Joint Site Permits Application to the Minnesota Public Utilities Commission for: Summit Lake Solar Energy Conversion Facility and Battery Energy Storage System

Summit Lake Solar, LLC
Nobles County, Minnesota

Solar Facility Docket No. IP-7153/GS-25-89
BESS Facility Docket No. IP-7153/ESS-25-88

February 2025

8400 Normandale Lake Blvd., Suite 1200
Bloomington, MN 55437

Applicant:	Summit Lake Solar, LLC
Address:	8400 Normandale Lake Blvd., Suite 1200 Bloomington, MN 55437
Authorized Representative:	Alia Mohammad
Signature:	Alia Mohammad
Phone:	612-474-2681
Email:	amohammad@nationalgridrenewables.com

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ACRONYM LIST

AADT	Annual Average Daily Traffic
AC	alternating current
Applicant	Summit Lake Solar, LLC
ARMER	Allied Radio Matrix for Emergency Response
BESS	Battery Energy Storage System
BMPs	best management practices
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
CR Study Area	Land Control Area and the area within a one-mile buffer
dBA	A -weighted decibel
DC	direct current
DOC	Department of Commerce
Drainage System Coordinator	Nobles County Drainage System Coordinator
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
gen-tie	generation tie
GIS	geographic information systems
GPS	Global Positioning System
IPaC	Information for Planning and Conservation
Joint Application	Joint Site Permits Application
kV	kilovolt
kV/m	kilovolt per meter
L_{10}	noise level experienced for 10 percent of any hour
L_{50}	noise level experienced for 50 percent of any hour
Land Control Area	Approximately 1,989.6-acre area of privately-owned land for which Summit Lake Solar, LLC has leases and purchase options to allow siting and construction of the Project.
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MISO	Midcontinent Independent System Operator, Inc
MN DEED	Minnesota Department of Employment and Economic Development
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency

MW	megawatt
MWh	megawatt hour
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NG Renewables	National Grid Renewables Development, LLC
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
PEM	Palustrine Emergent
PFO	Palustrine Forested
$PM_{10}/PM_{2.5}$	particulate matter less than 10 microns in diameter / particulate matter less than 2.5 microns in diameter
Preliminary Development Area	An approximate 1,481.6-acre area that falls entirely within the Land Control Area where Summit Lake Solar, LLC proposes to build the Project facilities.
Prime Farmland Rule	Minnesota Rules 7850.4400, subpart 4
Project	Summit Lake Solar Facility and Battery Energy Storage System
Project Substation	New substation that will collect energy generated by the Solar Facility
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
Solar Facility	Summit Lake Solar Facility
Summit Lake	Summit Lake Solar, LLC
Summit Lake Solar	Summit Lake Solar, LLC
Tetra Tech	Tetra Tech, Inc.
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Application Content Requirements Completeness Checklist

Project Permit Application Requirements (Minn. Rules 7850.1900, Subp. 1)	Application Section
A. a statement of proposed ownership of the facility as of the day of filing and after commercial operation;	1.2
B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	1.2
C. at least two proposed sites for the proposed large electric power generating plant and identification of the applicant's preferred site and the reasons for preferring the site;	3.4
D. a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	4.1.1, 4.1.2
E. the environmental information required under subpart 3;	See Environmental Information below
F. the names of the owners of the property for each proposed site;	1.2.2
G. the engineering and operational design for the large electric power generating plant at each of the proposed sites;	4.1; Appendix C
H. a cost analysis of the large electric power generating plant at each proposed site, including the costs of constructing and operating the facility that are dependent on design and site;	2.3
I. an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	4.1.1, 4.1.2, and 2.4
J. identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	5.2.8.2, 4.1.7, and 4.1.8
K. a listing and brief description of federal, state, and local permits that may be required for the project at each proposed site; and	1.5
L. a copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a Certificate of Need has been submitted or is not required.	1.5.1
Environmental Information Requirements (Minn. Rules 7850.1900, Subp. 3)	
A. a description of the environmental setting for each site or route;	5.1
B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services;	5.2
C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	5.3
D. a description of the effects of the facility on archaeological and historic resources;	5.4
E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna;	5.5
F. a description of the effects of the facility on rare and unique natural resources;	5.5.8
G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	5.6
H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures.	5.1 – 5.5

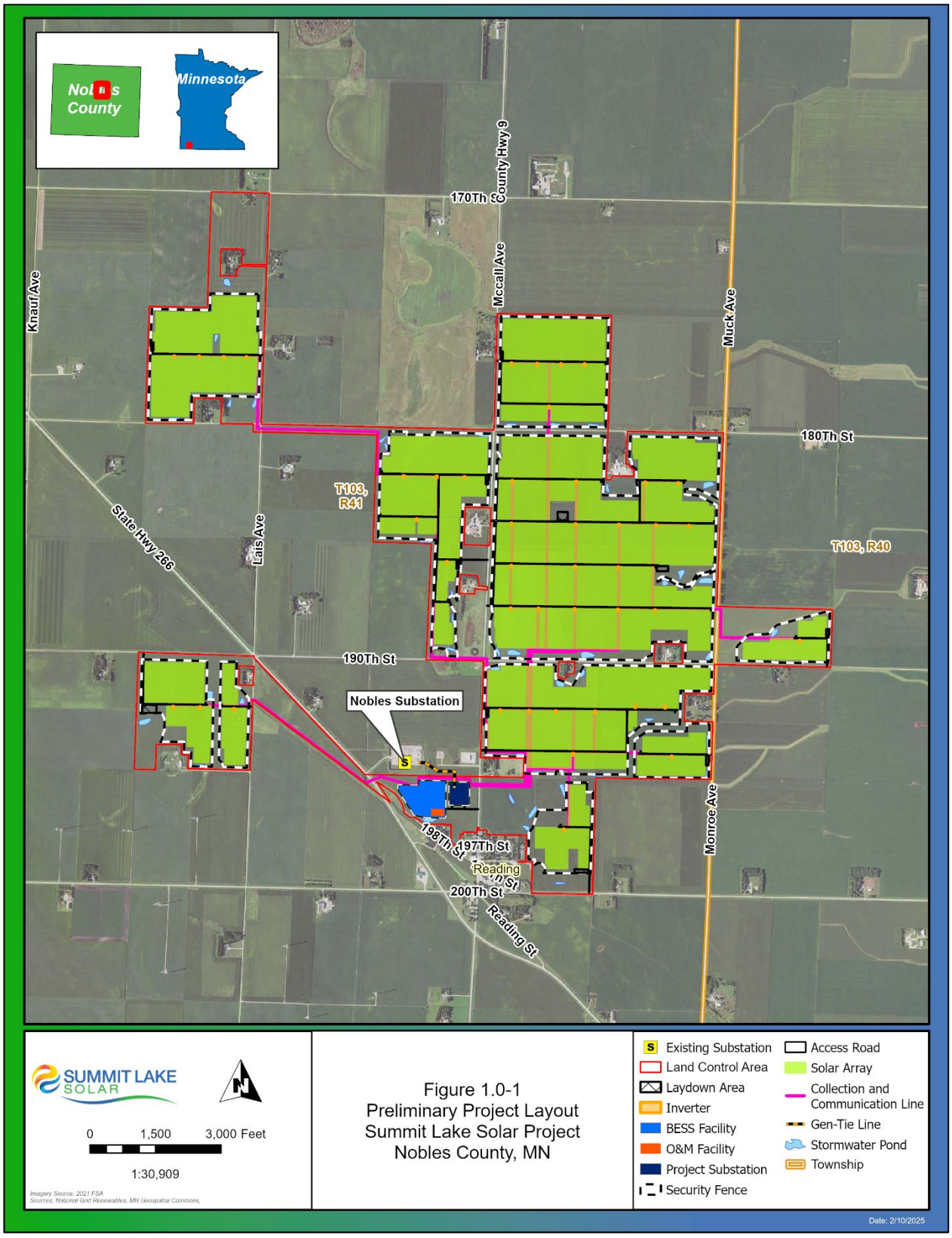
1.0 INTRODUCTION

Summit Lake Solar, LLC (Summit Lake, Summit Lake Solar, or Applicant), a wholly owned subsidiary of National Grid Renewables Development, LLC (NG Renewables) respectfully submits this Joint Site Permits Application (Joint Application) to the Minnesota Public Utilities Commission (Commission) for two Site Permits pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850.

Summit Lake proposes to construct the Summit Lake Solar Facility (Solar Facility) and Battery Energy Storage System (BESS), collectively the Project, in Summit Lake and Elk Townships, Nobles County, Minnesota (see Figure 1.0-1). The Solar Facility is proposed as a solar energy conversion facility with an up to 200-megawatt (MW) alternating current (AC) nameplate capacity. The BESS will consist of a stand-alone structure with an up to 200 MW / 800-megawatt hour (MWh) nameplate capacity and ancillary support infrastructure.

The Point of Interconnection for the Solar Facility and BESS will be the Nobles Substation. Summit Lake proposes to construct a substation for the Project (i.e., the Project Substation) that will collect energy generated by the Solar Facility and move that energy to the Point of Interconnection via an approximately 1,100-foot long 345 kilovolt (kV) generation tie (gen-tie) transmission line. The BESS will function independently from the Solar Facility but will share the Project Substation and the gen-tie line. The BESS will charge its batteries with power from the existing electrical grid via the proposed gen-tie line and Point of Interconnection. When needed, the BESS will also send electricity back into the grid via the gen-tie line and Point of Interconnection. The Solar Facility and BESS will be operated and maintained in tandem, using the same staff. It is estimated that three to four full-time permanent positions will be required to operate and maintain the Solar Facility and one to two full-time permanent positions to operate and maintain BESS. Figure 1.0-1 provides an overview of the Project.

Summit Lake is a wholly owned subsidiary of NG Renewables. NG Renewables is a utility-scale renewable energy development company headquartered in Bloomington, Minnesota that has developed multiple operating solar, wind, and energy storage projects throughout the United States. Over 2,900 MW of solar, wind, or energy storage projects developed by NG Renewables are either under construction or operational. NG Renewables has a multi-gigawatt development pipeline of solar, wind, and energy storage projects in various stages of development throughout the United States with over 1,900 MW of solar development under construction or completed. NG Renewables provides custom renewable energy development solutions for utilities, independent power purchasers and corporations looking to harness renewable energy for business growth. NG Renewables prides itself on developing solar, wind, and energy storage projects that are farmer-friendly, community-driven, and beneficial for rural communities.


Nobles County
Minnesota
170Th St
County Hwy 9
Mccall Ave
Muck Ave
Knauf Ave
180Th St
T103, R41
State Hwy 266
Lais Ave
T103, R40
190Th St
Nobles Substation
S
198Th St
197Th St
Reading St
200Th St
Monroe Ave
SUMMIT LAKE SOLAR
N
0 1,500 3,000 Feet
1:30,909
Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
Figure 1.0-1
Preliminary Project Layout
Summit Lake Solar Project
Nobles County, MN
Existing Substation
Land Control Area
Laydown Area
Inverter
BESS Facility
O&M Facility
Project Substation
Security Fence
Access Road
Solar Array
Collection and Communication Line
Gen-Tie Line
Stormwater Pond
Township
Date: 2/10/2025

1.1 Purpose and Need

The Solar Facility will provide up to 200 MW AC of renewable power capacity and the BESS will provide up to 200 MW of battery storage. The Project will account for approximately 402,540 MWh annually of reliable, deliverable on-peak energy. The Project will displace 404 gigawatt hours of regional fossil fuel generation per year and prevent emissions of approximately 323,800 metric tons of carbon dioxide equivalent (CO_2e) annually (U.S. Environmental Protection Agency [EPA], 2024a). This is equivalent to carbon dioxide emissions from 140,575 metric tons of coal burned (EPA, 2024b). By way of example, the Project will produce enough energy to provide electricity for approximately 33,200 households based on the average annual electricity consumption (EPA, 2024b). The Project is being developed, designed, and permitted to meet or exceed applicable state and local requirements, including the prime farmland exclusion rule (discussed below) to the extent practicable.

Under Minnesota's Clean Energy Law, climate legislation establishes a carbon-free energy standard and a renewable energy standard. The carbon-free energy standard requires electrical utilities to achieve 80 percent carbon-free energy by 2030, 90 percent by 2035, and 100 percent by 2040 (Minnesota Statutes section 216b.1691, subd. 2g). Carbon-free energy sources are defined as energy sources that do not release carbon dioxide, such as solar. The renewable energy standard requires that 55 percent of the energy sold to Minnesota customers by electrical utilities come from renewable energy sources, such as solar, by 2035 (Minnesota Statutes section 216b.1691, subd. 2a).

The Project will help meet Minnesota's 100 percent carbon-free energy standard by 2040 (Minnesota Statutes section 216b.1691, subd. 2g) and will contribute to meeting the Minnesota Renewable Energy Objectives and other clean energy requirements in Minnesota, neighboring states, and the country at large. It will serve consumers' growing demand for renewable energy under various utility-sponsored programs and for utilities, independent power purchasers, and corporations seeking to use renewable energy for business growth. 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.

Additionally, the BESS is designed to operate independently and provide up to 200 MW of energy storage capacity. The impact to the electrical grid from construction of the BESS will be positive as the BESS can store excess energy from the grid, that may have otherwise been curtailed, and inject up to 200 MW AC back into the grid during times of increased demand or brief power outages. Depending on final design, the BESS can furnish other grid services such as frequency response and voltage support.

1.2 Applicant Information

1.2.1 Permittee and Contact Information

The permittee for the Site Permits will be:

Summit Lake Solar, LLC
8400 Normandale Lake Blvd., Suite 1200
Bloomington, MN 55437

The contact persons regarding this Joint Application are:

Alia Mohammad
National Grid Renewables Development, LLC
8400 Normandale Lake Blvd, Suite 1200
Bloomington, MN 55437
Direct: 612-474-2681
amohammad@nationalgridrenewables.com

Jeremy P. Duehr
Fredrikson & Byron, P.A.
60 South Sixth Street, Suite 1500
Minneapolis, MN 55402
Direct: 612.492.7413
jduehr@fredlaw.com

1.2.2 Statement of Ownership

Summit Lake has a combination of lease agreements and purchase options with the landowners for the Solar Facility and BESS. The Project will be constructed, owned, and operated by Summit Lake, a wholly owned subsidiary of NG Renewables. The land in the 1,989.6-acre Land Control Area, as shown in Figure 1.0-1, is currently owned by Todd and Jackie Rogers, Nolan and Whitney Rogers, Michael and Lois Harberts, Gary and Linda Kingery, Bruce and Gail Kingery, Wally and Wendy Cooper, Kevin Thorud, Donna Cooper, Randy Lubben, Arden and Sharon Harberts, Neil Cuperus, Township of Summit Lake, Michael and Melanie Wagner, and Elizabeth Harberts.

Summit Lake is also pursuing participation agreements with landowners who are currently not participating in the Project, but are located within the Project boundary or are directly adjacent to the Land Control Area. Outreach with these landowners has commenced and is ongoing.

1.3 Capacity and Power Purchase Agreements

The Project will provide cost-effective solar energy generation and storage. The Solar Facility and BESS will operate independently. Independent operation of the BESS allows for the BESS to receive and store energy from the grid and also inject energy back into the grid during times of increased demand or brief power outages. Summit Lake is working to secure a Power Purchase

Agreement, Build Transfer Agreement, Development Transfer Agreement, or other enforceable offtake agreement to sell the electricity, Renewable Energy Certificates, and capacity generated or stored by the Project. The power generated or stored by the Project will be offered to wholesale customers, including Minnesota utilities and cooperatives that have identified a need for additional low-cost renewable energy and capacity, and corporate and industrial customers that have set clean energy goals.

1.4 Schedule

The anticipated schedule for receiving Commission approval and Project construction, testing, and commercial operation is outlined below:

- Land acquisition: Complete. Summit Lake has lease agreements or purchase options in place for the entire Land Control Area. After issuance of the Site Permits and prior to construction of the Project, Summit Lake will purchase a portion of the Land Control Area from the underlying landowners with whom purchase options have been negotiated, and land under lease will enter into the construction and operations terms. Land that is under a lease agreement that will not be utilized for Project operation will revert back to the underlying landowner for continued agricultural use. Summit Lake is also pursuing participation agreements with landowners who are currently not participating in the Project, but are located within the Project boundary or are directly adjacent to the Land Control Area. Outreach with these landowners has commenced and is ongoing. Any land subject to a participation agreement will not be utilized for the installation or operation of Project facilities.
- Site Permits: Summit Lake anticipates the Site Permits will be issued in the first quarter of 2026.
- Other Permits: Summit Lake will acquire all other permits necessary for construction of the Project prior to conducting the work for which the permit is required. Refer to Table 1.5.4-1 - Potential Permits and Approvals.
- Equipment Procurement: Summit Lake is in the process of evaluating and procuring solar and BESS equipment for the Project. The equipment will be allocated to the Project based on meteorological and economic analysis to achieve the best match of technology for the facility locations.
- Construction: Summit Lake anticipates that construction will begin as early as the first quarter of 2026 with a targeted completion by the fourth quarter of 2028. Section 4 of this Joint Application provides additional information on the construction timeline and process.
- Commercial Testing: Testing for the Solar Facility and BESS is expected to begin as early as the fourth quarter of 2028, following the completion of construction.
- Commercial Operations: Commercial operation for the Project is scheduled to begin in the fourth quarter of 2028, but may occur sooner, following the completion of construction and testing.

1.5 State Policy and Required Permits

1.5.1 Certificate of Need

A Certificate of Need is required for all "large energy facilities" (Minnesota Statutes section 216B.243, subd. 2), unless the facility falls within a statutory exemption from the Certificate of Need requirements (Minnesota Statutes section 216B.243, subd. 8). The Solar Facility meets the definition of a large energy facility (Minnesota Statutes section 216B.2421, subd. 2(1)); however, the Solar Facility is exempt from Certificate of Need requirements because it is a solar energy generating system and is being developed and permitted by an independent power producer (Minnesota Statutes section 216B.243, subd. 8(a)(7)), Summit Lake. In addition, under Minnesota Statutes section 216B.243, subd. 8(9), a Certificate of Need is not required for energy storage systems. Therefore, a Certificate of Need is not required for the proposed Solar Facility or BESS.

