (e.g., American Legion, FFA, 4-H club), art, food, seasonal events, national holidays, and municipal events. Examples of regional cultural events include summertime festivals such as the Renville County Fair (Renville County Fair, 2023) and Corn Capital Days (Corn Capital Days, 2023).

4.2.8.2 Impacts

The Project Area is not located within municipal areas where community events typically occur. Construction and operation of the Project is not anticipated to impact community cultural values or events.

4.2.8.3 Mitigation

Impacts to cultural values are not anticipated; therefore, no mitigation is proposed.

4.2.9 Recreation

4.2.9.1 Existing Environment

Common recreational activities within Renville County include camping, hiking, biking, fishing, horseback riding, canoeing, snowmobiling, and hunting. There are no local, state, or federal parks or recreational areas within 1 mile of the Project Area except for the Renville County Drift Runner snowmobile trail, which has a trail that runs parallel with County Road 5 within the Project Area (see Figure 9).

Other recreational areas more than 1 mile from the Project includes the Renville Rangers Shooting Club, which has a rifle and pistol shooting range and is adjacent to the southern boundary of the Project on 830th Avenue, the Renville County Fairgrounds, approximately 1.8 miles from the Project and the Olivia Golf Club, a public golf course, approximately 3.7 miles from the Project.

4.2.9.2 Impacts on Recreation

Construction of the Project is not anticipated to disrupt nearby recreational activities. Gopher State Solar will coordinate with MNDNR, 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 any significant impacts to nearby natural resources.

If construction activity occurs during times of snow cover, Gopher State Solar will coordinate with the MNDNR listed contact for the Renville County Drift Runners snowmobile trail to minimize impacts to the trail and to determine procedures for informing the public of construction in the area.

Section 4.5.3 further discusses impacts on rivers and streams crossed by the Project and Section 4.3.3 discusses impacts on tourism by the Project.

4.2.9.3 Mitigation

Potential impacts to the snowmobile trails will be mitigated by notifying the public of construction and potentially temporarily restricting access.

4.2.10 Public Services, Utilities, and Transportation

4.2.10.1 Existing Environment

The Project Area is located in a rural, agricultural and residential area where public services such as electricity, natural gas, and water systems, along with fire protection and law enforcement are available.

There is one natural gas transmission pipeline and one crude oil pipeline in a shared right-of-way within the Project Area (see Figure 10). In addition, the Project Area includes two overhead electric transmission lines and several overhead electric distribution lines.

There are five county roads and three township roads within the Project Area (see Table 4.2.10.1-1 and Figure 10). County Road 5 runs north-south through the Project Area and is also Main Street in Bird Island, south of the Project. County Road 57 (405th Street) comprises a portion of the eastern boundary of the Project Area and County Road 69 (370th Street) is located near the western boundary of the Project Area. The Project Area is bordered by Township Road 56 (830th Avenue) to the south and ends just north of County Road 11 (860th Avenue) to the north. No public transportation services are available in the vicinity of the Project. Traffic data from the Minnesota Department of Transportation (MnDOT) was available for three county roads within the Project Area and is included in Table 4.2.10.1-2 (MnDOT, 2023b).

TABLE 4.2.10.1-1

Roads in Project Area

Route Name	Alternate Name	Ownership
County Road 57	405th Street	County
County Road 69	370th Street	County
County Road 70	840th Avenue	County
County Road 11	860th Avenue	County
County Road 5	Main Street	County
Township Road 208	380th Street	Township
Township Road 311	N/A	Township
Township Road 56	830th Avenue	Township

TABLE 4.2.10.1-2

Annual Average Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
County Road 70 (840th Ave)	2019	45
County Road 11 (860th Ave)	2019	435
County Road 5 (Main Street)	2019	1000

Note:AADT = annual average daily traffic

4.2.10.2 Impacts on Public Services, Utilities, and Transportation

As discussed in Section 4.2.1, construction and operation of the Project will have minimal impacts on the health and safety of the local population, and the level of use/service potentially needed by the Project is expected to be low; therefore, the Project will pose minimal safety and security risks to the public or site workers and no impacts to public services such as fire protection and law enforcement are anticipated.

Gopher State Solar will coordinate any planned outages associated with the Project with local utilities avoid and/or minimize disruptions to service in the area. Specific standards are required for the design and operating process of the Project and associated facilities. These standards and mitigation are outlined in North American Electric Reliability Corporation (NERC), Federal Energy Regulatory Commission, and NESC, which aid in the compatibility of new construction with existing utilities. All existing utilities will also be identified and marked prior to construction using public and private utility locator services, therefore no permanent impacts to utility services are anticipated.

Gopher State Solar has designed the Project to avoid impacts to the pipeline located in the northeast portion of the proposed Project (see Figure 10). Gopher State Solar 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. In this Application, Gopher State Solar has depicted a conservative panel design that avoids the pipeline (see Figures 4, 8, and 16). However, the Application's impact calculations include the area crossed by the pipeline to allow flexibility in future design modifications relative to the pipeline right of way. Accordingly, this Application presents a conservative analysis of Project impacts while negotiations continue regarding the Project's ultimate design relative to the pipeline right-of-way. The Project's final, pre-construction design maybe modified to ensure the Project design avoids the pipeline infrastructure and reflects any necessary agreements negotiated with the pipeline owner.

Gopher State Solar will coordinate with MnDOT to confirm that construction of the Project will not interfere with routine roadway maintenance. Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exits local roadways near the Project or equipment and materials are delivered to the Project construction site. To minimize traffic impacts, Gopher State Solar will coordinate with local road authorities to schedule large material and or equipment deliveries to avoid periods when traffic volumes are high whenever practical. Traffic control barriers and warning devices will also be used when appropriate. 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. Temporary access for construction of the Project will be along existing county and township roads. Immediate impacts to these roads may include increased use as an access road for vehicles and equipment associated with Project construction.

4.2.10.3 Mitigation

Since the coordination and safety procedures outlined above will be implemented during Project construction and permanent impacts to utilities and county and township roads during and after Project construction are not expected, no mitigation is proposed.

4.2.11 Zoning and Land Use

4.2.11.1 Zoning - Existing Environment

Based on the Renville County Zoning Map (Renville County, 2019), the entire Project Area is zoned as (A) Agricultural, and the Project is not located within any areas zoned as a shoreland district (see Figure 11). The County's Land Use Ordinance includes Zoning Regulations (Renville County, 2021a) and Renewable Energy Regulations (Renville County, 2021b) that outline standards for "Solar Energy Conversion Systems (large and small)." Solar farms greater than 100 kilowatts are listed as a conditional use in the agricultural district. Renville County's 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. The Project will consider county setbacks noted in the Ordinance where practicable and as discussed in Section 3.2.1.

The County Ordinance only applies to solar energy systems over 100 kilowatts that are not subject to oversight by the Minnesota Power Plant Siting Act (Minn. Stat. § 216E.10, subd. 1), which states that the Commission's Site Permit is the only site approval required for construction of the solar project, and therefore supersedes and preempts all regional, county, or local zoning, building, or land use rules, regulations, or ordinances.

The following comprehensive plans listed in Table 4.2.11.1-1 have been adopted within the Project Area (Renville County, 2010 and Renville County, 2013).

TABLE 4.2.11.1-1

Adopted Comprehensive Plans Within the Project

Plan Name	Governing Body	Year Adopted
Renville County Comprehensive Plan	Renville County	June 2002; Revised August 2010
Comprehensive Local Water Management Plan	Renville County	August 2013

4.2.11.2 Impacts to Zoning

Although the Site Permit from the Commission is the only site approval required for construction of the solar project, the review by the Commission will take local land use regulations into consideration. Gopher State Solar has incorporated the county's setbacks and performance standards as described in the Land Use Ordinance into the Project's design, to the extent feasible.

4.2.11.3 Mitigation

The Project is compatible with the rural, agricultural character of Renville County and will strive to follow the county's Zoning and Renewable Energy Regulations. In addition, Gopher State Solar has sited the Project to comply with Renville County's setback requirements, where possible, as discussed in Section 3.2.1. Lastly, Gopher State has initiated Project correspondence with Renville County and Township representatives (see Section 5.0).

4.2.11.4 Land use and Land Cover -Existing Environment

Based on U.S. Geological Survey (USGS) National Land Cover Database (NLCD) (USGS, 2021), the Project is located within a rural landscape; as such, the primary land use in the Project Area is agriculture, primarily in the form of cultivated crops (96 percent). The rest of the Project Area includes emergent herbaceous wetlands (1.3 percent), developed open space (1.2 percent), and developed low, medium, or high intensity use (0.9 percent). A minor part of the Project Area (less than 1 percent) is comprised of barren land, deciduous forest, pasture/hay, and herbaceous land. The majority of the agricultural land in the Project Area is used for raising row crops, such as corn and soybeans. The developed land within the Project Area generally consists of public roads, which include County Roads 57, 69, and 70, County State Aid Highways 5 and 11, and Township Roads 208, 56, and 331. The areas of barren land, deciduous forest, pasture/hay, and herbaceous land are associated with roadside ditches and small patches of forest groves adjacent to rural farmsteads. The area of open water in the Project Area is associated with East Fork Beaver Creek and unnamed streams.