1.5.2 Site Permits

The Solar Facility falls within the definition of a Large Electric Power Generating Plant (Minnesota Statutes section 216E.01, subd. 5) and, thus, requires a Site Permit from the Commission prior to construction (Minnesota Statutes section 216E.03, subd. 1). In addition, the BESS falls within the definition of an Energy Storage System (Minnesota Statutes section 216E.001, subd. 3a), and therefore, also requires a Site Permit from the Commission prior to construction (Minnesota Statutes section 216E.03, subd. 1). Summit Lake submitted a Size Determination Request to the Minnesota Department of Commerce (DOC) on January 21, 2025, in accordance with Minnesota Statutes section 216E.021(b). Minnesota DOC responded to Summit Lake's request on January 24, 2025, noting that the Project is not associated with other planned solar projects and confirming that the Project requires siting approval from the Commission. A copy of Summit Lake's Size Determination Request and Minnesota DOC's response letter are provided in Appendix A.

Summit Lake seeks approval of its Joint Application under the alternative review process provided for under Minnesota Statutes section 216E.04 and Minnesota Rules 7850.2800 to 7850.3900. A notification letter was filed with the Commission on November 26, 2024, indicating Summit Lake intended to file this Joint Site Permits Application under the alternative review process. The Site Permits are the only site approvals needed for construction of the Project (Minnesota Statutes section 216E.10, subd. 1). Other permits and licenses required for the Project are listed in Section 1.5.4.

1.5.3 Route Permit

The gen-tie line for the Project will be approximately 1,100 feet long, pending final engineering design. Per Minnesota Statutes section 216E.01 subd. 4, the gen-tie line does not meet the high voltage transmission line definition because the overall length is less than 1,500 feet. As such, a separate route permit from the Commission is not required for the gen-tie line.

1.5.4 Other Permits and Approvals

Summit Lake will obtain all permits and licenses that are required for the Project, following issuance of the Site Permits. The permits or approvals that Summit Lake has identified as potentially being required for the construction and operation of the Project are shown in Table 1.5.4-1. Copies of agency correspondence are included in Appendix B.

Table 1.5.4-1
Potential Permits and Approvals

Agency	Permit	Applicability	Permit Status and Timing
Federal			
U.S. Army Corps of Engineers, St. Paul District	Section 404 Permit for wetland impacts. Nationwide Permit 51 for solar facility St. Paul District Utility Regional General Permit for gen-tie line	Dredging or filling jurisdictional waters of the United States	To be obtained prior to construction, if necessary. Pre-construction notification may be required if permanent impacts exceed threshold for Nationwide Permit or Regional General Permit.
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasures Plan	Required if any facility associated with the Project (operations and maintenance [O&M] building or substation) has oil storage of more than 1,320 gallons	To be obtained prior to construction, if necessary.
U.S. Fish and Wildlife Service	Information for Planning and Consultation Review for Threatened and Endangered Species	If identified as potentially present in the vicinity of the Land Control Area	To be completed prior to construction.
State			
Minnesota Public Utilities Commission	Size Determination Request	Required prior to submittal of Site Permit application	Obtained January 24, 2025

Table 1.5.4-1
Potential Permits and Approvals

Agency	Permit	Applicability	Permit Status and Timing
	Certificate of Need	Required for generating plants larger than 50 MW unless an exemption applies	Not required since the Solar Facility is being developed by an Independent Power Producer. Not required for the BESS.
	Site Permits	Required for siting approval of large electric generating plant of 50 MW or more and energy storage systems of 10 MW or more	Joint Application Submitted February 21, 2025
	Route Permit	Required for a high voltage transmission line that is greater than 1,500 feet in length with a voltage of 100 kilovolts or greater	Because the gen-tie line is less than 1,500 feet in length, a Route Permit is not required.
Minnesota Pollution Control Agency	Section 401 Certification	Required for filling in jurisdictional waters of the United States and if a Section 404 permit is required from the U.S. Army Corps of Engineers	To be obtained prior to construction, if necessary
	National Pollutant Discharge Elimination System General Permit (includes Stormwater Pollution Prevention Plan)	For stormwater discharges from construction activities with disturbances greater than one acre	To be obtained prior to construction,
	Air Quality Permit	Required if operational facility criteria pollutant and HAP emissions exceed permitting threshold levels.	Permit not needed based on emission analysis and air quality permitting thresholds.

Table 1.5.4-1
Potential Permits and Approvals

Agency	Permit	Applicability	Permit Status and Timing
Minnesota Department of Health	Well construction permit	Required for installation of a well at the O&M building, if planned.	To be obtained prior to construction.
Minnesota Department of Natural Resources (MDNR)	Water Appropriation Permit	Required if water withdrawals via well or surface water	To be obtained prior to construction, if necessary.
	Natural Heritage Review Request	If identified as potentially present in the vicinity of the Land Control Area	To be completed prior to construction
	Utility License to Cross Public Waters	Required for utility line crossings of all Public Waters Watercourses and Basins; or Public Waters Wetlands on MDNR Administered Land.	To be obtained prior to construction, if necessary.
	Work In Public Waters	Required for work within Public Waters Wetlands on Private Lands	To be obtained prior to construction, if necessary.
Minnesota Department of Labor and Industry	Request for Electrical Inspection	Required to comply with the state electrical code	To be obtained during construction.
State Historic Preservation Office	Review and Coordination	Provide approval of Phase 1 field inventory methods and findings	Completed prior to initiation of construction.
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, if necessary.
	Access (Driveway) Permit	Required for construction of a driveway/access road utilizing MNDOT rights- of-way.	Obtain prior to construction of driveway on MNDOT right-of-way, if necessary.

Table 1.5.4-1
Potential Permits and Approvals

Agency	Permit	Applicability	Permit Status and Timing
	Oversize/Overweight Permit	Vehicles delivering equipment, materials and supplies that exceed applicable MNDOT height/length limits and weight limits	Obtain prior to equipment deliveries, if necessary.
County/Local			
Nobles County	Septic Permit	Required prior to installation of any septic system in Nobles County.	To be obtained prior to construction if a septic system will be installed for the Project O&M building.
	Spring Weight Restrictions	Load weight restrictions on county road system during spring thaw as shown on map. Map is updated annually.	Confirm county road weight restrictions with county prior to construction, if starting in spring.
	Driveway or Entrance Permit	Required for access from county roads.	To be obtained prior to construction.
	Utility Permit	Required to place facilities within public road right-of-way and/or across public drain tile	To be obtained prior to construction, if necessary.
	Moving Permit	Required for overweight or overwidth loads.	To be obtained prior to construction.
	Intersection Widening Permit	Required if any intersections need to be widened to support the Project' construction.	To be obtained prior to construction.
	Petition to realign public drain tile	Required if any public drain tile need to be re-aligned to accommodate the	To be obtained prior to construction

2.0 PROJECT INFORMATION

Summit Lake is currently developing the Summit Lake Solar Facility, an up to 200 MW AC solar photovoltaic facility and a BESS with an up to 200 MW / 800 MWh nameplate capacity and ancillary support infrastructure. The Project is in central, northeast Nobles County, Minnesota. The Point of Interconnection for both the Solar Facility and BESS is the Nobles Substation, which is adjacent to the Project. Details about the engineering and operational design of the Project facilities are presented in Section 4.0.

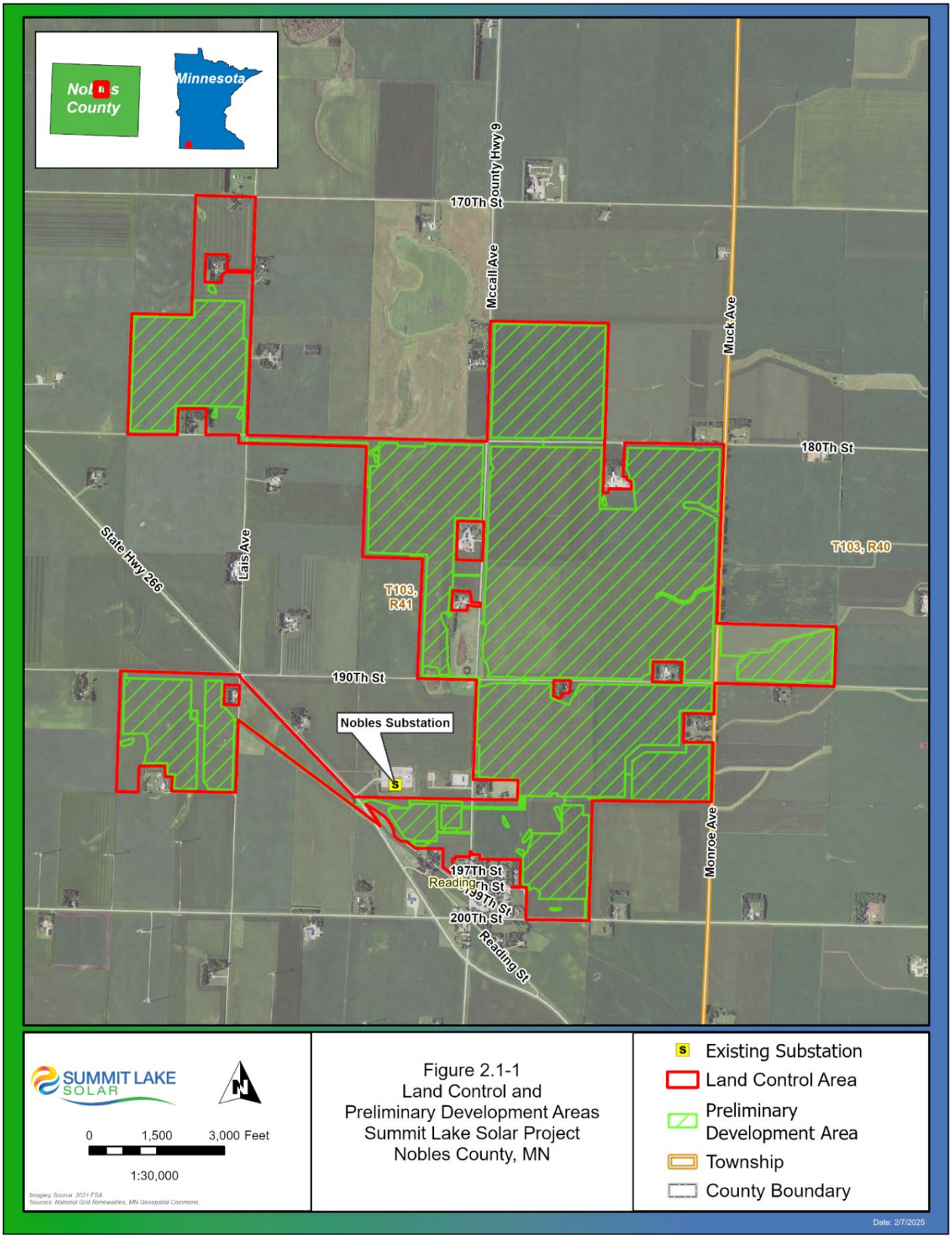
2.1 Project Location, Land Control, and Preliminary Development Areas

Summit Lake is proposing to build an up to 200 MW AC Solar Facility in Township 103N, Range 40W, Section 18 in Elk Township and Township 103N, Range 41W, Sections 10, and 12-15, and 22-24 in Summit Lake Township, Nobles County, Minnesota (see Figure 1.0-1). Summit Lake is also proposing to build an up to 200 MW / 800 MWh BESS adjacent to the Project Substation in Summit Lake Township, Township 103N, Range 41W, Section 23.

Summit Lake has obtained leases and purchase options for 1,989.6 acres of privately-owned land (Land Control Area). The Land Control Area is adjacent to and north of the unincorporated community of Reading. Summit Lake selected the Land Control Area based on significant landowner interest, transmission and interconnection suitability, optimal solar resource, and minimal impact on environmental resources. Existing infrastructure in the immediate vicinity allows Summit Lake to minimize the need to construct ancillary facilities beyond the immediate footprint of the Project. Existing infrastructure includes the Nobles Substation and high voltage transmission lines that tie directly into the existing electrical grid.

Based on preliminary design, the area needed to construct and operate the Project (i.e., the Preliminary Development Area) will cover approximately 1,481.6 acres of the Land Control Area. There are approximately 508.0 acres of the Land Control Area for which Summit Lake has site control but are not currently contemplated for occupation by the Solar Facility or BESS. The 508.0-acre portion of the Land Control Area that will not be utilized for the Project is currently under lease with the underlying landowners, or has been purchased, but may be excluded from the area controlled by Summit Lake during operation of the Project. Figure 2.1-1 shows an overview of the Land Control and Preliminary Development Areas.

Summit Lake has entered into lease or purchase option agreements with landowners for all of the parcels on which the Project would be constructed. Summit Lake would exercise its purchase options and hold title to the property it will purchase after the Site Permits are issued and prior to the start of construction. Concurrently, leased property that will be utilized by the Project will move into an operation term of the lease agreement and property currently under lease that is not utilized by the Project may be removed from the lease agreement and the underlying landowners will continue to have the option to farm the released property, or areas which continue to be leased, but are not utilized for the Project where there is sufficient room to operate large farming equipment.


Minnesota
170Th St
County Hwy 9
Mccall Ave
Muck Ave
180Th St
State Hwy 266
Lais Ave
T103, R40
T103, R41
190Th St
Nobles Substation
S
197Th St
Reading St
199Th St
200Th St
Reading St
Monroe Ave
SUMMIT LAKE SOLAR
N
0 1,500 3,000 Feet
1:30,000
Figure 2.1-1
Land Control and
Preliminary Development Areas
Summit Lake Solar Project
Nobles County, MN
S Existing Substation
Land Control Area
Preliminary Development Area
Township
County Boundary
Date: 2/7/2025

2.2 Project Overview and Interconnection

In this Joint Application, Summit Lake provides a preliminary Project layout that includes both the Solar Facility and BESS. The preliminary Project layout is subject to final micro-siting.

The preliminary layout for the Solar Facility contemplates both a below-ground electrical collection system (see Map 3 –Preliminary Project Layout, Map 4 – Detailed Preliminary Project Layout, and displayed in more detail in Appendix C – Site Plan) and a hybrid below-ground and above-ground electrical collection system. In the hybrid collection system, above-ground electrical lines would only be used to connect solar panels within each solar array and would be strung under the solar panels from the solar panel piles, while electrical lines between the arrays and the Project Substation would be installed below-ground. If a hybrid electrical collection system is used, the Solar Facility layout would be the same as the below-ground electrical collection system layout.

The Solar Facility would be located within the Preliminary Development Area and would include solar panels and racking, inverters, security fencing, a Project Substation, on-site below-ground or hybrid below-ground and above-ground electrical collection and communication lines, and up to six weather stations (up to 20 feet tall). Section 4.1.1 discusses this equipment in more detail. Eleven laydown areas are proposed for the Project, regardless of which electrical collection scenario is used.

The Project Substation would be constructed in the southwest portion of the Preliminary Development Area, adjacent to the Nobles Substation (i.e., the Point of Interconnection). An approximately 1,100-foot 345-kV gen-tie line would interconnect the Project Substation to the Nobles Substation. Transformers located within the Project Substation would step up the electricity generated by the Solar Facility from 34.5 kV to 345-kV to bring the power into the existing electrical grid.

The BESS would also be located within the Preliminary Development Area, adjacent to the Project Substation, and include up to 213 BESS modules that contain multiple batteries installed in purpose-built enclosures. Within the BESS, underground 34.5 kV electrical cable and communication lines would be installed to connect the BESS units to the Project Substation. The Project Substation would provide the BESS with independent connection to the electrical grid and be capable of bi-directional flow of electricity to and from the BESS. Access roads would be installed between the BESS units to allow access for operations personnel.

An operations and maintenance (O&M) building and parking lot is also proposed that would be shared by the Solar Facility and BESS. These Project components would be adjacent to the Project Substation and BESS.

Security fencing would encompass all Solar Facility and BESS components, and warning signs would be installed on the security fencing in accordance with the National Electrical Safety Code. The solar arrays will be fenced separately from the Project Substation and BESS. The Project Substation and BESS would each be fenced separately or may be fenced together. Gates would be installed at the entrance to each facility and signs would be installed on the entrance gates

providing a 24-hour emergency response number. The areas within the fence line of the Solar Facility that surround the solar arrays, and racking will be revegetated in accordance with the Vegetation Management Plan prepared for the Project (see Appendix D), with the exception of access roads which will be graveled. The areas within the fence lines of the Project Substation and BESS would be graveled for operation of these facilities.

The preliminary Project layout presented herein reflects Summit Lake's effort to maximize the energy production of the Solar Facility and follow applicable setbacks, while minimizing impacts from the Project to the land, environment, and surrounding community. The final Project layout may differ from the preliminary layout and the current boundaries of the Preliminary Development Area described in this Joint Application but will not extend beyond the outer boundaries of the Land Control Area, except in locations where the electrical collection lines connect noncontiguous portions of the Solar Facility arrays and where the gen-tie line connects the Project Substation to the Nobles Substation. The final layout will remain similar to the preliminary layout presented on Maps 3 and 4 and in the Site Plan in Appendix C, changes may occur as a result of ongoing site evaluation, permitting process, neighboring landowner preferences, and micro-siting activities.

2.3 Anticipated Costs

The total installed capital costs for the Project are estimated to be approximately $510 million, with costs depending on variables including, but not limited to, construction costs, taxes, tariffs, and panel selection, along with associated electrical and communication systems, and access roads. Costs associated with the various components are detailed in Table 2.3-1.