TABLE 4.2.11.4-1

NLCD Land Cover within Project Area

Land Cover Type	Acres	Percent of Project Area
Cultivated Crops	1,580	96%
Developed (open space, low/med/high intensity)	35.5	2.2%
Deciduous Forest	7.8	0.5%
Emergent Herbaceous Wetlands	21.2	1.3%
Pasture/Hay, Herbaceous, and Barren Land	<1.0	<0.1%
TOTAL	**1,645**	**100%**

TABLE 4.2.11.4-1

NLCD Land Cover within Project Area

Land Cover Type	Acres	Percent of Project Area

Source: USGS, 2021.

Several farmsteads that are located adjacent to but outside of the Project Area are typically situated along the surrounding roadways. There are 19 residences located within 0.25 mile of the Project (refer to Table 4.2.6.1-1 for additional detail on residences within 0.25 mile of the Project).

4.2.11.5 Impacts to Land Use and Land Cover

The Project will temporarily change the land use within the Preliminary Development Area from the predominant agricultural use to solar energy generation use for the life of the Project. The conversion of agricultural land to solar energy generation will have a relatively minimal impact on the rural character of the surrounding area or Renville County. Expected land use impacts within the Preliminary Development Area are provided in Table 4.2.11.5-1 below.

TABLE 4.2.11.5-1

Expected Land Use Impacts within Preliminary Development Area

Land Use Type	Acres	Percent of Preliminary Development Area
Cultivated Crops	1,129	99.5%
Developed (open space, low/med/high intensity)	4.99	<0.5%
Deciduous Forest	0.6	<0.1%
Emergent Herbaceous Wetlands	<0.1	0/0%
TOTAL	**1,135**	**100.0%**

As discussed further below in Section 4.3, Renville County has an estimated 624,114 acres of land used for farm operation or agricultural purposes. As such, impacts to 1,129 acres of agricultural land for the operation of the Project, including for the solar facility and transmission line footprint, will amount to less than 0.2% of agricultural land in Renville County.

The Project, as designed, is consistent with the Renville County Comprehensive Plan (Renville County, 2010). The Project Area does not include any areas noted as future urban expansion areas or areas noted as rural residential. In the event the Project is located in an area where there is a future extension of utilities, such as water, sewer, or other services, construction and operation of the Project is not anticipated to prevent the extension of these services.

4.2.11.6 Mitigation

Gopher State Solar has developed an AIMP and VMP (see Appendices D and E), which will be implemented throughout the duration of the Project. The AIMP and VMP will identify measures that Gopher State Solar and its contractors 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 Project. The AIMP and VMP outline measures to ensure the Project Area may be returned to future agricultural use following the closure and decommissioning of the Project, including descriptions of BMPs that will be used during construction to minimize long-term impacts to soil. Agency comments will be incorporated into the AIMP and VMP prior to finalizing either plan.

Landowners will be able to continue normal agricultural activities within Project Areas that are not converted to solar panels, access roads, or other Project facilities. After the useful life of the Project and once equipment is removed, the facility Project Area could be restored to an agricultural use in accordance with the AIMP, Project lease and easement agreements, the VMP, and applicable portions of the SWPPP, or to another use if the economic conditions at the time indicate another use is appropriate for the site. The Project is also not anticipated to preclude any current or future planned use of adjacent properties.

Permanent land use or zoning impacts are not anticipated as a result of the Project. The Project is compatible with the rural, agricultural character of Renville County and the goals and policies regarding urban growth set forth in the County's comprehensive plan and local zoning regulations. As such, no additional mitigation measures are proposed beyond those outlined in the AIMP and VMP.

4.3 LAND-BASED ECONOMIES

4.3.1 Agriculture

4.3.1.1 Existing Environment

According to the U.S. Department of Agriculture's (USDA) 2017 Census of Agriculture, Renville County is approximately 631,680 acres in size; approximately 624,114 acres within Renville County operate as farm operations, with 598,247 acres of that being used for cropland (USDA, 2022). Predominant crops in Renville County include corn for grain (264,229 acres), soybeans (228,655 acres), sugar beets (45,729), vegetables (25,199 acres), beans (7,819 acres), hay (4,553 acres), wheat (2,290 acres), and corn for silage or greenchop (1,835 acres). The top livestock types in the county by number are hogs and pigs, followed by cattle, and then sheep and lambs.

The 2017 market value of agricultural products sold in Renville County was approximately $609 million; of that approximately $372 million was associated with crops, including nursery and greenhouse crops, and $237 million was associated with livestock, poultry, and their products (USDA, 2022).

Agricultural use covers approximately 96% of the Project Area, based on USGS NLCD (USGS, 2021). The remaining portion of the Project Area is made up of various land types that include emergent herbaceous wetlands, developed spaces (low, medium, or high intensity or open space), and deciduous forest.

4.3.1.2 Impacts to Agriculture

As shown in Table 4.2.11.5-1, the Project will temporarily impact up to approximately 1,129 acres of agricultural land as a result of it being taken out of row crop production; this is not anticipated to be a significant impact to land-based economies in the vicinity of the Project, as it amounts to less than 0.2 percent of the agricultural land in Renville County. Surrounding areas will continue to be used for agricultural production during the construction and operation of the Project. Some agricultural land may also be impacted by the Project due to temporary disturbance associated with construction of Project infrastructure including steel piles, access roads, inverter skids, fencing, transmission power poles, and Project substation.

Livestock operations are located within and adjacent to the Project Area; however, no direct impacts to livestock are anticipated except for minor disturbances during construction. No conversion of feedlots or pastureland is proposed by the project.

4.3.1.3 Mitigation

As outlined in the land easement agreements, Gopher State Solar will provide payments to the owners of the land used for the Project. These payments are intended to replace the revenue that would have been generated if agricultural production were continued by the landowners. Areas disturbed during construction will be restored to pre-construction conditions, as much as practicable, and will be reseeded as outlined in the VMP. This restoration is intended to maintain the existing topography and landform characteristics of the Project to allow it to blend in with the surrounding area. Certain areas within the Project may allow some agricultural practices to continue, such as haying or grazing, depending on type of infrastructure that is present. Additionally, agricultural production will be able to continue during construction and operation at locations within the Project Area, but outside the fence of the Preliminary Development Area.

Measures to mitigate and minimize topsoil removal include limiting removal to areas designated for spot grading and construction of roads and structures. Impacts to soils will be further mitigated by incorporating erosion control measures during and following construction. Gopher State Solar's construction contractor will implement erosion and sediment control BMPs outlined in the SWPPP, which will be specifically prepared for the Project, and as provided below. BMPs during construction and operation for general agricultural impact mitigation are outlined in the Project AIMP included in Appendix D. Vegetation management during construction and operation will be implemented in accordance with the Project VMP included in Appendix E.

The SWPPP and AIMP will also outline measures for managing topsoil and compaction minimization during construction. During the operating life of the Project, erosion control will be further accomplished by establishing beneficial perennial vegetation within and directly adjacent to the Project perimeter fence installed around the PV solar arrays in accordance with the VMP. Culverts may be installed under gravel access roads, as necessary, to redirect surface water. These actions will work to preserve soils in place, and therefore, may result in less soil erosion than typically occurs during row crop farming.

As discussed in the AIMP and VMP, and as will be described in the future SWPPP, the following is an overview of best practices and mitigation planned during construction:

- During construction, one of the primary means to protect and preserve the topsoil at the Project site will be to separate the topsoil from the other subgrade/subsoil materials when earthmoving activities, excavation or trenching are taking place;

- A temporary halt of Project construction activities may be called 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;

- Gopher State Solar will remain flexible and implement new practices and procedures that will help ensure the quality of the Project land while maintaining the safety of the workers, as needed under the directive of adaptive management;

- Stripped topsoil will be stored on site and newly spread topsoil will be loosely compacted and/or "tracked" to give a smooth-surface and employ the wind and stormwater erosion prevention BMPs;

- When performing foundation work, topsoil will be stripped and stored for later use. Once the 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 appropriate seed mix;

- Trenching activities will require excavation of topsoil and subgrade materials (which will be segregated) and trenches will be backfilled with unscreened native backfill and covered with topsoil;

- Silt fencing or similar BMPs will be used on the downside of all hills, near waterways, and near drain tile inlets to minimize erosion;

- Gopher State Solar is committed to preserve soil drainage performance on neighboring, non-participating properties and restoring drain tile systems on participating properties as needed during operations, or upon decommissioning if tiles are not deemed necessary during solar operations; and

- Construction-related debris and unused material will be removed by Gopher State Solar and the contractor.

Livestock operations are located within and adjacent to the Project Area; however, no direct impacts to livestock are anticipated except for minor disturbances during construction. No conversion of feedlots or pastureland is proposed by the Project.

4.3.2 Forestry

4.3.2.1 Existing Environment

The Project is located entirely on agricultural land (see Figure 6). In addition, there are no areas within the Project Area considered to be forestry resources for commercial use. Tree cover within the Project Area is primarily associated with undeveloped wetlands and waterways, fence lines, and shelterbelts or windbreaks adjacent to homesteads, farmstead structures, or livestock areas.

4.3.2.2 Impacts to Forestry

No economically significant forestry resources will be impacted by the Project.

4.3.2.3 Mitigation

No impacts to forestry resources are anticipated; therefore, no mitigation is proposed.

4.3.3 Tourism

4.3.3.1 Existing Environment

No local, state, or federal parks or recreation areas are located within 1 mile of the Project Area. The Renville County Drift Runner snowmobile trail network has trails within the Project Area. The

Renville Rangers Shooting Club's rifle and pistol shooting range is adjacent to the southern boundary of the Project on 830th Avenue (see Figure 9).

Other tourism locations including the Renville County Fairgrounds and Olivia Golf Club are discussed in the Recreation Section 4.2.9.

4.3.3.2 Impacts on Tourism

No tourism attractions, except for the Renville County Drift Runner trail and the Renville Rangers Shooting Club shooting range, are located within 1 mile of the Project Area. The Renville County Drift Runner snowmobile trail occupies the road ditches on either side of County Highway 5, which bisects the Project from north to south. Access to the snowmobile trail will remain open throughout operation of the Project. If Project construction occurs during snow cover, Gopher State Solar will coordinate with the MNDNR listed contact for the Renville County Drift Runners snowmobile trail to minimize or avoid impacts on trail use. None of the tourism areas outside of the Project Area are likely to be impacted by Project activities.

4.3.3.3 Mitigation

If necessary, Gopher State Solar will coordinate with the MNDNR listed contact for the Renville County Drift Runners to determine procedures for informing the public of construction in the area and any restricted access during construction. Similarly, 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. No permanent impacts to tourism are expected, therefore no mitigation is proposed.

4.3.4 Mining

4.3.4.1 Existing Environment

Based on aerial photographs, site reconnaissance, and data from the Aggregate Source Information System (MnDOT, 2023a) and Aggregate Finder – Map (MNDNR, 2023b), no mines or gravel pits are located in the Project Area.

4.3.4.2 Impacts on Mining

No mining operations are present within the Project Area; therefore, impacts are not anticipated.

4.3.4.3 Mitigation

No impacts to mining are anticipated; therefore, no mitigation is proposed.

4.4 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

4.4.1 Existing Environment

Information on known archaeological sites and historic structures was gathered in August 2023 from the Minnesota State Historic Preservation Office (SHPO) and the Minnesota Office of the State Archaeologist (OSA), both in St. Paul, Minnesota. The desktop investigation and literature review queried the area within 1 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 (also known as architectural history sites). Sites in these datasets typically include, but are not limited to, Native American mounds and earthworks, prehistoric burial grounds and habitation sites, remains of EuroAmerican home- and farmsteads, logging camps or other industrial land use, and standing buildings, bridges, or other features of the built environment. Sites not included in these datasets may include locations known to Native Americans to have cultural importance.

4.4.1.1 Previously Recorded Archaeological Sites

No previously recorded archaeological sites were identified in the Project Area or within 1 mile of the Project Area.

4.4.1.2 Previously Recorded Historic Structures

No previously recorded historic structures were identified in the Project Area or within 1 mile of the Project Area.

4.4.1.3 Archaeological Survey

Gopher State Solar sponsored an archaeological survey of those portions of the Project Area assessed as having a greater probability to contain significant archaeological sites. The archaeology survey occurred over two separate mobilizations in May and November 2023. The surveyed areas included undisturbed portions of the Project Area that were (see Figure 12):

- Within 500 feet (150 meters) of an existing or former water source of 40 acres (19 hectares) or greater in extent, or within 500 feet (150 meters) of a former or existing perennial stream;
- Located on topographically prominent landscape features;
- Located within 300 feet (100 meters) of a previously reported site; or
- Located within 300 feet (100 meters) of a former or existing historic structure or feature (such as a building foundation or cellar depression).

Areas assessed as having a relatively low potential for containing archaeological resources included inundated areas, former or existing wetland areas, poorly drained areas, and areas with a 20 percent or greater slope. Low potential areas and areas in which Holocene (less than 10,000 years old) deposits have been significantly disturbed were excluded from intensive field survey. A total of 1,088 acres (62 percent) of the total 1,769 acres within the Study Area were surveyed, as shown on Figure 12.

No archaeological resources were identified during the field surveys (see Appendix H).

4.4.2 Impacts to Cultural Resources

Based on the May and November 2023 field investigations, no sites eligible for inclusion on the National Register of Historic Places (NRHP) would be adversely affected by Project construction, operations, or maintenance.

4.4.3 Mitigation

Gopher State Solar will prepare an Unanticipated Discovery Plan for reference during construction activities. Should an NRHP-eligible site be identified during construction, the Applicant will coordinate with SHPO and OSA to avoid, minimize, or mitigate adverse effects. Such efforts may be achieved through, but not limited to, Project design changes (avoidance), engineering or construction controls (minimization), or data recovery excavation (mitigation). While not expected, in the event archaeological materials and/or human remains are identified during Project construction activities, such 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. If the site is determined to be eligible for inclusion on the NRHP, consultation among these parties will determine any procedures for avoidance, minimization, or mitigation. Should human remains be identified, the procedures as outlined in United States Code, Title 25, Section 3001 “Native American Graves and Repatriation Act” and Minnesota Statutes Chapter 307, “Private Cemeteries” will be followed in coordination with the OSA and Minnesota Indian Affairs Council.

4.5 NATURAL ENVIRONMENT

4.5.1 Air

4.5.1.1 Existing Environment

Section 109(b) of the Clean Air Act (CAA) requires that the EPA establish National Ambient Air Quality Standards (NAAQS) requisite to protect public health and welfare (40 Code of Federal Regulations Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children, and the elderly, and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), PM less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Minnesota is in compliance with the primary and secondary NAAQS for all criteria pollutants except lead, which has one nonattainment area in Dakota County (EPA, 2023a; MPCA, 2023a).

In Minnesota, air quality is tracked using air quality monitoring stations across the state. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI) on an hourly basis for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy (MPCA, 2023b).

The air quality monitor located nearest to the Project is in Marshall, Minnesota, approximately 50 miles to the southwest. This station monitors for O_3 and $PM_{2.5}$. The AQI for Marshall for the past five years is provided in Table 4.5.1.1-1 (MPCA, 2022b). Note that data from 2022 was not available at the time this Application was prepared.

TABLE 4.5.1.1-1

Days in Each Air Quality Index Category (Marshall, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy

2021	289	65	3	2	0
2020	330	30	0	0	0
2019	326	35	0	0	0
2018	333	32	0	0	0
2017	329	31	0	0	0

Source: MPCA 2022b

Air quality has generally been considered good for the majority of the past five reported years in Mashall. Since 2017, the largest number of days classified as moderate or unhealthy for sensitive groups occurred in 2021. In that year, two days were classified as unhealthy, and no days were classified as very unhealthy.

4.5.1.2 Impacts

Impacts on air quality from construction and operation of the Project will be minimal and limited to the period of construction. 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. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover.

4.5.1.3 Mitigation

Soils at the Project are not susceptible to wind erosion, which may create dust. Therefore, construction-specific mitigation measures and BMPs related to dust control have not been proposed. If wind erosion becomes an issue during construction, standard industry practices may be implemented, including mulching exposed soils, wetting exposed soils, maintaining vegetative cover (both cover crops and permanent vegetation), and reduced vehicle speeds. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the long-term maintenance of vegetative cover within the fenced areas.

4.5.2 Soils, Geology, and Groundwater

Soils, underlying geologic bedrock formations, groundwater and other hydrogeologic resource features of the Project Area were identified using desktop evaluations and included use of:

- Geographical information system (GIS) layers - NRCS Web Soil Survey (USDA NRCS, 2023), Minnesota Well Index (MDH, 2023a), Karst Feature Mapping of Minnesota (U of M; MNDNR, 2022), USGS Topographic Mapping (USGS, 2019); and

- Renville County Soil Survey (USDA, 2000), Surface Geology Renville County, Minnesota (MNDNR, 2003), Geologic Map of Minnesota Bedrock Geology (Jirsa et al., 2011), Bedrock Geology Interactive Mapper (U of M, 2023), Source Water Protection Web Map Viewer Interactive Mapper (MDH, 2023b), Wellhead Protection Vulnerability Fact Sheet (MDH, 2018), Minnesota Stormwater Manual (MPCA, 2022c), Minnesota Groundwater Provinces 2021 (MNDNR, 2021a),

Wellhead Protection Plan for the City of Bird Island (Woodside, et al., 2019), and Geotechnical Desktop Study (Maciolek and Meyer, 2023)

4.5.2.1 Soils

Existing Environment

The Soil Survey of Renville County (USDA, 2000) indicates that the soils of Renville County are primarily clayey loams. Throughout Renville County the surface is near level or gently sloping; however, the surface is steeper near the Minnesota River and along its tributaries. Renville County is covered entirely by Pleistocene aged glacial sediments, consisting of till, glaciolacustrine deposits, and glacial outwash (MNDNR, 2003). The different parent materials, topography, native vegetation, and type of glacial deposit account for the variety of soils in the County.

Soils within the Project Area mainly consists of clay loams, silty clay loams, and sandy loams (see Figure 13). The topography within the Project Area is nearly-level, which is consistent with current row-crop agriculture production (USGS, 2019). Approximately 69% of the Project Area is classified as hydric soil where historic wetlands were present prior to drainage (e.g., installation of drain tiles and ditches) or where wetlands are presently located. Approximately 31% of the Project Area is classified as non-hydric soils (see Figure 13) (MNDNR, 2022a).

Approximately 63% of the Project Area is prime farmland if drained, 25% prime farmland, 4% farmland of statewide importance, and 7% prime if protected from flooding or not frequently flooded during the growing season (Minnesota DOC, 2020).

Impacts

Impacts to soil will occur during both the construction and minimally during operational stages of the Project. Soil impacts will primarily occur from the construction for the Project substation, O&M building, Project gen-tie line, access roads, laydown areas, fencing, PV pile foundation posts, tracker installation, PV solar module installation, collector line system, electrical enclosures/inverters, general grading, and site preparation. Soil impacts in the solar array areas and in areas not intended for permanent above-ground facilities will be restored. The result of long-term maintenance of native and other beneficial vegetation within the fenced areas will be an improvement in soil health at the end of the Project's use.