Table 2.3-1 Estimated Project Costs

Project Components	Cost (in $)
Solar Facility	
Engineering, Procurement, Construction Contractor	$330 - $396 million
Development Expense	$9 - $13 million
BESS	
Engineering, Procurement, Construction Contractor	$68 - $80 million
Development Expense	$3 - $4 million
Solar Facility and BESS	
Interconnection	$8 - $9.5 million
Financing	$5 - $7 million
Project Gen-tie Line	$650 - $800 thousand
Project Total	**~$510 million**

2.4 Future Expansion

Summit Lake does not anticipate future expansion of the Project. Land will be leased or purchased for the 30--year operational life of the Project. Summit Lake Solar has an executed Generator Interconnection Agreement with Xcel Energy and Midcontinent Independent System Operator, Inc

(MISO), enabling the Project to interconnect at the Nobles Substation (the Project Point of Interconnection). The agreement accommodates up to 200 MW AC from the Solar Facility.

The Applicant is pursuing an additional, separate Generator Interconnection Agreement for the BESS to operate independently and receive and store energy directly from the electric grid. The Project Substation would provide the BESS with an independent connection to the electrical grid. The BESS could accommodate up to 200 MW of surplus energy and inject it back into the electrical grid during times of increased demand or brief power outages. At any given point, the BESS would not inject over 200 MW at the Point of Interconnection.

3.0 PROHIBITED AND EXCLUSION SITES

Minnesota Rules 7850.4400 subp. 1 prohibits large electric power generating plants from being located in areas that include 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 their land use districts; state parks; nature conservancy preserves; state scientific and natural areas; and state and national wilderness areas. The Project is not located within any prohibited areas.

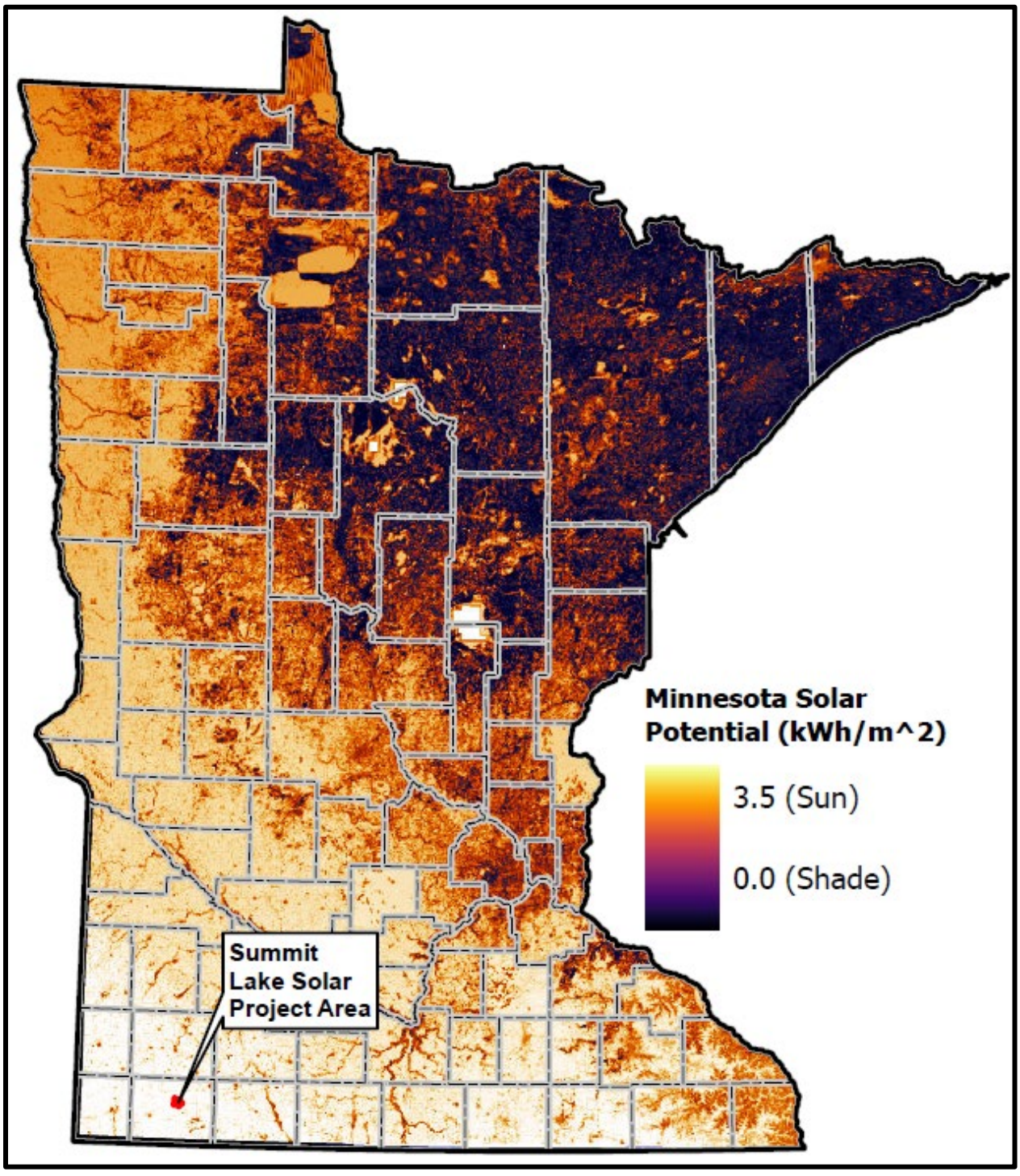
Additionally, Minnesota Rules. 7850.4400 subp. 3 excludes large electric power generating plants from being located in the following areas unless there is no feasible and prudent alternative. These exclusion areas include state registered historic sites; state historic districts; state Wildlife Management Areas; county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The Project is not located within any exclusion areas. An analysis of Summit Lake's avoidance of exclusion areas and other sensitive environmental areas is provided below in Section 5.0.

Minnesota Rules 7850.4400, subp. 4 (Prime Farmland Rule) excludes large energy power generating plants from being permitted where the developed portion of the site includes more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. The Summit Lake Preliminary Development Area is sited on prime farmland (see Section 5.5.4). Given the up to 200 MW AC net generating capacity of the Solar Facility, this rule would allow use of up to 100 acres of prime farmland for the Solar Facility. The BESS is not subject to the Prime Farmland Rule. The Preliminary Development Area, including the 16.0 -acre BESS area, which is not subject to the Prime Farmland Rule, is 1,481.6 acres of which approximately 894.2 acres are prime farmland and 561.0 acres are prime farmland if drained. These acreages of prime farmland would be used for operation of the Solar Facility for the life of the Project, but as described below, would not be permanently precluded from use for agricultural purposes in the future. An analysis on potential alternatives to avoid prime farmland is provided in Appendix E and summary of the analysis results is provided in Section 3.3.

3.1 Selection of the Land Control Area

Summit Lake explored Nobles County for the Project based on the high solar resource in this portion of the state (see Figure 3.1-1). This solar resource and supportive community were foundational to the Project conception. Summit Lake identified the Nobles Substation as a potential interconnect location in Nobles County because of its available capacity to interconnect the Project to the transmission system, the presence of adequate roads for access, and relatively flat, unobstructed terrain in the vicinity of the Nobles Substation to maximize the utilization of the solar resource. Summit Lake reviewed real estate options within approximately five miles of the Nobles Substation. This distance was selected to account for transmission interconnect efficiency, which is essential to successful development of the Project.

Figure 3.1-1 – Minnesota Solar Potential (University of Minnesota, 2024)



Siting the Project Substation and BESS in proximity to an existing substation allows Summit Lake to make efficient use of existing equipment, minimize line loss, and minimizes the length of the transmission line needed to interconnect the Project; additional details about Project interconnection are provided in Section 4.1.7. Summit Lake signed leases and/or purchase options with landowners that owned relatively flat, unobstructed, generally contiguous parcels of land, with no or limited environmentally sensitive resources, that are directly adjacent to the Nobles Substation, and who voluntarily opted to host facilities for the Project. Due to the proximity to the Nobles Substation, the need for new transmission infrastructure is limited to a gen-tie line that is approximately 1,100 feet in length.

3.2 Exclusion Areas and Sensitive Environmental Features Avoidance Analysis

Summit Lake evaluated potential constraints during site selection to determine whether the Project can avoid human settlement and environmental constraints to the maximum degree practicable and to determine which parcels should be avoided. Key constraints that were considered include transmission interconnection, willing landowners to sell or lease land for the Project, and environmental constraints that may prohibit or make development more challenging.

Within Nobles County and five miles from the Nobles Substation, Summit Lake avoided parcels with environmental constraints that may prohibit or make solar development more challenging. These include parcels that are:

- owned or managed by a state or federal agency (e.g., state park, Wildlife Management Area, or Waterfowl Production Area);
- within a municipality;
- within two miles of an airport;
- with U.S. Fish and Wildlife Service (USFWS) designated critical habitat;
- with Minnesota Department of Natural Resources (MDNR) Sites of Biodiversity Significance;
- with MDNR mapped native plant communities and native prairie;
- with MDNR Public Waters Inventory watercourses; and
- with MDNR rare species records.

These constraints, and the parcels most suitable for solar development without these features, are displayed on Map 5 - Potential Solar Development Constraints. As shown on Map 5, Summit Lake has sited the Project with voluntary leases and/or purchase options near a substation, and in a location that avoids the sensitive resources identified above.

3.3 Prime Farmland Assessment

The Prime Farmland Rule prohibits large energy power generating plants, such as the Solar Facility, 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 or unless the project meets one of the Prime Farmland Rule's exemptions. In May 2020, the Minnesota DOC issued the *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternatives* (Minnesota DOC, 2020). Some areas (e.g., within two miles of certain cities) are not subject to the Prime Farmland Rule; however, the only exception to Minnesota Rules 7850.4400, subp. 4 is if there is no "feasible and prudent" alternative to the project location. The guidance document is intended to assist solar developers in evaluating whether there is a feasible and prudent siting alternative to the proposed project location. Summit Lake completed an evaluation of potential alternatives in an attempt to find a location for the Solar Facility that would use fewer acres of prime farmland.

The selected location better meets the needs of the Solar Facility and avoids prohibited areas to the maximum extent practicable. In addition, there is relatively little opportunity to avoid impacts to prime farmland in the state of Minnesota where high solar potential exists. Areas where non--prime farmland is more prevalent are generally associated with steep slopes, forested areas, wetlands and floodplains, and other areas not suitable for solar development. In addition, areas of non-prime farmland that are not constrained by natural resources do not have adequate area available to support a 200 MW solar facility. The detailed analysis is provided in Appendix E. Summit Lake's assessment demonstrates that Summit Lake was unable to find a feasible and prudent alternative location for the Solar Facility.

3.4 Alternatives Considered but Rejected

Per Minnesota Statutes section 216E.04, subd. 2(8-9), both the Solar Facility and BESS qualify for the alternative review process specified in Minnesota Rules 7850.2800-7850.3900. Accordingly, Summit Lake is not required to analyze alternative sites. Summit Lake is required, however, to identify rejected sites and the reasons for rejecting them pursuant to Minnesota Rules 7850.3100. Summit Lake considered the central portion of Minnesota where the Project could be sited to better comply with the Prime Farmland Rule, as discussed in Section 3.3 and Appendix E. However, no feasible or prudent alternative to the Land Control Area described herein was identified as a result of this analysis and no alternative sites were carried forward for the Project. Summit Lake selected the Land Control Area for the Project because of the proximity to existing electrical transmission infrastructure, willing participants, optimal solar resource, and opportunity to minimize environmental impacts to the extent practicable.

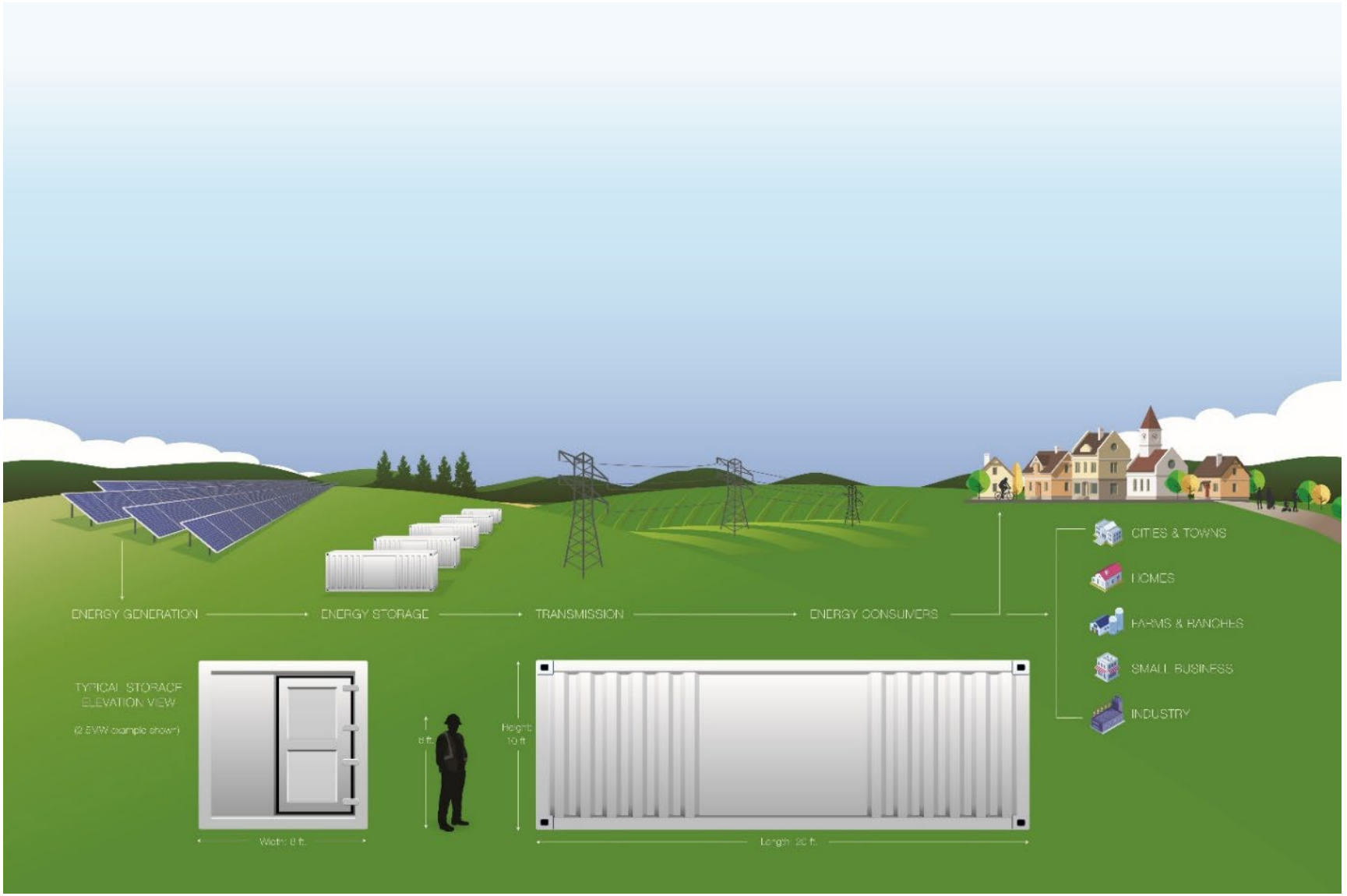
4.0 ENGINEERING AND OPERATIONAL DESIGN

The following sections describe the designs of the Solar Facility and BESS, including equipment, components, access roads, safety features, associated facilities, temporary facilities, and interconnection facilities. The Preliminary Development Area for the Project is shown on Figure 4.0-1 and on the Site Plan in Appendix C.

Figure 4.0-1 outlines the process of converting solar energy and connecting it to the transmission grid; this figure also shows how power is transferred to/from the BESS and the transmission grid. The process begins with solar panels converting energy from sunlight into direct current (DC) electrical power. Discrete sets of solar panels will be connected in a series via DC electrical cables and connected to an inverter. The inverters will convert the DC power (approximately 1,500 volts) from the solar panels to AC power (650-950 volts, depending on the inverter specifications). The inverters connect to a transformer, which will step up the AC voltage of generated electricity to 34.5 kV. From the transformers, buried electrical cable will carry the electricity from the transformer to the Project Substation. Buried cables will be at least four feet below-ground. Transformers in the Project Substation will step up the voltage from 34.5 kV to 345 kV. The electricity will then be carried via the above ground 345 kV gen-tie line to interconnect to the electrical grid via the Nobles Substation (i.e., the Point of Interconnection for the Project).

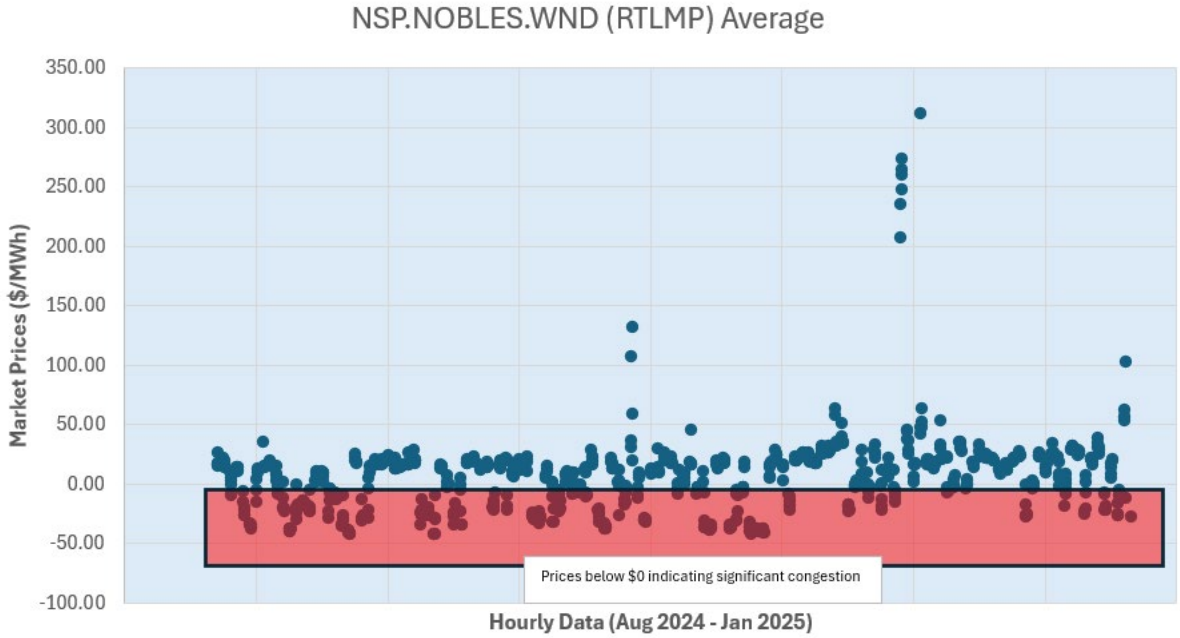
The BESS will connect independently to the Project Substation but will connect to the Nobles Substation via the same 345 kV gen-tie line as the Solar Facility. Electrical connections between the BESS and Project Substation, and between the Project Substation and Nobles Substation, will allow for bi-directional flow of electricity. During times when excess energy is available on the electric grid, electricity will be directed from the Nobles Substation to the Project Substation where it will be stepped down from 345 kV to 34.5 kV. The electricity will then be transferred to the BESS via buried below-ground 34.5 kV electrical cables. Once the energy reaches the BESS inverters, the AC power will be converted back to DC power and stored in the BESS unit's lithium-ion batteries. At times when the electric grid experiences increased usage or power outages, energy will be released from the BESS units, converted back to AC power, and sent back to the transformer within the Project Substation where it will be stepped up to 345 kV and transferred to the Nobles Substation via the 345 kV gen-tie line.

Figure 4.0-1: Harvesting Solar Energy and Battery Storage



The Nobles Substation is in a region of significant wind generation, which means there are numerous hours in the year when there is excess wind generation trying to get on the bulk grid but, due to transmission limitations, ends up getting curtailed to maintain the stability of the electric grid. This causes market locational marginal pricing to go below zero, as shown on Figure 4.0-2 for the data spanning August 2024 to January 2025 at the Nobles Substation. Adding solar generation at this substation will help diversify the energy mix and utilization of the transmission system (e.g., the timing of energy generation from solar sources often differs from the wind sources thereby allowing the two sources of energy to contribute to energy needs without significant overlap). Battery storage will also be able to charge or absorb electrons during the high-wind/negative market price hours and reduce the congestion on the electric grid and potentially reduce incidences of curtailment of wind generation. Figure 4.0-2 shows the congestion and need for energy storage.

Figure 4.0-2: Frequency of Negative Market Price Hours at the Nobles Substation



The strategy around co-locating a BESS facility using MISO's Surplus Interconnection Service with the Summit Lake Solar Facility is to ensure that:

i) the unused transmission capacity for the Solar Facility is used more efficiently; and

ii) the capacity behind the Point of Interconnection is firm and dispatchable.

Adding BESS through Surplus Interconnection Service is usually a much quicker process, improves the capacity credit for a generation facility, and allows for greater reliability during periods of peak electricity demand. The BESS facility will help to shape the solar output in a way that reduces curtailments, which have been prevalent at the Nobles Substation (i.e., MWh going to waste), and increases reliable output during times when the electrical grid requires supplemental energy or when market prices are high. The electrical grid may require supplemental energy

because of peak energy consumption, other generation facilities not operating at full capacity, brownout conditions, or any other scenario where energy demands increase. Figure 4.0-3 illustrates this concept.

4.1 Project Design

4.1.1 Solar Facility

The Solar Facility will utilize photovoltaic panels with tempered glass that may vary in size but are generally four to seven feet long by two to four feet wide and one to two inches thick. The panels will be installed north to south on a tracking rack system that utilizes steel for the foundations and aluminum for the frame. Motors allow the racking to rotate from east to west throughout the day. Each tracking rack will contain multiple panels. On the tracking rack system, panels will be approximately 15 feet in height from the ground to the top of the panels when at a 45-degree angle (see Figure 4.1.1-1). Height may vary due to manufacturer, topography, and vegetation constraints and could reach a height of approximately 20 feet from the ground. The photovoltaic panels will have a silicon and weatherized plastic backing or a side-mount or under-mount aluminum frame, heat strengthened front glass, and laminate material encapsulation for weather protection. The main protection built into the module is from light wind, dust, sand and precipitation. Tracker technology helps prevent hail and wind damage to the modules by safely stowing the modules in a way that limits/reduces the risk of damage to the modules.

To limit reflection, solar photovoltaic panels are constructed of dark, light-absorbing materials. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings, which will be used. The solar arrays will occupy most of the Solar Facility.

4.1.1.1 Linear Axis Tracking Rack System

A linear axis tracking rack system allows the photovoltaic panels to track the sun throughout the day. The panels and tracking rack system are generally aligned in rows north and south with the photovoltaic panels 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 panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the Solar Facility to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value.

The tracking rack system is mounted on top of steel piers that are typically driven into the ground, without the need for excavation or concrete to install the piers. The piers are driven into the ground with a hydraulically powered high-frequency hammer mounted on a tracked carrier. Piers are typically installed at 8 to 15 feet below the surface, pending site-specific conditions that will be determined through geotechnical borings prior to construction. Figures 4.1.1-1 through 4.1.1-3 visually show the general racking equipment and dimensions of a linear axis tracking rack system.

Figure 4.1.1-1: Tracking Rack System

Figure 4.1.1-2: Approximate Tracking Rack System Dimensions

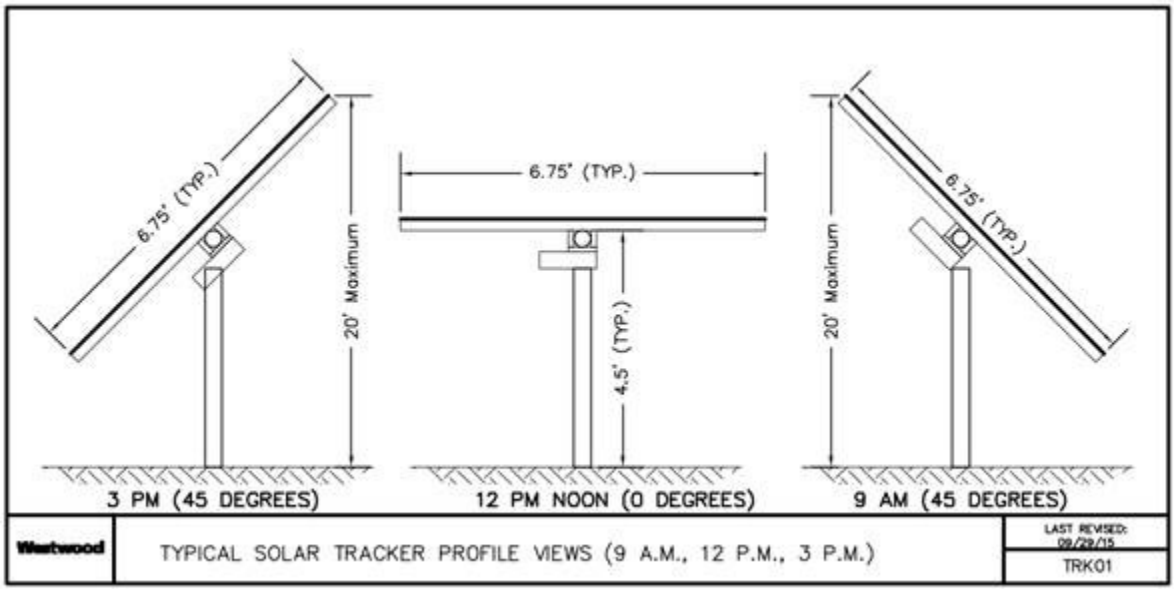


Figure 4.1.1-3: Standard Steel Pier Foundations

4.1.1.2 Inverters, Transformers, and Electrical Collection System

Solar panels collect and release energy as DC power at approximately 1,500 volts. Inverters, placed at the end of solar arrays, are required to convert the DC power generated by the solar panels to the AC power that is needed to transmit the energy through cabling into transformers, then the Project Substation and ultimately into the electrical grid. Transformers are used to step-up or step-down AC voltages. For the Solar Facility, a transformer will be used to step-up the voltage from the solar panels to 34.5 kV before it is transmitted to the Project Substation. Another transformer will be located within the Project Substation that will further -step-up the AC voltage from 34.5 kV to 345 kV before it is transmitted to the Nobles Substation via the 345 kV gen-tie line. The voltage is required to be at 345 kV to interconnect with the Nobles Substation and the existing electrical grid.

The electrical collection system of the Solar Facility is made up of electrical cables that connect the solar arrays, inverters, transformers, and Project Substation. The electrical collection system for the Solar Facility will be installed either below-ground or in a hybrid arrangement with above-ground cabling connecting the solar arrays to one another and below-ground cables connecting the solar arrays to the Project Substation. For both options, below-ground collection lines will be installed at least four feet below ground surface.

The electrical collection system will be site-specific depending on geotechnical analysis, constructability, costs, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collection system. The electrical cables that would be used for each type of electrical collection system are described below.

Below-ground Electrical Collection System

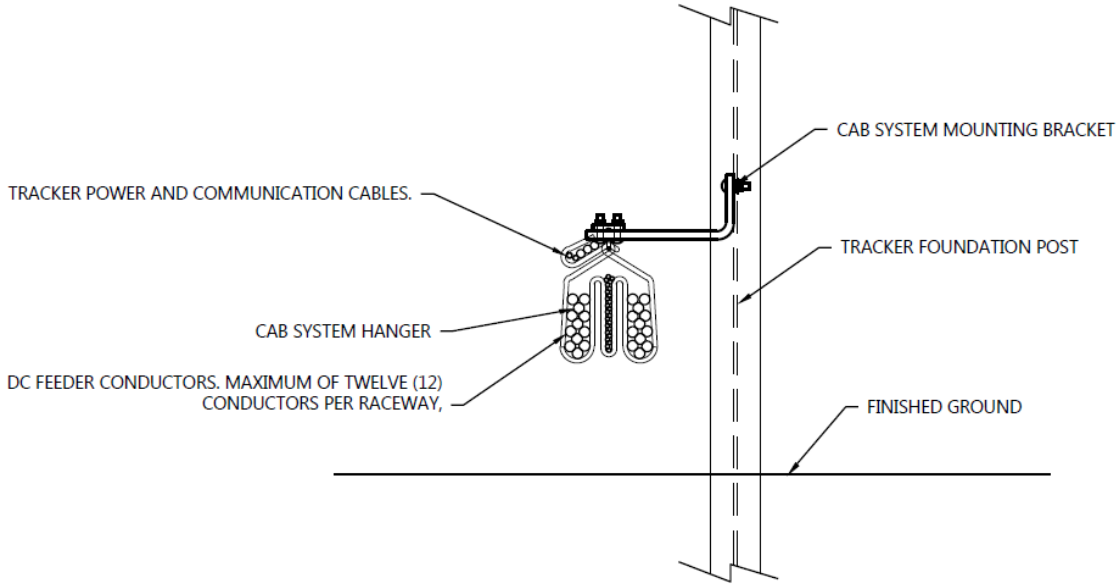
The solar panels deliver DC power to the inverters through cabling that will be located in a below-ground trench (approximately four feet deep and one to two feet wide). Below-ground AC collection systems from the inverter skids to the Project Substation will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During all trench excavations, the topsoil and subsoil will be removed and stockpiled separately in accordance with the Agricultural Impact Mitigation Plan for the Project (see Appendix F). Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil.

Hybrid Below-ground and Above-ground Electrical Collection System

A hybrid below-ground and above-ground electrical system is being considered for the Solar Facility for several reasons including ease of access for operations and maintenance, reduced ground disturbance, and cost considerations. If above-ground cabling is utilized, it would only be utilized to connect solar panels together within each solar array.

In the hybrid electrical collection system, DC collection cables will be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets will connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will then be routed below-ground to the inverter/transformer skid where the current is converted to AC and voltage is stepped up to 34.5 kV. A typical drawing of the hanging brackets at the end of each row is provided below in Figure 4.1.1-4. From the inverter/transformer skid, the AC collection would be installed below ground to the Project Substation. The 34.5 kV collection and communication lines between solar arrays and the Project Substation will be routed below-ground at a minimum depth of four feet. Cables connecting each unit of solar arrays will be directionally bored under county roads.

Figure 4.1.1-4: Typical Above-Ground DC Collection Hanging Bracket

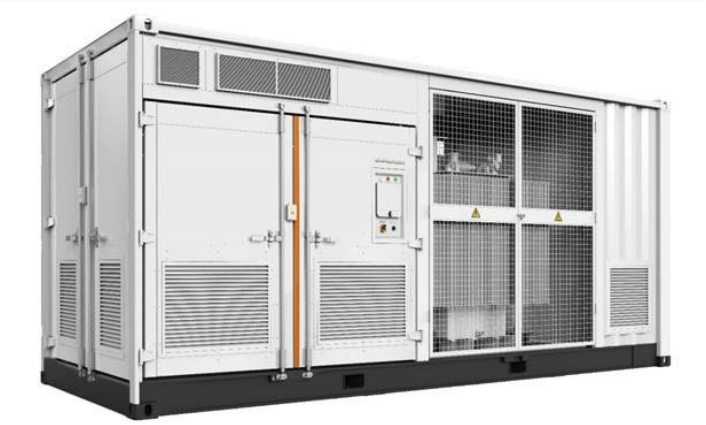


Central Inverter/Transformer Skids

Regardless of the collection system configuration (below-ground or hybrid), the Solar Facility will utilize central inverter/transformer skids and include a transformer into which the inverters will feed electricity (see Figure 4.1.1-5). The final number of inverters will depend on the inverter size, as well as inverter and panel availability. The preliminary design proposes 44 central inverter skids; the preliminary layout would be the same regardless of which electrical collection system configuration is selected. These skids provide the foundation for the inverter, transformer, and Supervisory Control and Data Acquisition (SCADA) system. The skids will be placed atop a concrete slab or pier foundations and typically measure 10 feet wide by 25 feet long, with a structure height of approximately 12 feet above grade. Concrete slabs are typically 1 to 1.5 feet deep and pier foundations are up to 15 feet deep. Concrete slabs would be used if subgrade soil conditions are such that skin friction and end bearing values are too low to support driven pile foundations. Pier foundations would be used as a typical foundation solution as long as the subgrade soil conditions allow for driven piles. This would represent good skin friction and end bearing capacities. Concrete foundations will be poured onsite or precast and assembled off-site.

The inverter/transformer skids will be located in the interior of the Solar Facility along access roads. Typical drawings of inverters are included in the Site Plan in Appendix C and Figure 4.1.1-5 below shows a typical central inverter and step-up transformer station.

Figure 4.1.1-5: Typical Inverter and Transformer Station



4.1.2 Battery Energy Storage System

The BESS will aid with regulating power distribution by charging its batteries with power from the existing electrical grid when demand is low and sending electricity into the grid when demand is high. This will allow Summit Lake to maximize energy output and efficiently utilize interconnection facilities and will, in part, reduce costs for interconnection customers and improve wholesale market competition by helping to reliably stabilize the electrical grid. Cost reduction is derived from reduced system congestion, which allows for greater overall transmission capacity for all interconnected facilities.

The rated power capacity of the proposed BESS is up to 200 MW and the energy capacity is 800 MWh. The storage duration is 4 hours. When the BESS is operating at full capacity and discharging 200 MW, then it is able to discharge for 4 hours. Rated power capacity is the maximum rate of discharge (MW) that the BESS can achieve. Energy capacity is the maximum amount of stored energy (MWh). Storage duration is the amount of time storage can discharge at its power capacity before depleting its energy capacity (NREL, 2019).

Summit Lake proposes to locate the BESS within the south-central portion of the Preliminary Development Area, adjacent to the Project Substation, and utilize an AC-coupled system (i.e., all batteries are in one location as opposed to being distributed throughout the Solar Facility). This type of system allows for efficient access, monitoring, and maintenance; has more flexible energy and power capacity sizing; and has more flexible dispatch capabilities. The preliminary design for the BESS incorporates a modular layout based on currently available technology. The location of the BESS is planned for approximately 16 acres in the south-central portion of the Preliminary Project Development Area, adjacent to the east side of the Project Substation.

Battery storage technology is advancing at a rapid pace and, as such, the options that may be available for the BESS when Summit Lake begins procuring infrastructure could be significantly more advanced or offered in a wider selection than those currently available. Summit Lake will analyze current market offerings during final engineering to select the specific BESS model for the Project. A variety of lithium iron phosphate battery technologies are under review for the

Project and the preliminary design presented herein contemplates a typical BESS. A typical BESS is a model that is frequently used by similar projects. The actual footprint of the BESS may vary based on the model selected during final engineering.

The BESS will be a modular system comprised of lithium-ion batteries encased in stand-alone enclosures (see Figure 4.1.2-1). Standalone enclosures are necessary, as opposed to a large warehouse or storage building, to ensure people cannot enter into the battery enclosures for safety reasons as described in Section 4.1.2.1. The enclosure dimensions are anticipated to be 40 feet long by 10 feet wide by 9.5 feet high. Multiple enclosures will be utilized in tandem, and the enclosures will have a Battery Management System for automated monitoring and managing of the batteries to ensure design performance, as well as providing control for the charging/discharging of the batteries along with temperature monitoring and control of the individual battery cell temperature with an integrated cooling system.

Figure 4.1.2-1: Typical BESS Module

The Project will utilize approximately 213 modules at the start of the Project. It is anticipated that the BESS shall be augmented over the duration of the project life cycle (typically, every 4-6 years) where additional battery enclosures are added to replace degraded energy capacity. Over the life of the BESS, the batteries will lose some of their capacity. Under current MISO market rules, a BESS is accredited capacity based in part on its ability to provide the energy equivalent of its claimed capacity for a minimum of at least four continuous hours each day. To maintain the facility's rated capacity, the BESS will undergo augmentation either through the addition of battery modules within the existing enclosures or the addition of supplemental battery enclosures. The augmentation schedule to maintain overall BESS functionality will be determined during the design process after final equipment selection and will be based on the projected degradation of the batteries.