Mitigation

During construction, soil compaction is anticipated for the direct-embedded piers for the solar arrays and inverter skids. Topsoil will be stripped and stored prior to installation of the solar arrays and will be restored to the area after construction. Low impact equipment and methods will be used to prevent soil compaction. During operation of the Project, soil compaction could occur from the use of access roads. Relatively light duty maintenance vehicles will use access roads, which could cause soil compaction to be confined to the roadbed. Installing permanent vegetation adjacent to access roads and dressing access roads with gravel is expected to reduce the potential for soil erosion in the Project Area.

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

SWPPP to MPCA for review and approval prior to construction in order to obtain coverage under the General Construction Stormwater Permit Program.

Construction activities may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. 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.

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. Stormwater ponds are designed to be located completely outside of wetland areas.

4.5.2.2 Geology

Existing Environment

Surficial geology features within Renville County are relatively flat and derived from glacial origin as a result from 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. These glacial deposits result from till and outwashes associated with glacial activity in the region (MNDNR, 2003). Glacial deposits are approximately 200 feet thick or greater, overlaying the bedrock within the Project Area (Maciolek and Meyer, 2023). Depth to bedrock within Renville County generally decreases to the south near the Minnesota River. Underlying bedrock within the Project Area consists of Archean aged granitic orthogneiss, migmatite, and leucogranite; Proterozoic aged pyroxenite, peridotite, gabbro, and plutonic and volcanic photoliths; and Cretaceous aged conglomerate, sandstone, mudstone, shale, marlstone, and lignite. Additionally, Pre-Cambrian dikes and the Yellow Medicine Shear Zone are within close proximity of the Project Area (Jirsa, 2011; University of Minnesota (U of M), 2023). According to the University of Minnesota Karst Feature Inventory, karst features such as sinkholes, springs, and stream sinks are not present in the Project Area (U of M and MNDNR, 2022). The nearest karst feature is a stream sink, which is approximately 18 miles southwest of the Project Area.

Impacts

The Project will not result in a significant change in surficial materials. Due to the thickness of surficial materials being greater than 200 feet, excavation or blasting of bedrock is not anticipated. Karst features are not present within the Project Area and are not expected to be a concern for the Project. A geotechnical analysis will be performed prior to construction to support the selection of construction materials and methods.

Mitigation

No significant impacts to surface or bedrock geology features are anticipated. Geotechnical evaluation will be completed prior to construction to decide if Gopher State Solar requires special construction methods related to soil conditions.

4.5.2.3 Groundwater

Existing Environment

Minnesota Groundwater Provinces exist throughout the state based on bedrock and glacial geology. The Gopher State Solar Project is in Minnesota Groundwater Western Province 5. Glacial groundwater aquifers within Western Province 5 consist of loam and clay loam glacial sediment aquifers, with limited surficial and buried sand aquifers. Underlying Cretaceous and Precambrian aged bedrock aquifers are limited within Western Province 5 (MNDNR, 2021a).

According to the Minnesota Well Index Database, wells surrounding the Project Area are set in buried deposits of glacial sand and gravel or unspecified sources, due to the thickness of surficial materials above bedrock. Groundwater use in Renville County is primarily from buried sand aquifers, with lesser amounts coming from Cretaceous aquifers (MNDNR, 2021a).

According to the MNDNR Water Table – Depth, the Project Area depth to groundwater is between 0 and 20 feet below ground surface (MNDNR, 2022b). Given that the Project is located within an area heavily used for agricultural purposes, subsurface drainage is common to manage soil moisture. Subsurface drainage systems can alter the depth to groundwater (Smith, 2018).

Public and non-public community water supply source-water protection in Minnesota is administered by MDH through the Wellhead Protection Program. Wellhead Protection Areas (WHPA) for public and community water-supply wells are delineated on the basis of a zone of capture for 10-year groundwater time-of-travel to the well. A Drinking Water Supply Management Area (DWSMA) is delineated around the WHPAs using geographically definable boundaries, such as roads, section lines, etc. Within the DWSMA, the water-supply provider conducts an inventory of potential contamination sources and develops management practices and monitoring strategies to mitigate well contamination. There are no WHPAs or DWSMAs within the Project Area. The 892.59-acre Bird Island DWSMA surrounding the 320.52-acre WHPA is located approximately 1.25 miles southeast of the Project Area. 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 (MDH, 2018; MDH, 2023b). 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 (Woodside et al., 2019).

The MDA Well Index identifies 36 wells within 1 mile of the Project Area, with depth to groundwater ranging from 11 to 56 feet below ground surface. The wells are for domestic use. No wells are mapped within the Project Area (MDH, 2023a).

Impacts

Project construction is anticipated to be relatively shallow, and therefore impacts to groundwater resources both at the site and in surrounding areas are not anticipated. Gopher State Solar will be completing a geotechnical study closer to the construction date to further inform the Project's design, engineering, and construction techniques. As previously mentioned, there are no DWSMAs or WHPAs within or adjacent to the Project Area.

Project construction is not likely to affect the use of existing water wells. No wells are known to occur within the Project Area (MDH, 2023a). If an unknown or unregistered well is discovered

during construction, Gopher State Solar will coordinate with the landowner to ensure that MDH requirements for registering or capping the well are followed.

Impacts to groundwater resources are not anticipated during facility operation of the Project as water supply needs will be limited. An O&M building will be constructed as part of the Gopher State Solar Project. If potable water is required for the O&M building, Gopher State Solar will acquire a domestic water well permit and will hire an approved well drilling contractor prior to O&M building construction. Water use at the O&M building will be limited to rest room 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.

Subsurface blasting is not likely during construction; therefore, disturbances to groundwater from newly fractured bedrock is not anticipated.

Solar panels, roads, and gravel surfaces are considered impervious surfaces by the MPCA (MPCA, 2022c). The increase of impervious surfaces has the potential to impact groundwater recharge. The Project will have minimal increase in impervious surfaces within the Project Area. Additionally, the increased amount of perennial vegetation that will be established within the Project Area and stormwater treatment basins will facilitate groundwater infiltration. The steel pier rack foundations will likely be driven and will not require concrete foundations; however, some concrete foundations may be required. Final depths of the pier rack foundations will be determined following the geotechnical analysis of the Project Area. Impacts to the aquifer resources are not anticipated.

Large quantities of hazardous material have the potential to spill or leak into the soil and groundwater. If hazardous materials are used or stored during construction and operation they will be labelled, stored, and disposed of in accordance with applicable requirements. Additionally, all hazardous materials stored, including portable and permanent aboveground storage tanks, will have the appropriate containment required by regulations. PV solar module washing activities will use ionized water. All herbicide applications for vegetation management will follow applicable regulatory use and management requirements.

Some solar panels are considered hazardous waste if they exhibit toxicity, ignitability, reactivity, or corrosivity; however, they are typically considered hazardous waste if heavy metals such as lead and cadmium leach at a concentration that would fail the toxic characteristic leaching procedures. A final panel selection has not been made for the Project; however, if the panels contain heavy metals, Gopher State Solar will develop a spill prevention, control, and countermeasure plan for the Project to address releases should panels break or become damaged.

Mitigation

Dewatering required during project construction will be managed in accordance with the SWPPP and MNDNR temporary dewatering permit by discharging to the surrounding surface. If applicable MNDNR permit thresholds are expected to exceed during construction, Gopher State Solar will obtain a Water Appropriation Permit from MNDNR.

4.5.3 Surface Waters

Hydraulic features within the Project Area include wetlands, waterways, waterbodies, and floodplains (see Figure 14). The Project is within the East Fork Beaver Creek, Headwaters East Fork Beaver Creek, and Buffalo Creek Hydrologic Unit Code (HUC) 12 Watersheds (EPA, 2023b).

Merjent Inc. (Merjent) conducted a wetland and other waters field delineation in support of the Project in May and October 2023. Prior to field surveys, a desktop assessment was completed to identify wetland and waterbody areas within the Project Area. USFWS National Wetlands Inventory data with MNDNR 2019 updates and the MNDNR hydrography data were used to identify potential surface waters within approximately 2,145 acres (Survey Area) that includes the Project Area. The Survey Area encompassed a buffer to allow for minor adjustments to Project design, both for avoidance and minimization of impacts to resources and for constructability (MNDNR, 2019 and MNDNR, 2023c). The data were used as a precursor for field delineations. Field surveys were conducted to confirm desktop boundaries and to update wetland/upland vegetation breaks, slope, and hydrology indicators. A total of 12 wetlands and 4 waterways were delineated through the desktop and field survey efforts (see Figure 14).

4.5.3.1 Floodplains

Existing Environment

A floodplain is any land area susceptible to being inundated by floodwaters from any source, and is usually 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 that do not experience strong current. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. FEMA designates floodplain areas based on the percent chance of a flood occurring in that area every year. These designations include the 100-year floodplain, which has a 1 percent chance of flooding each year, and the 500-year floodplain, which has a 0.2 percent chance of flooding each year.

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

Within the Project Study Area, no 100-year floodplains are present. The entire Project Area is designated as Zone X, which is defined as an Area of Minimal Flood Hazard, by FEMA (FEMA, 2023).

Impacts on Floodplains

Since there are no 100-year floodplains within the Project Site, impacts are not anticipated.

Mitigation

No impacts to floodplains are anticipated; therefore, no mitigation is proposed.

4.5.3.2 Impaired Waters

Existing Environment

Under Section 303(d) of the Clean Water Act (CWA), the MPCA assesses all waters of the state and creates a list of impaired waters every two years. The listings are based on water quality monitoring of lakes and major streams and are used to set pollutant reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses, which are referred to as total maximum daily loads. The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters. These waters are described as "impaired." The 303(d) list was approved by the EPA on April 29, 2022.

The Project Area includes one impaired waterbody, Judicial Ditch 9 (MN07010205-625), which is listed as having an impaired designated use of aquatic life (see Figure 14) (EPA, 2023c).

Impacts

Gopher State Solar will site solar infrastructure outside of the impaired waterbody; however, one collector line will be bored under impaired Judicial Ditch 9. Direct impacts to impaired surface waters are not anticipated, and no Project activities are likely to exacerbate the existing impairment. Gopher State Solar will employ best management practices during construction and in compliance with local and state permits to prevent erosion and sedimentation near surface waters.

Mitigation

No impacts to impaired waters are anticipated; therefore, no mitigation is proposed.

4.5.3.3 Lakes and Other Waterbodies

Existing Environment

Lakes and other waterbodies are non-linear surface water features. Based on a review of aerial photography and field survey results, no open waterbodies (e.g., lakes, ponds, etc.) were identified within the Project Area. Lake Lillian, the closest lake, is approximately 7.75 miles north of the Project Area.

Impacts

No lakes or other waterbodies were identified within the Project Area; therefore, impacts are not anticipated.

Mitigation

No impacts to waterbodies are anticipated; therefore, no mitigation is proposed.

4.5.3.4 Rivers and Streams (Waterways)

Existing Environment

Waterways include rivers, streams, and other watercourses that move water across the landscape within a defined path. Based on the wetland delineation, there are 4 waterways within the Project Area: East Fork Beaver Creek, Unnamed Tributary to East Fork Beaver Creek, Unnamed Tributary to Judicial Ditch 9, and Judicial Ditch 9 (see Figure 14).

Public Waters are wetlands, water basins, and watercourses of significant recreational or natural resource value as defined in Minn. Stat. § 103G.005. The MNDNR has regulatory jurisdiction over these waters, which are identified on the MNDNR Public Waters Inventory (PWI) maps. Crossing a Public Water with infrastructure such as bridges or utilities would require a License to Cross Public Waters from the MNDNR. There are no Public Waters within the Project Area. There is one Public Water approximately 300 feet east of a Project collector line: Unnamed Stream, M-064-005-008-037 (MNDNR, 2023d). No Project activity will occur within or across this Public Water.

Public Ditches are open channels to conduct the flow of water as defined in Minn. Stat. § 103E.005 and drainage authorities include county boards, watershed districts, and water management organizations. There are four Public Ditches within the Project Area (MNDNR, 2023d). These Public Ditches were identified based on a review of aerial photography and confirmed during field survey. Beaver Creek East Fork and County Ditch 63 are located in the south and west central portions of the Project. Judicial Ditch 9 and an unnamed stream are located in the northeast portion of the Project (see Figure 14).

Impacts

Gopher State Solar will not place solar infrastructure within delineated streams, including Public Waters and Ditches; however, there will be four crossings where collector lines will be bored under three of the Public Ditches within the Project Area. Direct impacts to rivers and streams are not anticipated. Gopher State Solar will obtain the necessary permits, implement best management practices, and comply with the NPDES, Construction General Permit MNR100001, during construction and will perform construction activities in compliance with local and state permits to prevent erosion and sedimentation near streams and surface waters.

Mitigation

No permanent impacts to rivers and streams (waterways) are anticipated; therefore, no mitigation is proposed.

4.5.3.5 Wetlands

Existing Environment

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation’s navigable streams are protected under Section 404 of the federal CWA and most wetlands in Minnesota are protected under the state Wetland Conservation Act (WCA). National Wetland Inventory (NWI) data for Minnesota provides information on the potential location, extent, and type of Minnesota wetlands. The NWI for Minnesota is a publicly available GIS database that provides information regarding the potential

existence of wetlands. NWI data should be used as a reference only and may be inconsistent with wetland conditions on the ground.

Wetland types within the NWI data are classified using the Cowardin wetland habitat classification system. The Cowardin classification system is hierarchical and defines wetland habitats based on vegetative and sediment class along with water regime.

In May and October 2023, Merjent completed a wetland and other waters delineation of the Survey Area. The survey was performed by qualified biologists who covered the entire Survey Area.

Based on field delineations, approximately 1.63 acres of wetlands may be present within the Project Area (see Figure 14). Details on wetland types are included in Table 4.5.3.5-1.

TABLE 4.5.3.5-1

Summary of Delineated Wetlands within the Project Area

Wetland ID	Eggers and Reed Classification [a]	Circular 39 Classification [b]	Size (acres) within Survey Area [c]
w01	Seasonally Flooded Basin	Type 1: Inland Seasonally Flooded	0.56
w02	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.03
w03	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.02
w04	Seasonally Flooded Basin	Type 1: Inland Seasonally Flooded	0.03
w05	Seasonally Flooded Basin	Type 1: Inland Seasonally Flooded	0.20
w06	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.02
w07	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.01
w08	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.07
w09	Shallow, Open Water Communities	Type 5: Inland Shallow Open Water	0.01
w10	Fresh (Wet) Meadow	Type 2: Inland Fresh Meadow	0.07
w11	Hardwood Swamp (Vernal Pool Subtype)	Type 7: Inland Wooded Hardwood Swamp	0.47
w12	Hardwood Swamp (Vernal Pool Subtype)	Type 7: Inland Wooded Hardwood Swamp	0.14
TOTAL			**1.63**

[a] Source: Eggers and Reed, 2015.
[b] Source: Shaw and Fredine, 1956.
[c] Note: delineated wetlands may extend outside of Survey Area.

Impacts on Wetlands

Based on the preliminary Project design, potential impacts to wetlands are not anticipated. Solar generation facility infrastructure will not be placed in wetlands, so permanent impacts are not anticipated. Access roads have also been designed to avoid wetlands.

Mitigation

Wetlands will not be impacted; therefore, mitigation is not anticipated.

4.5.4 Vegetation

4.5.4.1 Existing Environment

The Project Area is located within the Minnesota River Prairie subsection of the North Central Glaciated Plains Section of the Prairie Parkland Province (MNDNR, 1999). Within the Minnesota River Prairie subsection, agriculture is the dominant land use; however, although remnant stands

of tallgrass prairie are rare, upland prairie species are common throughout the section (MNDNR, 1999). The Prairie Parkland Province is heavily influenced by the most recent glaciation as ice sheets crossed the province several times, depositing a mantle of drift 100 feet to 600 feet thick (MNDNR, 1999).

The MNDNR Minnesota Land Cover Classification System (MLCCS) provides detailed land cover information that includes human-modified cover classifications; however, MLCCS data do not cover the Project Area (MNDNR, 2023e). Instead, USGS NLCD was used to quantify land cover types within the Project Area.

The USGS NLCD provides nationwide data on land cover at a 30-meter resolution based on 16 classifications of land use. Within the Project Area, approximately 96 percent is used for cultivated crops. Other land classification types include developed emergent herbaceous wetlands (1.29 percent) and developed, open space (1.25 percent), with all other land cover categories composing 1 percent or less of the Project Area. See Table 4.5.4.1-1 and Figure 15 for a full list and depiction of land cover types within the Project Area (USGS, 2021).

TABLE 4.5.4.1-1

Land Cover Types within the Project Area

Land Cover Types	Acres	% of Project Area
Cultivated Crops	1,580.2	96%
Emergent Herbaceous Wetlands	21.2	1.29%
Developed, Open Space	20.5	1.25%
Developed, Low Intensity	12.3	0.75%
Deciduous Forest	7.8	0.47%
Developed, Medium Intensity	2.5	0.15%
Developed, High Intensity	0.2	0.01%
Hay/Pasture	0.1	0.01%
Herbaceous	0.1	0.01%
TOTAL	**1,645**	

The Minnesota Biological Survey documents sites of biodiversity significance (SOBS) that are ranked based on several factors, including the quality (i.e., size and condition) of Native Plant Communities (NPC) within the site, the presence and numbers of rare species populations, and the site's context within the landscape (i.e., whether the site is isolated in a landscape dominated by cropland or developed land, or whether it is contiguous with or close to other areas with intact NPCs (MNDNR, 2023f). These sites are ranked by grouping and rated within each of the state's ecological classification system subsections. A rank of outstanding is assigned to those sites which contain the largest, most intact functional landscapes, and the best occurrences of the rarest plant and animal species. No SOBS are located within the Project Area. The nearest SOBS to the Project Area is the Bird Island site, which is 1.3 miles south of the Project Area (see Figure 17).

NPC are referred to as native habitats or natural communities and are named for the characteristic plant species within them or for characteristic environmental features (MNDNR, 2023f). No NPC are located within the Project Area. The nearest NPC (Ups23a) to the Project Area is 1.4 miles south of the Project Area.