Summit Lake has designed the Project layout presented herein to accommodate future augmentation of BESS units within the fenced area (see Maps 3 and 4). Specific installation timing

will vary based on capacity monitoring during operations. Accordingly, the initial construction of the BESS will not include all battery enclosures displayed on Maps 3 and 4, with augmentation units added during the life of the Project. Summit Lake respectfully requests the Site Permit expressly allows the addition of augmentation units, as depicted in the final site plan, without a need for a Site Permit Amendment or minor alteration approval from the Commission.

The lithium-ion batteries in each BESS enclosure operate with DC electricity that utilizes inverters, converters, and transformers to convert the electricity to AC for compatibility with the existing electrical grid. The BESS will connect to its own bay within the Project Substation and energy will be delivered between the Project Substation and BESS via low-voltage electrical lines (480 volts AC) that are capable of bi-directional flow. These cables will connect to pad-mounted switchgear/transformer(s), and a power distribution system that are placed adjacent to the BESS units within the BESS yard. A transformer will be located within the Project Substation that will step-up/step-down the AC voltage collected from or transmitted to the BESS. When injecting power into the electrical grid, AC power from the BESS will be stepped up from 34.5 kV to 345 kV before it is transmitted to the Nobles Substation via the 345 kV gen-tie line. The voltage is required to be at 345 kV to interconnect with the Nobles Substation and the existing electrical grid. When excess power from the electrical grid is transmitted to the BESS, the transformer within the Project Substation will step down the power from 345 kV to 34.5 kV before sending the power to the BESS units.

Additionally, stabilized gravel access roads will be installed between the BESS units to allow access during operation and perimeter fencing will be installed around the BESS in accordance with National Electrical Safety Code requirements. Fencing will be placed around the BESS independently or around the BESS and the Project Substation together.

4.1.2.1 BESS Safety

Summit Lake is committed to safety in all aspects of construction and operation of the BESS and will construct and operate the BESS in accordance with relevant safety codes, regulations, and industry best management practices.

Advances in technology, safety standards, and fire/building codes have and will continue to mitigate BESS fire safety risks. Strict adherence to National Fire Protection Association (NFPA) standard NFPA-70E shall be followed as related to electrical safety. Hazard mitigation systems that will be used for the Project include:

- remote monitoring (down to the cell level);
- Heating, ventilation, and air conditioning for temperature control;
- heat and smoke detection;
- automatic shutdown and personnel warnings;
- gas detection system;
- deflagration venting; and
- system-specific training for local fire departments and emergency response teams.

Summit Lake proposes to use BESS modules for the Project from a BESS manufacturer that has incorporated all required and reasonable safety precautions into the design of the equipment. The

lithium-ion batteries will be stored in weather-proof enclosures and each enclosure includes a fully integrated heating, ventilation, and air conditioning system for temperature control, sensors, and controls for remote monitoring, and built-in fire detection. No off-gassing or air emissions are produced by the BESS.

4.1.2.2 BESS Testing and Certification

Summit Lake is committed to partnering with equipment suppliers that manufacture to stringent quality standards, and all equipment that would be used for the Project will be tested and certified by third party professionals. Standards, certifications, and code requirements from multiple nationally recognized organizations will be required for the engineering, design, manufacture, and testing of the enclosures and equipment included in the BESS. All BESS equipment used for the Project will be tested for compliance with prominent safety standards, including International Electrotechnical Commission 62619, International Electrotechnical Commission 6244-1, Underwriters Laboratories 1973, and Underwriters Laboratories 9540A. BESS design shall comply with International Fire Code 2018, NFPA 855, and National Electric Code (NFPA 70).

4.1.2.3 BESS Facility Monitoring Systems

The BESS will have a Battery Management System that will allow automated monitoring in the Project Substation control or SCADA room and managing of the batteries to ensure design performance, as well as providing control for the charging/discharging of the batteries along with temperature monitoring and control of the individual battery cell temperature with an integrated cooling system.

Each lithium-ion battery is equipped with cell level, module level, rack level, and system level monitoring. Real-time data is collected and provided to an automatic control logic housed in the Battery Management System and site controller. The Battery Management System and site controller ensure the BESS is operating within the original equipment manufacturer's operating parameters and warranty requirements. If any operating limit is exceeded, the batteries will disconnect from the system. In addition, in the event of a fire safety warning, the control system will automatically contact a fire monitoring service who will contact the local fire department. Current battery technology has also advanced so that fire risk is less prevalent. The batteries are more thermally stable and less prone to thermal runaway.

Summit Lake is proposing BESS modules in separate stand-alone enclosures for the Project to reduce the risk of fire. While stand-alone enclosures will require a larger footprint, they also minimize potential fire risk as compared to other designs. An advantage of having the batteries in standalone enclosures is, if one battery were to catch fire, the fire would be contained within that enclosure and would not impact adjacent enclosures. In addition, stand-alone enclosures only allow external access, which avoids the risk of personnel getting trapped inside of a structure if a fire occurs.

Summit Lake is committed to providing training resources for local emergency responders, as well as working with local emergency responders to develop a Project-specific Emergency Response Program. The Emergency Response Program would require quarterly safety drills and annual safety training with local first responders. The Emergency Response Program will cover possible

incidents that could occur at the BESS and include corresponding emergency procedures. Summit Lake will coordinate with local emergency responders to develop the Emergency Response Program prior to the commercial operation date for the Project.

4.1.3 Access Roads

The Solar Facility will include approximately 15.5 miles of graveled access roads. The BESS and Project Substation will share approximately 0.3 mile of graveled access roads. Access roads will be used for operations and maintenance along with emergency access should any incidents occur. The final length of the access roads will depend on the equipment selected and final engineering design. Access roads will be up to 16 feet wide where straight and may widen to approximately 45 feet along curves and at internal road intersections. The preliminary Project design contemplates 13 access points to the Solar Facility from existing public roads and one access point to the BESS and Project Substation from McCall Avenue to each facility. All entrances to the Solar Facility and BESS will be secured with locked gates.

Summit Lake has designed access roads for effective and efficient access for operations and maintenance and for safe ingress and egress of employees, visitors, and emergency responders. Summit Lake has minimized the amount of access roads to only the number necessary for the Project. For example, access roads reach all portions of the site and every central inverter, but not every block of panels has access roads along the entire perimeter (i.e., along the perimeter fence). This design minimizes the amount of ground disturbance and new impervious surfaces while still providing effective and efficient site access.

Upgrades or changes to public roads may be required for construction or operation of the Project. Summit Lake will work with the appropriate government unit that has jurisdiction over the roads to facilitate required upgrades that meet the required public standards. Upgrades or changes may include, but are not limited to, road improvements, additional aggregate, and driveway changes. Road use and improvements will be incorporated into a Development Agreement with the appropriate governmental unit. Driveway changes will require a county entrance permit from Nobles County, which will be obtained prior to construction. The county entrance permits will be obtained prior to the start of construction.

4.1.4 Security Features

Permanent security fencing will be installed along the perimeter of the solar arrays within the Solar Facility and around the Project Substation and BESS. Fencing will be secured to posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. The fencing around the Solar Facility will consist of an agricultural woven wire fence and will extend approximately seven feet above grade. As typically requested by the MDNR on other projects, barbed wire will not be used around the perimeter of the Solar Facility. In place of barbed wire, one foot of three to four strands of smooth wire will be placed atop of the woven wire fence for a total height of approximately eight feet above grade. Gates will be strategically installed at corners for deer egress and contact information for the site manager will be posted at the gates.

The fencing around the Project Substation and the BESS will be a 6-foot above grade chain-link fence and include one foot of barbed wire on top to comply with the National Electric Safety Code

(NESC). This fencing will be designed to prevent the public from gaining access to electrical equipment which could cause injury or death.

Summit Lake will install security cameras at entrance gates to the Solar Facility, Project Substation, and BESS. Security lighting will be installed at the entrances to the Solar Facility, Project Substation, and BESS and will be downlit. The typical pole height for security lighting will be 10 feet and the lighting will be manually operated by switch as well as motion activated. Each inverter within the Solar Facility will also be downlit and switch controlled for repair purposes. For more details about the proposed lighting, see the Site Plan in Appendix C.

4.1.5 Associated Facilities

4.1.5.1 Project Substation

The Project Substation will be a 34.5/345 kV step-up substation with metering and switching gear required to connect to the transmission grid. The Project Substation will be shared by the Solar Facility and BESS and will have separate bays for each facility. It will be designed according to regional utility practices, MISO Standards, Midwest Reliability Organization Standards, NESC, and the Rural Utility Service Code. The area within the Project Substation footprint will be graveled to minimize vegetation growth in the area and reduce fire risk. The Project Substation will be fenced with a six foot chain-link fence, topped with one foot of barbed wire in accordance with NESC standards. Based on the preliminary design, approximately 5.1 acres will be required to construct the Project Substation.

A Spill Prevention, Control, and Countermeasures Plan is required by the EPA if any facility associated with the Project has oil storage of more than 1,320 gallons. The Project Substation will contain two industry-standard main power transformers, which will require a Spill Prevention, Control, and Countermeasures Plan. This plan will be prepared prior to the start of commercial operation.

4.1.5.2 Operation and Maintenance Building

An O&M building will be shared by the Solar Facility and BESS. It will be located adjacent to the BESS. The O&M building will be made of metal (similar to a pole barn). It will contain an office for the onsite Plant Manager, a technician room, restroom, and storage area for equipment required for operations and maintenance. Equipment within the O&M building will include a SCADA cabinet, spare panels, spare parts for the Project Substation and BESS, and equipment to operate the Project Substation, as well as safety equipment for working with live electricity.

Onsite storage at the O&M building may include hydraulic oil stored in a plastic or poly tote or 55-gallon drums on secondary containment pallets and potentially a fuel tank, for maintenance vehicles, that would be a double walled tank with additional secondary containment. The Project Stormwater Pollution Prevention Plan will describe pollution prevention measures for storage, handling and disposal of hazardous materials, solid waste, concrete and equipment wash water, portable toilets, construction products, and materials.

4.1.5.3 Parking

A parking lot will be located adjacent to the O&M building. The final size will be determined in accordance with the Nobles County Planning and Zoning Ordinance. The parking lot will be gravel or paved depending on the size needed to comply with the county parking and loading regulations.

4.1.5.4 Stormwater Ponds

The preliminary design for the Project includes 44 stormwater ponds throughout the Preliminary Development Area that range in size from 0.1 to 0.9 acre (17.2 acres total; see Maps 3 and 4). These stormwater basins are generally located in existing low areas. As noted in the Vegetation Management Plan (see Appendix D), the area within the stormwater basins will be vegetated with a wet seed mix that will help stabilize soils after rain events.

4.1.5.5 Weather Stations

The Solar Facility and BESS will have up to six weather stations that will be up to 20 feet in height (see Figure 4.1.5-1). Weather stations will be within the Preliminary Development Area; the final locations will be determined during final engineering design.

Figure 4.1.5-1: Weather Station

4.1.6 Temporary Facilities

Summit Lake will utilize 11 temporary laydown areas within the Preliminary Development Area, totaling approximately 5.4 acres. These areas will serve both as a parking area for construction personnel and staging areas for components during construction of the Solar Facility and BESS. These laydown areas have been sited to avoid any tree clearing and wetland impacts. After construction is complete, the laydown areas will be vegetated in accordance with the Project Vegetation Management Plan and soil conditions will be restored in accordance with the Agricultural Impact Mitigation Plan.

4.1.7 Interconnection to the Existing Electrical Grid

The Solar Facility and BESS will both be connected to the Project Substation in separate bays. The Project Substation will be a 34.5/345 kV step-up/step-down substation with metering and switching gear required to interconnect the Solar Facility and BESS into the existing Nobles Substation via a shared 345 kV overhead gen-tie transmission line of approximately 1,100 feet, pending final engineering design. The gen-tie transmission line will be strung from a single dead-end structure located within the Project Substation to another dead-end structure within the Nobles Substation. The structures will be made of wood or steel and will be less than 150 feet tall. The type of conductor will be determined following the completion of detailed electrical design.

4.1.8 Pipeline System

Minnesota Rules 7850.1900, subp. 1(J) is not applicable to the Project because no pipelines will be accessed or built as part of the Project.

4.2 Project Layout

The final layouts for the Solar Facility and BESS will optimize electrical generation, efficiency, and storage while avoiding and minimizing impacts on environmental and cultural resources and existing infrastructure. Pursuant to Minnesota Statutes section 216E.10, the Site Permits issued by the Commission supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose government. To the extent that they apply to the Project, the layout of the Solar Facility and BESS will also comply with other local, state, and federal regulatory standards. In addition, all MDNR buffer requirements under Minnesota Statutes section 103F.48 have been met.

Nobles County adopted a Solar Energy Ordinance on January 1, 2021 (Nobles County, 2021). The definition of a Solar Energy System in the Nobles County Solar Energy Ordinance includes both solar energy generating and storage equipment; given the size of the Solar Facility and BESS, the Project is specifically considered a Large Solar Energy System according to the Nobles County Solar Energy Ordinance. The Project is sited in areas zoned as Agricultural Preservation and Rural Residential Districts. The Nobles County Solar Energy Ordinance states that Large Solar Energy Systems are conditionally permitted in the Agricultural Preservation and Rural Residential Districts. Setback requirements for Large Solar Energy Systems from property lines and road centerlines are provided in Table 4.2.1 and displayed on the Site Plan provided in Appendix C.

Table 4.2-1 Nobles County Setbacks

Feature	Setback Requirement to Solar Facility (feet)	Preliminary Development Area (at closest in feet)[2]	Solar Array (at closest in feet)	BESS (at closest in feet)
Property Lines [1]	150	10	50	145
Centerline of all roads including fences	200	41	85	90
Centerline of County Drain Tile[3]	75	N/A[4]	42	35

[1] Measurements were taken from non-participating parcels adjacent to the Land Control Area.

[2] Measurements are taken from the fenceline of the Solar Facility.

[3] The County does not have a specified setback from county drain tile. This setback was established based on discussions with the County's drainage engineer, ISG. Summit Lake reserves the right to reduce the setback to 50 feet based on the results of a feasibility study currently being prepared by the County's drainage engineer, ISG.

[4] Drain tile is present within the Preliminary Development Area; therefore, no distance to drain tile is provided.

Source: Nobles County, 2021

While the preliminary design of the Project avoids and minimizes impacts on environmental and cultural resources and existing infrastructure, the preliminary design does not comply with the setback requirements in the Nobles County Solar Energy Ordinance. In order to comply with the county setbacks, Summit Lake would either need to reduce the number of panels included in the preliminary Solar Facility design, which would in turn reduce the generation output, or would need to acquire leases and purchase options for additional land to achieve the proposed nameplate capacity for the Solar Facility for which Summit Lake has secured MISO interconnection approval. In Summit Lake's view, the setbacks utilized are adequate to address potential impacts to neighboring properties and adjacent roadways while minimizing the production impacts to the Project. To further minimize impacts to neighboring properties, Summit Lake has designed the Solar Facility to be setback a minimum of 150 feet from non-participating residences. Efficient utilization of the Land Control Area will allow for an efficient use of the land and will maximize production tax revenue to Nobles County, Elk and Summit Lake Townships. Summit Lake is coordinating with the Nobles County and will work with the county to address any concerns it may have about the Project design and setbacks.

4.3 Estimated Solar Facility and BESS Acreages

Table 4.3-1 describes the estimated acreage within the 1,481.6-acre Preliminary Development Area based on the preliminary design for the below-ground and hybrid below-ground/above-ground electrical collection configurations. The estimated Solar Facility and BESS acreages are the same for both options.

Table 4.3-1 Estimated Solar Facility and BESS Acreages within the Preliminary Development Area

Project Facilities	Acres
Solar Arrays [1]	1,131.2
Inverters	0.8
Access Roads	26.5
Project Substation	5.1
BESS, O&M Building, and Parking Lot	16.0
Laydown Yards [2]	5.4
Collection and Communication Lines [3]	1.4
Stormwater Ponds	17.2
Remaining Area within the Fenceline of the Solar Facility	278.0
PROJECT TOTAL	**1,481.6**

[1] The impacts associated with solar panels include an approximate 17-25-foot-wide grass area between every row of panels.

[2] The laydown yards are only used during construction and result in temporary impacts.

[3] Acreage provided for collection and communication lines includes only the areas where these facilities extend outside of the fence line of the Solar Facility.

4.4 Construction

A variety of activities must be completed to carry the Solar Facility and BESS through construction. Below is a preliminary list of activities necessary to develop the Project.

Pre-construction, construction, and post-construction activities for the Solar Facility include:

- Pre-construction
  - Geotechnical analysis
  - Design Project Substation and electrical collection system
  - Design solar array, access roads, and O&M building
  - Underground utility discovery
  - Procure all necessary facility components (solar panels, tracking system, transformers)
- Construction
  - Gopher One Locate
  - Staking
  - Site preparation, grubbing, and grading
  - Construct laydown areas and set up temporary job site trailers

    - Construct fencing
    - Civil construction of access roads
    - Install photovoltaic mounting posts
    - Install below-ground or hybrid collection system
    - Install electrical enclosure/inverter including foundations
    - Tracker installation
    - Photovoltaic panel installation
    - Construct 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, inverter skids and electrical cabinets, and access roads
    - Test facility
    - Begin commercial production

Pre-construction, construction, and post-construction activities for the BESS include:

- Pre-construction
    - Geotechnical investigation;
    - Underground utility identification and location;
    - Initiate soil/vegetation stabilization in areas with no disturbance;
    - Design BESS; and
    - Procure necessary facility components (BESS inverters, storage devices/containers, emergency generators).
- Construction
    - Gopher One Locate
    - Staking
    - Site preparation, grubbing, and grading
    - Maintain perennial vegetation established during preconstruction activities
    - Establish temporary or permanent (seasonally dependent) vegetation in disturbed areas, as practical
    - Civil construction of access roads
    - Construct fencing
    - Install BESS foundation

    - Install BESS components and electrical connection to the Project Substation
- Post-construction
    - Restore disturbed areas not intended for permanent above-ground facilities
    - Maintain and restore established vegetation as per the Vegetation Management Plan
    - Replace temporary vegetation with perennial vegetation as applicable
    - Test BESS
    - Begin commercial operation

4.4.1 Solar Facility Construction Activities

During construction, equipment and work vehicles will travel to and from the site. Portions of the Preliminary Development Area will require grading. Typical construction equipment such as scrapers, dozers, dump trucks, watering trucks, motor graders, vibratory compactors and pile drivers, pickup trucks, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- skid steer loader;
- 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 site. An overview of construction activities follows.