Merjent conducted a desktop assessment and preliminary field review to identify potentially undisturbed grasslands within the Project Area that may contain native prairie. In the State of Minnesota, native prairie has been defined as land that has never been plowed where native

prairie vegetation originating from the site currently predominates, or if disturbed, is predominantly covered with native prairie vegetation that originated from the site. 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 (Minn. Stat. § 84.02, subd. 5). The desktop review used publicly available sources including aerial imagery, MNDNR NPC, and MNDNR SOBS. Based on this effort, one area of potential prairie was recorded; this area appeared to be tilled in the past such that the native vegetation was disturbed.

The MNDNR surveyed active railroad rights-of-way for native prairie remnants. Many native or sensitive plants in Minnesota can be found in native prairie remnants along railroads. No MNDNR-designated railroad right-of-way prairies are located within the Project Area.

Gopher State Solar has secured 100% land control within the Project Area through leases or easements. The Project Area is comprised entirely of private land, although some state-administered conservation easements exist on some properties within the Project Area. The Minnesota Conservation Reserve Enhancement Program (CREP) is a voluntary, federal-state funded natural resource conservation program that places land into conservation easements. Minnesota's Reinvest in Minnesota (RIM) reserve program accomplishes conservation goals by placing lands in perpetual conservation easements. Both programs are administered by Minnesota's Board of Water and Soil Resources (BWSR). All RIM easements within the Project Area have been avoided (see Figure 16). All CREP easements have been avoided with the exception of those that will be crossed by underground collector lines (see Figure 16). In those cases, Gopher State Solar plans to install the collector lines beneath the ground surface using a directional bore, thereby avoiding impacts to the surface of the CREP easement lands. Gopher State Solar will coordinate with landowners and BWSR to develop an installation plan that will comply with the conditions of the CREP easements.

4.5.4.2 Impacts to Vegetation

No impacts to native vegetation communities are expected to occur as a result of construction and operation of the Project. Most of the land use within the Project Area (96 percent) is in cultivated agricultural land (see Table 4.5.4.1-1). Approximately 7.8 acres of deciduous forest are present within the Project Area primarily as wind breaks for residences. Gopher State Solar expects to avoid most forested areas and any required tree removal will be minimal. Overall, minimal impacts to vegetation are anticipated. No SOBs, NPC, or railroad prairies are located within the Project Area. One site was identified as potential native prairie based on Merjent's desktop assessment and field reconnaissance. In addition, two RIM easements and four CREP easements lands are located within the Project Area (see Figure 16). Gopher State Solar will avoid both potential native prairie and RIM and CREP easements during project design with the exception of one CREP easement underneath which Gopher State Solar will install a collector line via directional bore such that there will be no surface impacts (see Figure 16). Thus, impacts on special designations of vegetation (e.g., SOBS, NPC, railroad prairies, native prairies, and RIM/CREP lands) are not anticipated.

To minimize potential impacts to vegetation, Gopher State Solar will implement site restoration, revegetation, and seeding, and will monitor results of these efforts per the VMP and AIMP. In addition, throughout Project operation, less pesticide and herbicide use typical of traditional agricultural practices will be employed through implementation of the Project VMP, AIMP, and SWPPP. Project equipment will be washed to remove noxious and invasive plants and seeds before entering the Preliminary Development Area. Overall, the Project will result in a shift from

primarily cultivated agricultural use to perennial vegetative cover through reseeding and active vegetation management within the Preliminary Development Area.

4.5.4.3 Mitigation

Impacts to sensitive vegetation or special designations of vegetation are not anticipated; therefore, no mitigation is proposed.

4.5.5 Wildlife

4.5.5.1 Existing Environment

Wildlife species with the potential to occur within or near the Project were researched and are described below using information from the USFWS, MNDNR, and other publicly available sources. These species include fish, reptiles and amphibians, birds, and mammals described below. In addition, pollinator insects may be present in the Project Area including native bees, butterflies, and moths. The following section includes a discussion of general wildlife resources within the Project Area with a focus on species that commonly occur in cultivated agricultural lands. Additional details regarding protected species and other rare and unique resources that may be present in the Project Area are provided in Section 4.5.6. Proposed fencing is described more in Section 3.1.5. Consistent with MNDNR 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.

Four streams were identified within the Project Area (see Section 4.5.3.4) that may provide habitat for fish. Species that may be present in small streams through agricultural lands include the creek chub (*Semotilus atromaculatus*), fathead minnow (*Pimephales promelas*), white sucker (*Catostomus commersoni*), and common carp (*Cyprinus carpio*) (Zimmerman et al., 2003).

Reptile and amphibian species that may occur in agricultural lands and grasslands within the Project Area include great plains toad (*Anaxyrus cognatus*), western chorus frog (*Pseudacris maculata*), painted turtle (*Chrysemys picta*), spiny softshell (*Apalone spinifera*), snapping turtle (*Chelydra serpentina*), prairie skink (*Plestiodon septentionailis*), western fox snake (*Pantheropsis ramspotti*), red-bellied snake (*Storeria occipitomaculata*), plains garter snake (*Thamnophis radix*), and common gartersnake (*Thamnophis sirtalis*) (MNDNR, 2018; MNDNR, 2021b; MNDNR, 2023g). Due to the temporary nature of vegetative cover in cultivated agricultural areas and lack of diversity in plant assemblages and habitat structure, occurrence, and habitat quality for these species in the Project Area is limited.

The Project Area is located within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat, and within the Prairie Potholes Bird Conservation Region (BCR) (USFWS, 2021). The USFWS identified 26 species of birds that breed within Prairie Potholes BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. BCC species that breed in the Prairie Potholes BCR and may nest or forage around agricultural lands or grasslands include the bobolink (*Dolichonyx oryzivorus*), chimney swift (*Chaetura pelagica*), and grasshopper sparrow (*Ammodramus savannarum*) (USFWS, 2021). According to the Minnesota Breeding Bird Atlas, avian species that have been confirmed or have probable sightings near the Project Area include Mourning Dove (*Zenaida macroura*), Killdeer (*Charadrius vociferus*), Chimney Swift (*Chaetura pelagica*), Eastern Kingbird (*Tyrannus tyrannus*), American Crow (*Corvus brachyrhynchos*), Tree Swallow (*Tachycineta bicolor*), Cliff Swallow (*Petrochelidon pyrrhonota*), American Robin (*Turdus*

migratorius), American Goldfinch (*Spinus tristis*), Brewer's blackbird (*Euphagus cyanocephalus*), and Common Grackle (*Quiscalus quiscula*) (Audubon Minnesota and UMN NRRI, 2023).

Species of mammals that may use agricultural and grassland areas within the Project Area include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), Virginia opossum (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) (MNDNR, 2023h).

4.5.5.2 Impacts to Wildlife

As outlined in Section 4.5.4 and Table 4.5.4.1-1, land use within the Project Area is primarily cultivated agricultural lands (96 percent). Lands used for agriculture have temporary non-diverse vegetative cover that may be used by some wildlife that adapt to frequently disturbed lands with low plant diversity.

Approximately 33 percent of existing land use within the Preliminary Development Area will be converted to developed land or impervious surfaces for the Project substation, operations and maintenance facility, roads and other project features that most wildlife will not use (see Table 3.2.2-1). This estimate of developed land or impervious surfaces within the Preliminary Development Area may be an overestimate because sensitive features (e.g., CREP easement) that Gopher State Solar is crossing with collector lines will be bored so that there are no surface impacts. The majority of the Preliminary Development Area, including under the photovoltaic arrays, will be revegetated to perennial grasses, and forbs that will result in more consistent permanent vegetative cover throughout the year and more diverse species assemblage for wildlife to use for cover, foraging or hunting, and reproduction. Specifically, 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 with the goal of benefitting pollinators throughout the spring, summer, and fall. Thus, the construction and operation of the Project is anticipated to result in higher quality habitat for wildlife species, including pollinators. Perennial ground cover and diverse grasses and forbs within the Preliminary Development Area will also reduce the use of herbicides and pesticides, decrease surface run-off into adjacent waterbodies, reduce soil erosion, and restore soil health, all of which will also benefit wildlife.

In addition to implementing the Project's SWPPP, AIMP, and VMP, Gopher State Solar will buffer all streams by 16.5 feet per the Minnesota Buffer Law administered by BWSR; this buffer will manage run-off and erosion and reduce amounts of phosphorus, nitrogen and sediment that enter the stream (BWSR, 2023), further benefitting fishes, amphibians, and aquatic insects. Proposed fencing is described more in Section 3.1.5. 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.

4.5.5.3 Mitigation

Impacts to wildlife are not anticipated; therefore, no mitigation is proposed.

4.5.6 Rare and Unique Natural Resources

4.5.6.1 Existing Environment

Federally Listed Species

The USFWS Information for Planning and Consultation (IPaC) database was reviewed for a list of federally listed threatened and endangered species, candidate species, and designated critical habitat that may be present within the Project Area.

Based on the official species list provided by USFWS (see Appendix K), one federally listed species has been previously documented within the vicinity of the Project Area. One candidate species and one species proposed for listing have been previously documented within the vicinity of the Project (see Table 4.5.6.1-1). No federally designated critical habitat is present.

TABLE 4.5.6.1-1

Federally Listed Species Within the Vicinity of the Project

Common Name	Scientific Name	Federal Status
Monarch butterfly	*Danaus plexippus*	Candidate
Northern long-eared bat*	*Myotis septentrionalis*	Endangered

*This species only has to be evaluated under the ESA for wind projects.

Northern Long-eared bat

The range of the northern long-eared bat stretches across much of the eastern and Midwestern United States. During summer, the bats roost singly or in colonies under bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places such as caves and mines. This species is thought to be opportunistic in selecting roosts, using tree species based on the tree's ability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures such as barns and sheds. In winter, northern long-eared bats use caves and mines as hibernacula (USFWS, 2024).