4.4.1.1 Geotechnical

Geotechnical and pull testing studies will be performed to determine the topsoil and subsoil types, and the mechanical properties of the soils. These variables will be used to engineer the solar array foundation system.

4.4.1.2 Site Clearing and Vegetation Removal

After the necessary permits are received, construction will begin with the initial site preparation work, including utility locates. Depending on timing of the start of construction, the Solar Facility may require the clearing of residual row-crop debris from the previous seasons. Alternatively, and depending on construction timing, Summit Lake may plant a cover crop that is compatible with the Project Vegetation Management Plan (see Appendix D). This cover crop will stabilize soils where row crops or other vegetation are not present.

4.4.1.3 Earthwork

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil (depending on the depth of grading cut) in accordance with the Agricultural Impact Mitigation Plan, as described further in Section 5.3.1. Some grading will be required to provide a more level workspace and maintain soil stability in areas with a slope greater than five percent. Topsoil shall have temporary and permanent erosion control and soil stabilization measures established in accordance with the Stormwater Pollution Prevention Plan. The earthwork activities will be completed using typical civil construction equipment, such as scrapers, bulldozers, front-end loaders, back-hoes, or skid-steers.

4.4.1.4 Access Road Construction

As a component of earthwork, permanent access roads and permanent turnouts will be developed. This work will start with the stripping and segregating of topsoil materials from the anticipated 16-foot-wide road width. Topsoil removed from permanent access roads will be removed to suitable locations near the site of removal and spread across existing topsoil for storage. Storage locations will be identified (Global Positioning System [GPS] boundary and depth) and recorded on site maps to facilitate final reclamation after decommissioning. The subgrade materials will be compacted 16-foot-wide to the specified compaction requirements as laid out by the civil and geotechnical engineer. After compaction is reached and verified, the road will be installed as designed, typically done with or without geo-fabric depending on the soil type, and then, with a surface of 4 to 12 inches of gravel. The gravel will be placed level with the existing grade to facilitate drainage and minimize ponding.

After gravel is installed and compacted to the engineers' requirements, drainage ditches will be shaped as identified on the final grading plan. Finally, the previously stripped and windrowed topsoil material will be re-spread throughout Solar Facility.

4.4.1.5 Solar Array Construction

Once grading activities are complete, the racking system supports will be constructed using steel piles driven into the ground. The solar facilities will be constructed in blocks, and multiple blocks could be constructed simultaneously. Construction of the blocks will include pre-positioning and driving piles; mounting the tracking rack system to the piles; pre-positioning of panels; mounting panels to the tracking rack system; the completion of electrical connections, terminations and grounding; and installation of cable management systems In some situations where soils are low strength or consist of loose, non-cohesive sand, helical screw or auger-type foundation posts may be used. Helical screw or auger-type foundation posts are not anticipated; however, final determinations will be made after the geotechnical work is completed. Foundations are typically steel and are used where high load bearing capacities are required. The pile is driven using a hydraulic ram that moves along tracks and is operated by two workers. Soil disturbance will be restricted to the hydraulic ram/screw machinery, about the size of a small tractor, temporarily disturbing soil at each pile insertion location and while driving between drilling locations.

The remainder of the tracking rack system will be installed by construction crews using hand tools and all-terrain tracked equipment to distribute materials. Array racking will be bolted on top of the foundation piling to create a "rack" to which the solar panels can be fastened.

During array and racking assembly, multiple crews and various types of vehicles will be working within the Project area. To the extent practicable, vehicular traffic will be limited to permanent and temporary access roads to minimize soil disturbance, mixing, and compaction; however, vehicular traffic will occur off of roads throughout the Project during construction. Off-road construction vehicles include flatbed trucks for transporting array components, small all-terrain vehicles, rough-terrain forklifts and skid-steers, and pick-up trucks for transporting equipment and workers throughout the Preliminary Development Area. Panels will be staged in advance throughout the Preliminary Development Area and brought to specific work areas for installation by wagon-type trailers pulled by small tractors or by all-terrain tracked equipment. The solar panels will be installed by multiple crews using hand tools. Installation crews will proceed in serpentine fashion along staked temporary access roads in a pre-established route to minimize off-road traffic.

4.4.1.6 Electrical Collection System

Electrical wiring will connect the solar panels to inverters, which will convert the power from DC to AC. The AC will be stepped up through a transformer from the inverter output voltage to 34.5 kV and brought via collection cables to the Project Substation. These cables may be installed in a below-ground system or hybrid above-ground / below-ground system (see Section 4.1.1.2). Directional boring will be used during construction where the electrical collection and communication lines are located within wetlands and the lines will be located below-ground. In addition, electrical cables connecting blocks of solar arrays will be directionally bored under public roadways

A below-ground collection system will involve the installation of all cables in trenches or ploughed into place at a depth of at least four feet below grade. During trench excavation, the topsoil and subsoil will be removed and stockpiled separately in accordance with the Agricultural Impact Mitigation Plan. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil.

If a hybrid option is selected and above-ground cabling is utilized, the DC collection cables will be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets would connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will be routed below-ground at a minimum depth of at least four feet below grade to the inverter/transformer skid where the current is converted to AC and voltage is stepped up to 34.5 kV. From the inverter/transformer skid, the AC collection would be installed below ground to the Project Substation, as described above for the below-ground collection system.

The electrical collection system 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 collection system.

4.4.1.7 Project Substation Construction

Construction work within the Project Substation site will include site preparation and installation of substructures and electrical equipment. Installation of concrete foundations and embedment for equipment will require the use of trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Above-ground and below ground conduits from this equipment will run to a control enclosure that will house the protection, control, and automation relay panels. A station service transformer will be installed for primary AC power requirements. Batteries and battery chargers will be installed inside the enclosure for auxiliary power to the switchyard's control system. Crushed rock will cover the area of the Project Substation and adequate lighting will be installed around the Project Substation for worker safety during construction and operation.

One of two methods will be used to install Project Substation foundations. Option 1 would be to use a small rubber tire backhoe to dig out major foundations prior to pouring the concrete slabs. Option 2 would use an auger/drill type machine for minor foundations.

In both scenarios, the limit of disturbance will be within the footprint of the Project Substation for both the foundation equipment and the concrete delivery trucks. All topsoil from the Project Substation footprint will be removed to a pre-established suitable location for storage. The storage area will be near the site where the soil was removed, accurately located (GPS boundary, soil depth), and graded to facilitate revegetation. Subsoil will be removed, if necessary, to an acceptable pre-established and approved area for storage where the subsoil will be stabilized and remain undisturbed. After decommissioning, subsoil will be returned to the area from which it was excavated (as needed), topsoil will be replaced, and the area will be brought back to pre-construction contours.

4.4.2 BESS Construction Activities

After the necessary permits are received, construction will begin with the initial site preparation work, including utility locates. Construction of the BESS will begin with grading and site leveling. Topsoil will be segregated and placed in a designated location. Construction of the BESS will require grading of approximately 16.0 acres. Summit Lake does not anticipate soil removal for construction of the BESS due to the existing, relatively flat topography.

Site preparation will include installation of substructures and electrical equipment. Installation of concrete and steel pile foundations and embedment for equipment will require the use of trenching machines, excavators, concrete trucks, pumpers, vibrators, forklifts, and cranes. Medium-voltage cables will be installed below ground between the power conversion systems and the Project Substation. The BESS will include individual BESS containers, inverters (or power conversion systems), switchboards, low voltage cabling, medium voltage switchgear, a junction box, and medium voltage transformers. A fire alarm system will be integrated into the BESS to help identify and communicate any alarms and give proper notification to the operations team.

Each equipment enclosure (power conversion system and BESS containers) will be installed on a foundation designed to support its weight based on regional soil conditions. These foundations will either be steel-reinforced concrete slabs or steel pile foundations. For BESS foundations, two

installation methods are commonly used: Excavation and Concrete Pouring: A small excavator would be used to dig the major foundation areas before pouring the concrete slabs. For Steel Pile Installation, a pile driver embeds steel piles to create a foundation for the enclosures.

The power conversion system and BESS containers will be transported to the site on flatbed semi-trailers and placed on the foundations using an overhead crane. The containers will then be secured and fastened to the concrete pads and steel piles with anchor bolts. Crushed rock will be placed between and around installed BESS equipment. Adequate lighting will be installed around the BESS site for worker safety during construction and operation. Lighting will be downlit and controlled via timers, sensors, and switches to limit light usage to the extent necessary to meet safety and security requirements.

4.4.3 Construction Management

Summit Lake will designate an on-site construction manager that will oversee the Solar Facility and BESS construction. The construction manager's responsibilities will include scheduling and coordinating the activities of engineering, procurement, and construction contractors. The construction manager will be supported by other members of Summit Lake's team who specialize in engineering, permitting, meteorology, environmental compliance, real estate, and geographic information systems (GIS) mapping.

Throughout the construction phase, ongoing coordination will occur between the development, design, and construction teams. The construction manager will coordinate execution of the work. This coordination includes safety and quality control programs, cost, and schedule forecasting, as well as site security and ongoing communication with local officials, citizen groups, and landowners.

4.4.4 Commissioning

The Solar Facility and BESS will undergo equipment inspection and testing prior to beginning commercial operations and in compliance with Site Permit requirements. Individual and combined inspection and testing will occur for each component of the Solar Facility and BESS. These components include, but are not limited to, the solar array; associated communication, meteorological, collection, SCADA systems; battery modules; and BESS on-board monitoring systems. Testing, inspections, and commissioning will occur periodically during construction and upon completion of the construction phase.

4.4.5 Restoration

As portions of the Project near completion, temporary staging and laydown areas and other temporary disturbance areas within the Preliminary Development Area will be restored in accordance with the Vegetation Management Plan (see Appendix D). Topsoil will be spread and the Project will be graded to natural contours, where possible, and soil will be de-compacted in accordance with the Project Agricultural Impact Mitigation Plan (see Appendix F). Summit Lake anticipates that the post-construction clean-up and site restoration activities will take approximately 2 to 4 months.

Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the Vegetation Management Plan (see Appendix D) and the Project Stormwater Pollution Prevention Plan. Seed mixes will be designed to be used with the vegetation management practices of periodic mowing, grazing, and selective spot herbicide applications. All areas that will not contain permanent facilities (i.e., area under the arrays, the laydown yards, and the stormwater basins) 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. Additionally, a temporary cover crop will be planted with the perennial seed mixes to stabilize the soil and prevent erosion during the time it takes for the seeds to establish.

Summit Lake anticipates that the short-term establishment practices will occur from years 0 through 5, with long-term maintenance practices occurring from year 6 onward. Vegetation is expected to be fully established during the sixth growing season after native seed mix is planted. The long-term goal is to vegetate 95 percent of the Project site with at least 90 percent of the species being native. Additional short- and long-term goals are discussed within the Vegetation Management Plan (see Appendix D).

The Vegetation Management Plan provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The required restoration management is designed to continue for 5 years. The Vegetation Management Plan outlines vegetation management tasks during the establishment and perpetual maintenance phases including monitoring for and treating invasive species, mowing, and re-seeding.

The Project will use an adaptive management approach for vegetation management as outlined in the Vegetation Management Plan. Monitoring vegetation during the active growing season (May to September) is a key aspect of adaptive management and will be useful in identifying issues, tracking progress, and reevaluating management needs.

The Vegetation Management Plan outlines several vegetation maintenance strategies that may be implemented at the Project including mowing, herbicide use, and grazing. Mowing may be used when vegetation reaches a height of approximately 18 to 24 inches initially to bring it back to a height of roughly 6 to 9 inches and will help control weed species until natives become established. Mowing will continue as prescribed by the Vegetation Management Plan. Herbicides will be employed where it is determined that mowing alone will not accomplish perennial weed control. Alternatively, livestock (e.g. sheep or goats) may be used experimentally where grazing proves to be a more viable long-term management strategy.

4.5 Solar Facility and BESS Operation and Maintenance

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

The Solar Facility and BESS will be professionally maintained and operated by Summit Lake, an affiliate, or contractor. Primary tasks include scheduled monthly and quarterly inspection(s) of electrical equipment, vegetation management, and snow removal on access drives.

The expected service life of the Solar Facility and BESS is 30 years. At the end of 30 years, should Summit Lake desire to extend operations it would apply for amendments to the Site Permits to allow continued operation of the Solar Facility and BESS. Should Summit Lake decide to continue operation, a decision would be made as to whether existing equipment could be used or upgrades with newer technologies are required.

The Solar Facility and BESS will be operated and maintained in tandem, using the same staff. It is estimated that three to four full-time permanent positions will be required to operate and maintain the Solar Facility and one to two full-time permanent positions to operate and maintain BESS. A maintenance plan will be created for both facilities to ensure safe and efficient performance, including a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating / degradation. Derating / degradation refers to the known process of components losing some efficiency or otherwise degrading over the course of the Project life cycle. Like all technology and physical components, a certain amount of this is unavoidable, and Summit Lake will plan for it and maintain the facility as needed. Once construction is complete, three to ten trucks will be on site daily, and at intervals associated with the maintenance schedule in Section 4.5.5 during normal operations. The main scheduled activities are described in more detail below in Sections 4.5.1 through 4.5.5.

All maintenance activities for the Solar Facility and BESS will be performed by qualified personnel. Maintenance activities will be performed during the day to the extent that they do not disrupt energy production. As an example, if a panel needs repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The panel can then be replaced, and the combiner box circuit closed. Additionally, the power production circuits are separated from the tracking circuits. This allows the photovoltaic panels to operate during an unscheduled outage of the tracker system. On occasion, it may be desirable to perform maintenance when the sun is down. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residents are present. Approved technicians will service the BESS units and associated equipment once per month. A performance audit and inspection to assess the quality of equipment will be conducted annually. If any equipment needs to be replaced before the Projects' end-of-life, the Applicants will reuse, recycle, or dispose of equipment in accordance with applicable regulations and best management practices.

An O&M building will include areas for the storage of the spare parts and the tools as described in Section 4.1.5.2. The facilities will be operated through a real-time control system for most operations functions.

4.5.1 Supervisory Control and Data Acquisition System and Battery Management System

Performance monitoring will use a real-time and continuous collection of data acquired by the onsite meteorological station, energy meter, and SCADA. The SCADA system provides data on solar energy generation and production, availability, meteorology, and communications. The solar

modules will communicate directly with the SCADA system for remote performance monitoring, energy reporting, and troubleshooting. Operators will be notified immediately of any abnormalities allowing for timely corrective action regardless of time of day.

The BESS will have a Battery Management System that will allow automated monitoring and managing of the batteries to ensure design performance, as well as provide control for the charging/discharging of the batteries along with temperature monitoring and control of the individual battery cell temperature with an integrated cooling system.

Performance monitoring of the Solar Facility and BESS will consist of a weekly or monthly download of the data acquired by the onsite meteorological stations and SCADA system (energy produced, alarms, faults, etc.) and the Battery Management System.

4.5.2 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, including:

- Photovoltaic panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.;
- Inverters, transformer and electrical panels: visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
- BESS: Performance verification, check of air filters, heating, ventilation, and air conditioning system, and fire suppression systems;
- Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds;
- Cabling and wiring: visual check of the buried and aerial electrical line and connection box to verify their status.
- Gen-tie line, structures, and components: Routine visual inspection (maintenance of structures may be performed by other parties); and
- Project Substation: Scheduled visual inspections.

4.5.3 Facility Maintenance

Housekeeping of the Solar Facility and BESS will include road maintenance, vegetation maintenance (method is to be determined; either traditional mowing or livestock grazers will be utilized), fence and gate inspection, lighting system checks, and photovoltaic panel washing (if required; minimal to no washing is anticipated to be needed at the Project facilities due to the naturally occurring and frequent precipitation). When snowfall occurs, the Solar Facility's tracking systems will aid in snow removal from the panels.

4.5.4 Maintenance Schedule

Table 4.5.5-1 provides information on the anticipated frequency of the operations and maintenance tasks. The table represents the anticipated preliminary frequency of these tasks. The frequency of inspection may vary based on facility demands and experience with performance of certain components and systems.