Monarch Butterfly

The monarch butterfly is a large butterfly with an approximate 3-4-inch wingspan and characterized by bright orange coloring on the wings, with distinctive black borders and veining. The species can be found in a wide variety of habitats including prairies, grasslands, urban gardens, road ditches, and agricultural fields, provided a supply of nectaring plants are available for adult foraging and milkweed plants are present for laying eggs and as a food source for caterpillars (USFWS, 2023).

On December 17, 2020, the USFWS published the result of its 12-month review of the monarch butterfly and determined that listing the species under the ESA was "warranted but precluded," meaning the species meets the criteria for listing as an endangered or threatened species, but the USFWS cannot currently implement the listing because there are other listing actions with a higher priority. The species is now a candidate for listing; however, candidate species are not protected under the ESA. The USFWS has added the monarch to the updated national listing workplan and based on its listing priorities and workload, intends to propose listing the monarch in Fiscal Year 2024, if listing is still warranted at that time, a final rule is typically published (USFWS 2020).

State-Listed Species

On behalf of Gopher State Solar, Merjent submitted a formal Natural Heritage Request through the MNDNR's Minnesota Conservation Explorer (MCE; 2023-0039), which is included in Appendix K. An automated response provided by the MNDNR on April 27, 2023, indicated that there are no rare features within the vicinity of the Project. These reviews expire after one year, so Merjent submitted another formal Natural Heritage Request through the MNDNR's Minnesota Conservation Explorer (2024-00452), which is included in Appendix K. An automated response was received on May 15, 2024, indicating that the MNDNR does not believe the proposed Project will negatively affect any known occurrences of rare features.

4.5.6.2 Impacts

Federally Listed Species

Northern long-eared bat

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 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 on the landscape will not result in direct impacts to individual bats but could result in indirect impacts due to removal of suitable roosting habitat.

Monarch Butterfly

Suitable habitat for monarchs may be present within the Project Area. If the USFWS determines 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.

The following general measures will be used to 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.

State-Listed Species

Automated responses provided by the MNDNR on April 27, 2023 and May 15, 2024 indicated that the Project will not negatively affect any known occurrences of rare features. The responses are provided in Appendix K.

4.5.6.3 Mitigation

Federally Listed Species

Impacts to federally listed species are not anticipated; therefore, no mitigation is proposed.

State-Listed Species

Impacts to state-listed species are not anticipated; therefore, no mitigation is proposed.

4.6 CLIMATE CHANGE

The effects of climate change have been tied to an increase in greenhouse gas (GHG) emissions from human-related activity, including transportation, energy production, and industry (EPA, 2023d). A key element in addressing climate change is the reduction of GHG emissions produced each year. Minn. Stat. § 216H.02 sets statewide greenhouse gas emissions goals aimed at reducing emissions from 2005 levels to net zero by 2050. In addition, as discussed in Section 1.1, Minnesota has set ambitious carbon-free energy standards requiring 100% of the retail energy sales in Minnesota to come from carbon-free energy by 2040.

The 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.

4.6.1 Impact of Project on Climate Change

Construction and operation of the project will release GHG, contributing to global warming. Approximately 20 to 50 grams per kilowatt of carbon dioxide equivalent (CO_2e) is produced during the lifespan of a solar project (National Renewable Energy Laboratory, 2012). Approximately 60 to 70 percent of that is due to the manufacturing of the panels and construction. Approximately 20% of the CO_2e is from the operational activities including operation of the O&M building, lighting, monitoring equipment, and emergency generators. The remainder of the CO_2e is due to decommissioning and disposal. However, the solar farm offsets these emissions within approximately three years of operation (GVEC, 2023).

Activities associated with the construction of the Project will result in GHG emissions from the combustion of diesel and gasoline in heavy construction equipment, delivery vehicles, and worker passenger vehicles. Emissions from construction activities were calculated by estimating the volume of fuel expected to be consumed by each piece of equipment and determining the GHG emissions released upon combustion of those fuel volumes. Construction activities are expected to produce a total of 3,636 tons CO_2e. 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.

Once construction of the Project is finished, the solar power generated from the new solar farm can replace some fossil fuel use that is currently releasing greenhouse gases into the atmosphere. The Project supports achievement of Minnesota's CFS, RES and SES standards, as the Project will contribute to this need for carbon free energy. The Project will beneficially impact climate change because it will reduce the need for more carbon-intensive sources of

energy and temporarily reduce emissions from agricultural activities (e.g., use of tractors and other farm implementation, decreased use of agricultural chemicals, etc.).

Once the Project is operational it will generate clean, renewable energy for Minnesotans and will work to reduce fossil fuel use and combat climate change. During the operational stage, up to six permanent full-time workers will staff the solar farm and maintenance activities will require the use of up to two maintenance trucks per day. The commuter vehicles and maintenance trucks will generate a minor amount of GHG emissions. Utilities required to support operation of the solar farm include electricity, water, and sanitation. Approximately 1,688 kWh per month of electricity may be purchased from the grid if needed to meet operational needs such as lighting, cameras, and comfort heating. Approximately 25 tons per year CO_2e will be generated during the operating phase of the Project.

Decommissioning activities are detailed in Section 3.4.1 and in the Decommissioning Plan in Appendix F. Essentially, all equipment and infrastructure will be removed, and the site will be restored to preconstruction conditions. GHG emissions associated with the decommissioning process will be similar in nature and duration to emissions from construction of the Project. GHG emissions from construction vehicles will be minimized by keeping equipment in good working order.

A summary of construction, operating, and decommissioning emissions is found in Appendix I Project Emissions Estimate.

4.6.2 Impact of Climate Change on Project

Future climate change, average annual temperature, and drought severity was modeled on the MNDNR Climate Change website using climate data from years 1895 to 2023 (MNDNR, 2023i). Models drawn for Renville County show climate in the Project Area is following suit with the rest of the globe; temperatures are rising, and large rainfall events are becoming increasingly more common.

These warmer and wetter climate trends are not anticipated to cause a major impact on project operations. The Project Area is not located within a 100- or 500-year floodplain. However, an overall wetter climate may impact flood size and frequency in the area, and. 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.

4.6.3 Mitigative Measures

The Project has been sited and designed with resiliency in mind as climate continues to change in Minnesota. The Project is not expected to have any negative effects or increase flood depths in the surrounding areas. Storm ponding onsite will be sized appropriately to account for the expected increase in precipitation and will store and treat any runoff before discharging offsite. The existing drainage patterns will be maintained and the increase in perennial vegetation onsite under the panels is expected to both increase the uptake of water onsite and slow and reduce runoff when compared to the current, cropped nature of the Project Area.

Solar modules and related facilities of the Project will be designed to withstand the weather events typically experienced in the Project Area, as well as potentially more severe storms and periods of drought due to climate change discussed above. Gopher State will procure equipment designed to ensure operational reliability across the range of anticipated environmental conditions for the lifetime of the Project, (e.g., 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.

The potential for increased precipitation has been taken into account in designing and sizing applicable stormwater management ponds for operation of the Project. Establishing perennial, native vegetation plantings will replace current row crop agriculture in the Project Area, increasing water uptake and slowing runoff. This will also lower the amount of nutrients leaving the site compared to row crop agriculture, from the reduction in fertilizer and pesticide application and the slowing of runoff brought about by the perennial vegetation.

4.7 POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts are combined, incremental effects of human activity. While an individual activity may be insignificant by itself, minor impacts in combination with other actions may cause a larger issue in a region or to an important resource. A review of the Renville County website, known MnDOT District projects, and the Minnesota EQB's website listing active projects subject to environmental 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.

4.7.1 Impacts and Mitigative Measures

Other planned projects in the Project vicinity have not been identified by Gopher State Solar that would contribute to potential cumulative impacts with the Project; therefore, no mitigative measures are proposed.

4.8 UNAVOIDABLE IMPACTS

Gopher State Solar has carefully sited and designed the Project to avoid impacts to human health and the environment to the extent practicable. Some temporary impacts are anticipated; however, they are anticipated to be minor. In addition, Gopher State Solar has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted.

4.8.1 Impacts and Mitigative Measures

Environmental effects related to the Project and efforts to avoid, minimize, and mitigate these effects are discussed in detail within this Application. Environmental impacts that are not entirely avoidable, but will be minimized and mitigated, are summarized by topic above and listed below. The majority of these unavoidable impacts will be temporary in nature, will occur during Project construction, and will be rectified through implementation of the SWPPP, VMP, and AIMP plans, which include BMPs, revegetation and site restoration activities.

The primary unavoidable impacts that will resolve during Project construction include the following:

- Construction-related noise;
- Dust related to construction traffic;
- Construction-related traffic;
- Temporary wetland impacts;
- Temporary and limited wildlife displacement within construction areas; and
- Exposed soils from grading activities and potential for soil erosion and sedimentation.

While temporary, the primary unavoidable impacts that are anticipated during the operational life of the Project include the following:

- Aesthetic changes to the landscape (agricultural landscape to solar facilities);
- Land use change from predominately row crop agriculture to solar panels, transmission facilities, and perennial vegetation; and
- Infrequent vehicle trips from maintenance vehicles traveling to and from the site.

Beyond the above-described mitigative measures that will be implemented for the Project, no other mitigation is proposed.