Table 4.5.5-1 Operations and Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
Photovoltaic Field	Photovoltaic Panels visual check	Once Yearly
	Wirings and junction boxes visual check	Once Yearly
	Photovoltaic strings measurement of the insulation	Once Yearly
	Advanced diagnostics	At Owner's Direction
	Overview aerial thermal scan	Once Yearly
	Photovoltaic strings and string boxes faults	Once Yearly
	Photovoltaic panels washing	No regular washing planned (only as site-specific conditions warrant)
	Vegetation Management (if necessary at site)	Up to three times a year depending on site conditions
BESS	System Visual Inspection	Quarterly
	Filter Inspection	Quarterly
	Fire Safety system Inspection and Maintenance	Once Yearly
Electric Boards	Case visual check	Once Yearly
	Fuses check	Once Yearly
	Surge arresters check	Once Yearly
	Torque check	Once Yearly
	DC voltage and current check	Once Yearly
	Grounding check	Once Yearly
Inverter	Case visual inspection	Once Yearly
	Air intake and filters inspections	Once Yearly
	Conversion stop for lack of voltage	Once yearly
	AC voltage and current check	Once yearly
	Conversion efficiency inspection	Once yearly
	Datalogger memory download	Once yearly
	Fuses check	Once yearly
	Grounding check	Once yearly

Table 4.5.5-1 Operations and Maintenance Tasks and Frequency		
Plant Device	**Task**	**Preliminary Frequency**
	Torque check	Once yearly
Support Structures	Visual check	Once yearly
	Photovoltaic panels toque check on random sample	Once yearly

4.6 Decommissioning

At the end of commercial operation, Summit Lake will be responsible for removing all solar modules, BESS units, and other associated facilities. At the end of the term for each Site Permit, Summit Lake may apply for an extension of the Site Permits and continue operation if approved. Should Summit Lake decide to continue operation, a decision would be made as to whether operations would continue with the existing equipment or to upgrade the facilities with newer technologies.

Decommissioning would include removing the solar modules, tracker system, inverters, fencing, access roads, above-ground portions of the electrical collection system, lighting, Project Substation, gen-tie line, BESS, and the O&M building and parking area. Below-ground components, including foundations, will be removed to a minimum depth of 48 inches as discussed below (see Section 4.6.2). In addition, steel foundation posts will be pulled out to full depth. Standard decommissioning practices will be used, including dismantling and repurposing, salvaging/recycling or disposing of the solar energy and battery improvements, and restoration. In accordance with the anticipated Site Permit conditions, 90 days prior to the start of the decommission, notice will be sent in writing to landowners and local units of government. These parties will again be notified once decommissioning activities have been completed. A detailed draft Decommissioning Plan is provided in Appendix G and is generally summarized below.

4.6.1 Timeline

Decommissioning is estimated to take about one year to complete, and the decommissioning crew will ensure that all equipment is recycled or disposed of properly.

4.6.2 Removal and Disposal of Solar Facility and BESS Components

The removal and disposal details of the Solar Facility and BESS 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 and shipped to an offsite facility for reuse or resale. Non-functioning modules will be packed, palletized and shipped to the manufacturer or a third party for recycling or disposal (see Section 4.7.1).
- 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 metal recycling facility. The posts can be removed using backhoes or similar equipment. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be de- compacted in a manner to adequately restore the topsoil and sub-grade material to a density consistent to promote plant growth.
- Overhead and Underground Cables and Lines: Most underground cables and conduits will be removed to a minimum depth of four feet. Facilities deeper than four feet or at depths shallower than four feet as otherwise specified in lease agreements may remain in place to limit vegetation and surface disturbance. The underground cables around equipment pads will be completely removed up to a length of 25 feet around the perimeter of pads. Prior to any excavation, topsoil will be segregated and stockpiled for later use, and the subsurface soils will be staged next to the excavation. The subgrade will be compacted to a density similar to the surrounding soils to promote plant growth and maintain drainage. Topsoil will be redistributed across the disturbed area.
- Overhead transmission line conductors: Conductors will be disconnected and removed from the Project and taken to a recycling facility. The steel transmission poles will be felled within the transmission line right-of-way and any hardware, bracing, and attachments will be transported along with the poles to a recycling facility. Removed pole locations will be revegetated with a seed mix specified in the approved Stormwater Pollution Prevention Plan and Vegetation Management Plan.
- BESS Facility: The BESS containers will be disconnected from electric ports prior to removal. The lithium-ion batteries will be transported to a recycling facility. The containers can be resold, reused, or recycled. Gravel aggregate will be removed and shipped from the Project site to be reused, sold, or disposed of appropriately 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 constructed with or without geotextile fabric (depending on the results of the geotechnical analysis) and a minimum of eight inches of aggregate over compacted subgrade. All pile foundations will be pulled out completely. Underground cables and duct banks will be removed to a depth of four feet. Topsoil will be reapplied to the disturbed area. Soil will be de-compacted, and the site will be restored to the pre-construction condition and re-vegetated.
- 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 Summit Lake's sole discretion, consistent with applicable regulations and industry standards.
- Equipment Foundation and Ancillary Foundations: The ancillary foundation for the Project are pile foundations for both equipment skids and meteorological stations. As described for the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated to a depth of at least 48 inches. All unexcavated areas compacted by equipment used for decommissioning will be de-compacted in a manner to adequately restore the topsoil and sub-grade material to a density consistent to promote plant growth. All materials will be removed from the site and reconditioned and reused,

sold as scrap, recycled, or disposed of appropriately, at Summit Lake'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 Summit Lake Solar's sole discretion, consistent with applicable regulations and industry standards. Fence posts can be pulled out using skid-steer loaders or other light equipment. The surrounding areas will be restored to pre-construction conditions to the extent feasible.
- Access Roads: Facility access roads will be used for decommissioning purposes, after which removal of roads will be discussed with the landowner, using the following process:
    - After final clean-up, roads may be left intact through mutual agreement of the landowner and Summit Lake unless otherwise restricted by federal, state, or local regulations; and
    - If a road is removed, aggregate will be excavated and loaded in dump trucks using front loaders, backhoes, or other suitable excavation equipment, and shipped from the site to be reused, sold, or disposed of appropriately at the Owner'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. Another disposal option is to provide the aggregate to local landowners as clean fill. All internal service roads are constructed with or without geotextile fabric and a minimum of eight inches of aggregate over compacted subgrade. Any ditch crossing connecting access road to public roads will be removed unless the landowner requests it remain. The subgrade will be de- compacted using a chisel plow or other appropriate subsoiling equipment. All large rocks will be removed. Topsoil that was stockpiled during the original construction will be distributed across the road corridor.

4.6.3 Restoration/Reclamation of Facility Site

Summit Lake will restore and reclaim the Solar Facility, BESS Facility, and associated equipment and facilities to pre-construction conditions consistent with the requirements of the lease agreements, Agricultural Impact Mitigation Plan, and Vegetation Management Plan, and Decommissioning Plan as applicable. Summit Lake assumes that most of the site will be returned to farmland and/or pasture after decommissioning and will implement appropriate measures to facilitate such uses. If no specific use is identified, Summit Lake will plant unvegetated portions of the site with a seed mix specified in the approved Stormwater Pollution Prevention Plan, Agricultural Impact Mitigation Plan, and Vegetation Management Plan, as applicable.

4.6.4 Financial Resource Plan

Summit Lake will be responsible for all costs to decommission the Solar Facility and BESS. Due to the uncertainty in future decommissioning costs and salvage values, Summit Lake will review and update the decommission estimate every 5 years as described in the draft Decommissioning Plan included in Appendix G. Summit Lake 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. Summit Lake will post the financial security during year 10 of Project operation. Summit Lake will abide by the applicable Site Permit

condition(s) and ensure the Project is decommissioned in accordance with the Site Permits and the Decommissioning Plan. In addition to Site Permit conditions, Summit Lake has included an obligation to decommission all components in the real estate agreements.

4.7 Facility Recycling

4.7.1 Solar Facility

Solar modules typically consist of glass, aluminum, copper, silver, and semiconductor materials that can be successfully recovered and reused. By weight, more than 80 percent of a typical solar module is glass and aluminum, which are common and easy to recycle materials. Other module components that can be successfully recovered are copper, silver, and semiconductor materials. More than 90 percent of semiconductor material and glass can be reused in new modules and products. While the solar modules and equipment used for the Project are expected to last for at least 30 years, at some point, they will need to be safely managed as waste products. Numerous research and development organizations, producers, academia, reuse service providers, and recycling and waste management companies work to develop end-of-life solutions for solar modules and equipment. One organization, the Solar Energy Industries Association, has been actively seeking and developing solar module and associated equipment recycling partners across the U.S. since 2016.

While a majority of the solar module is comprised of glass and aluminum, which are not hazardous, different varieties of solar modules have different metals present in the semiconductor and solder material. If these metals are present in high enough quantities in the solar modules, solar module waste could be a hazardous waste under the Resource Conservation and Recovery Act (EPA, 2024c). The most common reason that solar modules would be determined to be hazardous waste would be by meeting the characteristic of toxicity, which must be managed properly (MPCA, 2023a).

Many manufacturers of modules are taking proactive actions to determine the potential for the metals contained in modules to leach from the panels during operation of the module or if it is broken into pieces. Each of the manufacturers being considered to provide modules completes testing for hazardous substances; the manufacturers have confirmed that no hazardous substances are leached from the tested products resulting in leachate concentrations that exceed regulatory standards. Considering the modules are fully encapsulated, unlikely to shatter, and not expected to leach hazardous materials into the environment, the risk to the environment from the contents of the modules will be minimal. If a module is broken at the Solar Facility, the broken pieces and the remainder of the module will be recycled or disposed of and replaced, thereby further reducing the risk for hazardous materials contained in the modules to leach into the environment.

According to the Solar Energy Industries Association, a recycling network exists that ensures a clean energy economy remains sustainable for years to come (Solar Energy Industries Association, 2024). By the end of the useful life of the modules used for the Project, it is anticipated that module recycling will be sufficiently established in Minnesota or surrounding states to recycle the solar modules and associated equipment used for the Project.

4.7.2 BESS

Lithium-ion batteries are rechargeable batteries that consist of cells containing an anode layer, a cathode layer, and a separator, all in contact with an electrolyte. These batteries come in various chemistries, such as lithium cobalt oxide, lithium nickel cobalt aluminum oxide, and lithium iron phosphate, each with different characteristics in terms of energy capacity, stability, recharge speed, and longevity. Common materials used in these batteries include lithium, nickel, cobalt, manganese, graphite, iron, copper, and aluminum foils (EPA, 2023).

When lithium-ion batteries reach the end of their life cycle, they are often considered hazardous waste due to the potential for fire or explosion if not handled properly. Properly recycling these batteries is crucial for safety and to conserve critical minerals and valuable materials used in their production. The recycling process typically involves collecting, sorting, and shredding the batteries to recover materials like black mass, copper, aluminum foils, separators, and electrolytes. These recovered materials can then be processed through heat-based smelting or liquid-based leaching to extract metals like cobalt, nickel, and lithium for reuse in new batteries. The EPA is planning to propose new rules for recycling lithium-ion batteries with hopes to improve the management of materials (EPA, 2023). These new rules for improving the recycling process of lithium-ion batteries are expected to be in place by the end of the useful life of the BESS.

In addition to recycling, there is a growing focus on battery reuse and repurposing as environmentally friendly alternatives to recycling or disposal. Used lithium-ion batteries can still provide useful energy storage for other applications even after their performance degrades. Reuse and repurposing options are being developed to give batteries a "second life," extending their usefulness before they are eventually recycled. These practices not only benefit the environment by reducing resource demands for new batteries but also contribute to a more sustainable approach to managing lithium-ion battery waste. Summit Lake anticipates that by the end of the useful life of the BESS, there may be more opportunities for lithium battery reuse and repurposing options.

4.8 Repowering

As the solar and battery markets continue to produce less expensive and more efficient solar modules and batteries, repowering the Project may be a viable option as the Solar Facility and BESS age. 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. Summit Lake will continually evaluate the generation output, maintenance costs, and other contributing factors in conjunction with available technology upgrades to determine if repowering is a worthwhile investment. Any proposed repowering will abide by all local, state, and federal regulations. New or amended Site Permit applications or Generator Interconnection Agreements may be necessary.

5.0 ENVIRONMENTAL INFORMATION

The description of the existing environment throughout Section 5.0 is centered around the approximately 1,989.6-acre Land Control Area as identified in Figure 2.1-1 of this Joint Application. The 1,481.6-acre Preliminary Development Area is the portion of the Land Control Area that will be needed for construction and operation of the Solar Facility and BESS (see Figure 2.1-1). Additional description of the Land Control and Preliminary Development Areas is provided in Section 2.2.

The Applicant analyzed potential impacts on human and environmental resources for the Project using impact assessment areas. The impact assessment areas for each resource is the geographic area within which the Project may exert some influence. These impact assessment areas vary by resource and are summarized in Table 5.0-1.

The following impact assessment areas are used:

- **Preliminary Development Area**. The Preliminary Development Area includes the temporary construction workspaces and the footprints of permanent facilities that would be required for the preliminary design of the Project as described in Section 4. This is used as the impact assessment area for displacement, geology and groundwater resources, soils, surface waters (including stormwater, floodplains, and wetlands), and vegetation.
- **One mile**. A distance of one mile from the Land Control Area is used as the impact assessment area for analyzing potential impacts to aesthetics, recreation, archaeological and historic resources, wildlife and their habitats, and rare and unique natural resources.
- **3,200 Feet from the Land Control Area**: A distance of 3,200 feet from the Land Control Area is used as the impact assessment area for analyzing potential impacts related to noise.
- **Study Area**. Defined generally as the townships and county where the Project is located, the Study Area is used as the impact assessment area for analyzing potential impacts to cultural values, environmental justice, public health and safety, public services and infrastructure, land use and zoning compatibility, socioeconomics, land-based economies, air quality, climate change and greenhouse gas emissions. These are resources for which impacts may extend throughout communities surrounding the Project.

Table 5.0-1 Impact Assessment Areas

Impact Assessment Area	Specific Resource/Potential Impact to Resource
Preliminary Development Area	Displacement, Geology and Groundwater Resources, Soils, Surface Waters (Including Stormwater, Floodplains, and Wetlands), and Vegetation
One Mile Buffer	Aesthetics, Recreation, Archaeological and Historic Resources, Wildlife and Their Habitats, and Rare and Unique Natural Resources
3,200-foot Buffer	Noise

Table 5.0-1 Impact Assessment Areas	
Impact Assessment Area	**Specific Resource/Potential Impact to Resource**
Study Area	Cultural Values, Environmental Justice, Public Health and Safety, Public Services and Infrastructure, Land Use and Zoning Compatibility, Socioeconomics, Land-Based Economies, Air Quality, Climate Change and Greenhouse Gas Emissions

The preliminary design for the Solar Facility does not identify the locations of the posts for the solar arrays, so detailed calculations of impacts are not included for these features. Posts are typically 6-12 inches in diameter and would be installed via vibration or a pile driver in most locations; therefore, the permanent impacts associated with these features are expected to be negligible.

5.1 Environmental Setting

The MDNR and the U.S. Forest Service have developed an Ecological Classification System 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 (MDNR, 2024a). Through the Ecological Classification System, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located within the North Central Glaciated Plains Section of the Prairie Parkland Province (251B). The Project is in the Coteau Moraines ecological subsection (251Bb).

The Coteau Moraines ecological subsection is characterized as a transition from shallow deposits of windblown silt (loess) over glacial till to deeper deposits of loess. A steep escarpment marks the northeast edge of the subsection. The depth to bedrock in this subsection is 600 to 800 feet through most of this area. Soils are loamy and well-drained with thick dark surface horizons. Annual precipitation in the Coteau Moraines subsection ranges from 24 inches in the west to 27 inches in the east and the growing season averages 145 to 150 days in length. Prior to Euro-American settlement, vegetation in this subsection was almost entirely tallgrass prairie. Wet prairies were restricted to narrow stream margins and forests were similarly restricted to ravines along a few streams, such as the Redwood River. Land in this subsection is currently used for agricultural activity and there are few remnants of pre-settlement vegetation left (MDNR, 2024b).

The Project is in Nobles County in Summit Lake and Elk Townships and is directly adjacent to the Town of Reading; the Land Control Area overlaps the municipal boundary of Reading on the east, north, and west sides. Additional municipalities near the Project are Worthington (about 5.0 miles southeast), Brewster (about 10.0 miles east), Rushmore (about 5.9 miles southwest), Adrian (about 9.9 miles southwest), Lismore (about 9.0 miles west), and Wilmont (about 3.4 miles northwest). The nearest metropolitan area is Sioux Falls, South Dakota, which is approximately 50 miles southwest of the Project.

Rural residences are present along the margins of the Land Control Area in the areas outside of Reading, and in some cases the Land Control Area has been designed to specifically exclude rural residential properties (see Figure 2.1-1). Several rural residences were intentionally carved out of the Land Control Area to ensure that the residential yards would be avoided by Project design. Summit Lake is also pursuing participation agreements with landowners who are currently not

participating in the Project, but are located within the Project boundary or are directly adjacent to the Land Control Area. Outreach with these landowners has commenced and is ongoing.

Such rural residences are situated along public roadways. Land use inside the boundary of the Land Control Area is focused on row crop production, predominantly corn and forage crops.

Public roadways that generally bound the Land Control Area are 170th Street on the north, Knauf Avenue on the west, 200th Street on the south, and Nystrom Avenue on the east. County State Aid Highway 25 cuts diagonally through the southwestern corner of the Land Control Area as it travels south of Reading in a southeast-northwest direction. Additional county and township roads bisect the Land Control Area. A more detailed description of public roadways in the Study Area (i.e., the townships and county within which the Project occurs) is provided in Section 5.2.8.

The Nobles Substation is adjacent to the southern portion of the Land Control Area where the Project Substation for the Solar Project and the BESS Project are sited in the preliminary design presented herein. The Nobles Wind Farm is southwest of the Land Control Area and energy generated by the wind farm is fed to the Nobles Substation via underground collection lines. The nearest turbine to the Land Control Area is about 0.2 mile south of the southernmost portion of the Land Control Area in Township 103N, Range 41W, Section 22.

5.2 Human Settlement

Solar and BESS facilities have the potential to impact human settlements during construction and operation. Public health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Health impact concerns related to the operation of the Project include health impacts from electric and magnetic fields, stray voltage, and electrocution. Solar facilities also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the Study Area, be incompatible with local land use planning and zoning, and impact public services such as transportation or the availability of first responders. Potential impacts on human settlement from construction and operation of the Project are discussed in more detail below.