4.9 IRRETRIEVABLE AND IRREVERSIBLE IMPACTS

Gopher State Solar has carefully sited and designed the Project to avoid impacts to human health and the environment to the extent practicable. Environmentally sensitive areas including wetlands and waterbodies have been avoided to the extent possible and the Project does not anticipate causing any irretrievable or irreversible impacts. Some temporary impacts are anticipated; however, they are anticipated to be minor. In addition, Gopher State Solar has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted. No aggregate resources will be made unavailable as a result of the Project. Hydrocarbons will be used as fuel during construction of the Project and in plastic components of Project facilities. Petroleum fuels used in vehicles represent a small irretrievable impact that will be offset in the long term through a reduction of fossil fuels used to generate electricity. Upon Project decommissioning, plastic components will be recycled to the extent practicable using technology available at that time. Human labor used in the manufacture of Project components and the construction of the Project represents a net gain in terms of gainful employment in a sustainable development industry. Finally, the fiscal resources invested in the manufacture, development, construction, and operation of the Project represent investments in sustainable development and clean energy infrastructure that will have a net positive effect on the economy and the environment.

5.0 AGENCY AND PUBLIC OUTREACH

Prior to filing this Application, Gopher State Solar completed extensive and comprehensive engagement with local, state, and federal regulatory stakeholders and Tribal Nations to introduce the Project, request comments and receive feedback.

On October 25, 2022, Gopher State Solar met with the following Renville County officials:

- Lisa Herges (County Administrator)
- Scott Refsland (Director of Dept. of Env. Services)
- Doug Bruns (County Tax Assessor)
- Doug Erikson (Board Member Dist. 3)
- Randy Kramer (Board Member Dist. 1)

On June 13, 2023, Gopher State Solar sent an informal Project introduction letter and map to federal and state agencies, Minnesota Tribal Nations, and Renville County officials. The agencies and Tribal contacts are listed in Tables 5.0-1 and 5.0-2 along with responses received as of August 1, 2024.

A representative letter and responses received as of August 1, 2024 are provided in Appendix G. Gopher State Solar will continue to work with local, state, and federal agencies, Tribal Nations, and other stakeholders as the Project advances.

In May 2023, Gopher State Solar notified Renville County that the Project would be performing environmental surveys, including wetlands, waterbodies, and cultural resources. On February 6, 2024, Gopher State Solar provided a project update presentation to the Renville County Board.

On February 15, 2024, Gopher State Solar met with Minnesota State Representative Dean Urdahl and on February 20, 2024, Gopher State Solar met with Minnesota State Senator Andrew Lang to provide introductions to the Project and to answer any questions.

During the week of February 12, 2024, Gopher State Solar attempted outreach to all affected landowners and invited them to the Community Open House, which was held on February 22, 2024.

TABLE 5.0-1

Summary of Agency Communications

Agency	Response Date and Summary
Federal	
USACE, St. Paul District	August 11, 2023 – Letter acknowledged receipt of Project intro letter. August 11, 2023 – The Project may require a permit from the USACE if there are impacts to aquatic resources.
USFWS – MM-WI Ecological Field Office	July 5, 2023 – The Project proponent may want to consider surveys for tri-colored bat to assess the species use of habitat at this site; however, surveys are voluntary. If the Project may impact a bald eagle nest, or the Project will not be able to avoid disturbing bald eagles, contact USFWS regarding the Eagle Act permit process. The letter provided recommendations for site selection and layout as well as construction recommendations.
State	
Public Utilities Commission	
Department of Commerce – Energy and Environmental Review	June 23, 2023 – Email provided guidance on general project timelines and requested that Gopher State include Minnesota's 11 federally recognized

TABLE 5.0-1

Summary of Agency Communications

Agency	Response Date and Summary
	tribes in their outreach.
MNDNR Ecological Resources	June 28, 2023 – MNDNR requested shapefiles of the Project. June 29, 2023 – Gopher State provided the shapefiles and the MCE response. July 3, 2023 – MNDNR acknowledge receipt of the shapefiles and MCE response. August 17, 2023 – MNDNR indicated that there are no major wildlife or public water concerns, based on the information provided. MNDNR provided the guidance for Commercial Solar Siting.
Minnesota Pollution Control Agency	
Minnesota Department of Agriculture	
Minnesota Department of Transportation (letter sent March 7, 2024)	March 7, 2024 – MnDOT requested infrastructure details and provided guidance for siting solar projects and links to proposed MnDOT projects.
USDA NRCS – MN State Office	
Minnesota State Historic Preservation Office	
MN State Archaeologist	
MNDNR Lands and Minerals	
MNDNR Parks and Trails	
NRCS – Olivia Service Center	
Local	
Renville County Soil and Water Conservation District	

TABLE 5.0-2

Summary of Communications with Tribal Nations

Tribal Nation	Response Date and Summary
Red Lake Nation	
Fond du Lac Band of Lake Superior Chippewa	
Leech Lake Band of Ojibwe	
Shakopee Mdewakanton Sioux Community	June 26, 2023 – Emailed requesting copies of the desktop file review. September 1, 2023 – Literature review results provided to Leonard Wabasha, Director of Cultural Resources, Shakopee Mdewakanton Sioux Community. September 1, 2023 – Leonard Wabasha, Shakopee-Mdewakanton Sioux Community, that he has no concerns with the project moving forward.
Lower Sioux Indian Community	
Mille Lacs Band of Ojibwe	
Bois Forte Band of Chippewa	
Prairie Island Indian Community	
Upper Sioux Community	
White Earth Nation	
Grand Portage Band of Lake Superior Chippewa	

Per the standard guidance regarding Tribal Engagement the DOC provides to applicants for Site and Route Permits in Minnesota, Gopher State Solar sent Project introduction letters to two service lists maintained by the Commission: “Tribal Government Contacts” and “Tribal Historic Preservation Offices”. In addition to introducing the Project, the letters offered to hold meetings with any interested party, and to continue ongoing communications when requested. The date of the initial communication and the specific recipients of these communications are listed in Table 5.0-3.

TABLE 5.0-3

Tribal Engagement Contacts

Date	Outreach Type	Attendees/Contacts
06/12/2023	Electronic Service	Red Lake Nation: Darrell Seki, Sr., Hunter Boldt, Joe Plumer, Samuel Strong, and Vernelle Lussier
06/12/2023	Electronic Service	Fond du Lac Band of Lake Superior Chippewa: Allison Mitchell, Ian Young, Jill Hoppe, Miyah Danielson, Roger Smith, Sr., Scott Buchanan, Sean Copeland, and Wally Dupuis
06/12/2023	Electronic Service	Fond du Lac Development Corp. : Kevin Dupuis, Sr.
06/12/2023	Electronic Service	Leech Lake Band of Ojibwe: Kyle Fairbanks, Robert Budreau, Tommy Brown, Faron Jackson, Sr., Jason Decker, LeRoy Staples Fairbanks III, and Steve White
06/12/2023	Electronic Service	Shakopee Mdewakanton Sioux Community: Leonard Wabasha, Bill Rudnicki, Cole W. Miller, Keith Anderson, Rebecca Crooks Stratton, and Steve Albrecht
06/12/2023	Electronic Service	White Earth Nation: Annie Jackson, Eugene Sommers, Henry Fox, Jaime Arsenault, and Mike Laroque
06/12/2023	Electronic Service	Lower Sioux Indian Community: Earl Pendleton, Joseph Obrien, Kevin Okeefe, Robert Prescott, Miranda Sam, Nizhoni Smith, Robert L Larsen, and Cheyanne St. John
06/12/2023	Electronic Service	Mille Lacs Band of Ojibwe: Jamie Edwards, Melanie Benjamin, Sheldon Boyd, Shena Matrious, Terry Kemper, Harry Davis, Wendy Merrill, and Virgil Wind
06/12/2023	Electronic Service	1854 Treaty Authority: Sonny Myers
06/12/2023	Electronic Service	Bois Forte Band of Chippewa: Cathy Chavers, Robbie Goggleye, Shane Drift, and Travis Morrison
06/12/2023	Electronic Service	Bois Forte Band of Chippewa Tribal Government: Robert Moyer, Jr.
06/12/2023	Electronic Service	Bois Forte Reservation Tribal Council: Tara Geshick
06/12/2023	Electronic Service	Prairie Island Indian Community: Cody Whitebear, Heather Westra, Jessie Seim, Jody Johnson, Johnny Johnson, Michael Childs, Jr., Noah White, Shelley Buck, and Valentina Mgeni
06/12/2023	Electronic Service	Upper Sioux Community: Adam Savariego, Camille Tanhoff, Amy Hastings, Caralyn Trutna, Jeremy Hamilton, Kevin Jensvold, and Samantha J Odegard
06/12/2023	Electronic Service	Minnesota Chippewa Tribe: Gary Frazer, and Joel Smith
06/12/2023	Electronic Service	Red Lake Region: Kade Ferris
06/12/2023	Electronic Service	White Earth Reservation Business Committee: Laurie York, and Michael Fairbanks
06/12/2023	Electronic Service	Grand Portage Band of Lake Superior Chippewa: Agatha Armstrong, April McCormick, Bobby Deschampe, Marie Spry, and Toby Stephens
06/12/2023	Electronic Service	Grand Portage Band of Ojibwe: Mary Ann Gagnon
06/12/2023	Electronic Service	Leech Lake Band of Ojibwe: Irene Folstrom
06/12/2023	Electronic Service	Minnesota Indian Affairs Council: Shannon Geshick

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