5.2.1 Aesthetics

The topography of the Land Control Area is generally flat with elevations ranging from 1,656 to 1,747 feet above sea level. As discussed in Section 5.1, land use within the Land Control Area is predominantly agricultural, with corn and forage crops being the most common crops. There are narrow swaths of trees (i.e., windbreaks) surrounding or partially surrounding farmsteads that are adjacent to the Land Control Area boundary, and most farmsteads also include agricultural buildings. The area within one mile of the Land Control Area on the west, north/northwest, and east sides is also predominantly agricultural and rural with scattered farmsteads situated along public roads.

The area within one mile of the Land Control Area to the south and southwest is more developed and several vertical and horizontal human settlement features are present. The southern portion of the Land Control Area overlaps the municipal boundary of Reading and residential areas are directly adjacent to the Land Control Area and within 0.25 mile of the Land Control Area. The

intersection of County State Aid Highway 25 and 200th Street is just south of Reading and several municipal streets are present within Reading, between the Land Control Area and County State Aid Highway 25.

The existing Nobles Substation (i.e., the Point of Interconnection for the Project) is adjacent to the Land Control Area in Section 23, about 0.3 mile northwest of Reading. Two additional facilities associated with the Nobles Wind Farm are present between the Nobles Substation and McCall Avenue to the east. Several transmission lines interconnect to the Nobles Substation from the west, south, and east. One of these existing transmission lines bisects the Land Control Area in Sections 23 and 24, as it travels east out of the Nobles Substation.

The Nobles Wind Farm is southwest of the Land Control Area and other than the Nobles Substation and other associated facilities in Section 23, the nearest wind farm facilities are three turbines located between 0.2 and 0.4 mile south/southwest of the Land Control Area in Section 22.

The Nobles Wind Farm is a visible feature in the existing landscape of the Study Area. The Nobles Wind Farm has been in operation since 2010 and as such has become a part of the visual landscape in the Study Area. The profiles of the Solar Facility and BESS are much lower than that of a wind turbine, and although the Solar Facility and BESS may be visible to passersby on local roadways surrounding the Land Control Area, these facilities will be similar in appearance to other existing electrical substations and commercial industrial buildings in the unincorporated community of Reading.

Summit Lake developed the Land Control Area and Preliminary Development Areas to avoid rural residences and residential areas within Reading. As such, there are no residences or businesses within the Land Control Area or the Preliminary Development Area. However, several rural residences are surrounded by the Land Control Area boundary. These rural residences were intentionally carved out of the Land Control Area to ensure that the residential yards would be avoided by Project design.

Eighty-seven residences are within one mile of the Land Control Area (see Map 6). Table 5.2.1-1 shows how many of the 87 residences that are within one mile of the Land Control Area are within one mile of the Preliminary Development Area, the solar arrays, and the BESS facility.

Table 5.2.1-1 Residences within One Mile of the Land Control Area

Distance [1]	Preliminary Development Area	Solar Arrays	BESS Facility
≤ 50 feet	0	0	0
51 feet to 150 feet	0	0	0
151 feet to 300 feet	9	1	1
301 feet to 500 feet	11	11	0
501 feet to 1,000 feet	31	20	7
1,001 feet to 5,280 feet (1.0 mile)	34	53	43
PROJECT TOTAL	**85**	**85**	**43**

[1] Measurements are based on the preliminary Project design.

Most of the residences that are adjacent to or surrounded by the Land Control Area have trees and narrow windbreaks on two to three sides of the property that will provide some natural vegetative screening.

5.2.1.1 Impacts and Mitigation Measures

The Project will convert approximately 1,481.6 acres of predominately agricultural land (see Table 5.2.9-2 and associated discussion) to a solar facility and BESS characterized by complex geometric forms, lines, and surfaces that will be divergent from the surrounding rural landscape. Most of the Preliminary Development Area will be filled with rows of low-profile solar photovoltaic panels and perennial vegetation. Solar photovoltaic employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. The figures in Section 4.1 provide a reference for how the Summit Lake Project will appear during operation. To limit reflection, solar photovoltaic panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings. Renderings of the Solar Facility and BESS from public roadways that bisect the Land Control and Preliminary Development Areas are provided below in Figures 5.2.1-1 through 5.2.1-6.

In addition to the solar arrays, aboveground Project components within the Preliminary Development Area will be most visible to residences and passersby on public roads include the BESS facility, Project Substation, inverters, O&M building, fenceline, and gen-tie line structures. Access roads throughout the Preliminary Development Area will also be visible, as well as electrical collection lines if the hybrid option is used (see Section 4.1.1.2). Most of these facilities will also be low-profile (i.e., less than 20 feet in height). The Project Substation and the BESS facility will be of similar vertical profile as the existing Nobles Substation and two other wind farm facilities that are adjacent to the Land Control Area in Section 23. If the hybrid electrical configuration is selected, cabling will be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets would connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will be routed below-ground. The above-ground cabling would not likely be visible outside the facility due to a combination of line of sight with other components (arrays, inverters), distance from observer, and existing vegetative screening around residences.

Structures for the gen-tie line would be less than 150 feet in height and will be limited to the area between the proposed Project Substation and the Nobles Substation, which are approximately 500 feet apart. As noted in the description of the existing aesthetic environment, several transmission lines are already present in this area (see Map 7 – Existing Infrastructure and AADT). The gen tie structures will be visible from the local roadways but will be similar to the existing visual environment.

Figure 5.2.1-1: Monarch Avenue Looking North – Existing View

Figure 5.2.1-2: Monarch Avenue Looking North – With Solar Facility

Figure 5.2.1-3: County State Aid Highway 25 Looking South – Existing View

Figure 5.2.1-4: County State Aid Highway 25 Looking South – With Solar Facility

Figure 5.2.1-5: McCall Avenue Looking West – Existing View

Figure 5.2.1-6: McCall Avenue Looking West – With Project Substation and BESS

The solar arrays and BESS will be visible from public roads that surround and bisect the Land Control Area and from residential areas in Reading and the farmsteads that are directly adjacent to the Land Control Area. However, given the relatively low profile of the solar arrays and BESS, they will not be visible from long distances. Additionally, Summit Lake has designed the Project to avoid tree clearing and, as such, existing trees and windbreaks around residences will be maintained and provide some natural vegetative screening.

Operation of the Project will require downlit security lighting at the entrance of the Project and there will be downlit, switch controlled lights at each inverter for repair purposes.

5.2.2 Cultural Values

Cultural values include those perceived community attitudes or beliefs that provide a framework for community unity. Solar and BESS projects have the potential to affect public participation in community and regional events during both construction and operation.

Prior to European settlement, Native American groups lived in the Project Study Area for thousands of years. The Minnesota River Valley, which is about 65 miles north/northeast of the Project, and the tallgrass prairies south and north of the river were an important part of Native American culture and subsistence. The Upper Sioux Community Pezihutazizi Oyate (Dakota Nation) refer to the area around the Minnesota River as Pezihutazizi Kapi (the place where they dig for yellow medicine) and consider southwestern Minnesota to be their homeland (Upper Sioux Community Pezihutazizi Oyate, n.d.). The Lower Sioux Indian Community, the Mdewakanton Band of Dakota, also consider southwestern Minnesota to be their homeland and refer to Minnesota River valley as Cansa'yapi (where they marked the trees red) (Lower Sioux Indian Community, 2025).

As Euro-American settlers began moving into the region, Dakota peoples were often displaced and lost access to their homeland and traditional subsistence resources. By the mid- to late-1800s, Euro-American settlers began to dominate southwestern Minnesota, building homesteads and establishing agricultural fields across most of the landscape. The 1862 U.S./Dakota Conflict resulted in many Dakota being forcibly removed to reservations in other states. Today, the Upper Sioux Community Pezihutazizi Oyate reservation is located along the Minnesota River near Granite Falls (about 70 miles north of the Project) and the Lower Sioux Indian Community reservation is also located along the Minnesota River near Morton (about 65 miles northeast of the Project).

At present, the Project Study Area is a predominantly rural area within Nobles County, Minnesota. According to the U.S. Census Bureau (2023), the majority, roughly 53 percent, of the current population in Nobles County identifies as White only, not Hispanic or Latino with an ethnic background of European origin. However, a significant portion of the population, roughly 35 percent, identifies as Hispanic or Latino in Nobles County and the overall percentage of minority population in Nobles County is roughly 47 percent. Only about 1.7 percent of the current population in Nobles County identifies as American Indian and Alaska Native alone.

In addition to ethnic heritage, economic industry also influences the culture of the Study Area. As a predominantly rural county, agricultural production, including crop cultivation and animal

husbandry, are prevalent in Nobles County. According to the USDA Census of Agriculture, approximately 80 percent of the land in Nobles County is used for agricultural purposes (USDA, 2022). Additional information about the agricultural industry in Nobles County is presented in Section 5.3.1.

Examples of regional cultural events include events like the International Festival in Worthington. This festival has been going on for 30 years and includes Irish dancing, Native American fashion shows, Caribbean steel drum performances, mariachi performances, and lots of food and artisan booths to shop at (Explore Southwest Minnesota, 2024). Another example of a cultural event in Nobles County is the Nobles County Fair hosted each August by the City of Worthington (Nobles MN Fair, 2024). The Nobles County Fair prioritizes family fun for everyone. The fair includes a full carnival, food booths, grandstand events, and multiple 4-H competitions for things like livestock, photography, and botany (Explore Southwest Minnesota, 2024).

Hunting is also a popular cultural activity in the Project Study Area; information about how the Project may affect seasonal hunting is discussed in Section 5.2.10.

5.2.2.1 Impacts and Mitigation Measures

The Project would not impact public participation in the regional community cultural events noted above because it is located outside of the municipal areas where these events take place. Therefore, no impacts on cultural values are anticipated and no mitigation measures are proposed.

5.2.3 Displacement

The Land Control Area boundary was developed to specifically exclude residences, businesses, and other structures such as barns or sheds as shown on Map 6. However, several rural residences are surrounded by the Land Control Area boundary. These rural residences were intentionally carved out of the Land Control Area to ensure that the residential yards would be avoided by Project design.

5.2.3.1 Impacts and Mitigation

Summit Lake designed the Land Control Area to avoid residences, businesses, and other structures. As such, there is no potential for the proposed Project to displace residences. Because there are no occupied residences within the Land Control Area, there will not be any displacement; and no mitigation is proposed.

5.2.4 Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income in decisions related to the development, implementation, and enforcement of environmental laws, regulations, and policies (Minnesota Pollution Control Agency [MPCA], 2024a). The MPCA developed the Understanding Environmental Justice in Minnesota online screening tool to assist with identifying areas of concern for environmental justice (MPCA, 2024b). The online tool uses demographic and economic data from the U.S. Census Bureau at the census tract level to identify environmental justice communities.

In addition, recently passed Minnesota House Bill 7 includes an update in Minn. Statutes § 216B.1691, Subd. 1(e) that defines an environmental justice area 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 Land Control Area is within Census Tract 1051. Review of the MPCA's online tool indicates that there are no areas of environmental justice concern in Census Tract 1051 (MPCA, 2024b). Information relevant to the Minnesota definition of an environmental justice area is provided in Table 5.2.4-1.

Table 5.2.4-1 Environmental Justice Review [1]

County/Census Tract	Minn. Statutes § 216B.1691, Subd. 1(e) Criteria			
	Percent Non-white Population	Percent of Households with Income Equal to or Below 200 Percent of Poverty Level	Percent of Residents with Limited English Proficiency	Within Indian Country?
Census Tract 1051	18.6%	28.0%	4.1%	No

Source: MPCA, 2024b

As shown in Table 5.2.4-1, the presence of an environmental justice area is not indicated by the percentage of the non-white minority groups, income considerations, or the percentage of persons with limited English proficiency in Census Tract 1051. In addition, no federally recognized Indian Tribes or reservation lands are present in Nobles County or census Tract 1051.

5.2.4.1 Impacts and Mitigation Measures

No environmental justice areas are present within the Land Control Area based on review of the MPCA's Understanding Environmental Justice in Minnesota online screening tool. As the Project would not impact environmental justice communities, no mitigation measures specific to these communities are proposed.

5.2.5 Public Health and Safety

The Project is in rural Nobles County which according to the U.S. Census Bureau's Quick Facts website, has a population density of 31.1 persons per square mile of land area (U.S. Census Bureau, 2023). If emergency personnel were needed at the Project, multiple agencies would likely respond, depending on the situation. These would include the City of Wilmont Fire Department, Worthington Fire Department, Worthington Police Department, Nobles County Sheriff's Office, and Sanford Regional Hospital Ambulances, all of which are approximately 5 to 10 miles from the Project. Nobles County has an emergency manager that coordinates an emergency management program of the areas of the county that do not have emergency management organizations, including Summit Lake and Elk Townships (Nobles County, 2024a).

There are three towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Nobles County (The Radio Reference Wiki, 2020). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. For the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Summit Lake Solar Project; the nearest ARMER towers are located in the cities of Rushmore and Worthington, which are approximately 7.0 miles southwest and southeast of the Land Control Area, respectively (The RadioReference Wiki, 2020).

Tetra Tech, Inc. (Tetra Tech) conducted a Phase I Environmental Site Assessment of a majority of the Land Control Area in July 2024 (approximately 1,607 acres). The Phase I Environmental Site Assessment included a full review of federal and state databases to reveal any Historical Recognized Environmental Conditions or Controlled Recognized Environmental Conditions; none were identified. However, the Phase I Environmental Site Assessment did reveal two Recognized Environmental Conditions and one Business Environmental Risk (Tetra Tech, 2024a). Both Recognized Environmental Conditions identified solid waste areas around the southwest corner of parcel 17-0064-00. One solid waste area contained two 55-gallon drums in poor condition in which contents of the tanks were unknown. The other contained three 55-gallon drums in poor condition, also containing unknown contents. Because the contents are unknown, both solid waste areas presented a potential for impact to the soil and as a result are considered Recognized Environmental Conditions. The Business Environmental Risk identified was a concrete well with a cover on the northeast portion of parcel 17-0137-000. The landowner identified the well but there was no record of the well on the Minnesota Well Index. As a result, it is considered a Business Environmental Risk.

5.2.5.1 Impacts and Mitigation

Potential public health and safety issues during construction of solar generation and storage projects include injuries due to falls, equipment use, and electrocution. Construction activities will comply with local, state, and federal safety codes and regulations regarding installation of the Project facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Project; these include clear signage during all construction activities and fencing of all Project facilities to prevent public access. Hazard

mitigation measures will be utilized to avoid BESS fire safety risks including storing lithium-ion batteries in weather-proof enclosures that include fully integrated heating, ventilation, and air conditioning system for temperature control, sensors and controls for remote monitoring, and built-in fire detection and suppression

The Project will have minimal impact on the security and safety of the local populace in Nobles County. Summit Lake is gathering information to coordinate with all emergency and non-emergency response teams for the Project, including law enforcement agencies, local fire departments, ambulance services, and 911 services. The type and number of responding agencies will depend on the incident requiring emergency services. Summit Lake will develop an Operations and Emergency Action Plan that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior.

While there are ARMER towers in the Project Study Area (i.e., within 7.0 miles), the Project will not impact this communication system as Project facilities are proposed below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Summit Lake anticipates the structures for the gen-tie line to be less than 150 feet tall. As such, no mitigation is proposed.

The Phase I Environmental Site Assessment identified two Recognized Environmental Conditions and one Business Environmental Risk. The identified Recognized Environmental Conditions were directly adjacent to the Land Control Area, and the Business Environmental Risk was within the Land Control Area. Summit Lake will conduct an addition Phase I Environmental Site Assessment of the remaining portion of the 1,989.6-acre Land Control Area prior to the start of construction and final Project design will avoid impacting identified contaminated sites during construction and operation of the Project.

5.2.6 Electric and Magnetic Fields

Electric and magnetic fields are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors. Electric and magnetic fields can occur indoors and outdoors.

Project facilities that would generate electric and magnetic fields include the electrical collection lines and transformers installed at each inverter associated with the Solar Facility, BESS, and the gen-tie line. Electric and magnetic fields from electrical collection lines, regardless of whether they are below-ground or above-ground, transmission lines, and transformers dissipate rapidly with distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2002). Generally speaking, higher voltage electrical lines produce higher levels of electric and magnetic fields at the source before dissipating with distance.

Approximately 25,000 scientific papers have been published in the past 30 years regarding the health effects of exposure to electric and magnetic fields. The World Health Organization

performed a review of the current scientific literature and concluded that there is no evidence of low-level electric and magnetic fields causing negative health effects (World Health Organization, 2016). Guidelines are set to ensure members of the public are not exposed to potentially harmful levels of electric and magnetic fields. The internationally accepted guideline for the general public exposed to electric fields is 4.2 kV per meter (kV/m) and 833 milliGauss for magnetic fields (NIEHS, 2002).

5.2.6.1 Impacts and Mitigation

Levels of electric and magnetic fields from the Project as proposed in this Joint Application will be considerably below acceptable guidelines for public exposure. Project-specific electric and magnetic fields levels were not modeled for the 34.5 kV electrical collection lines, 345 kV overhead gen-tie line, or inverters and transformers. However, several studies have documented electric and magnetic fields exposure of various high voltage transmission lines. The NIEHS provides typical electric and magnetic fields levels for power transmission lines (NIEHS, 2002). For 230 kV transmission lines, which is lower voltage than the Project gen-tie line, electric fields directly below the transmission line were reported at 2.0 kV/m before dissipating to 1.5 kV/m at 50 feet (the approximate edge of right-of-way). Similarly, average magnetic fields directly below the 230 kV transmission line were reported at 57.5 milliGauss before dissipating to 19.5 milliGauss at 50 feet (NIEHS, 2002). For 500 kV transmission lines, which is higher than the voltage of the Project gen-tie line, electric fields directly below the transmission line were reported at 7.0 kV/m before dissipating to 3.0 kV/m at 65 feet (approximate edge of right-of-way). Similarly, average magnetic fields directly below the 500 kV transmission line were reported at 86.7 milliGauss before dissipating to 29.4 milliGauss at 65 feet (NIEHS, 2002).

A Canadian study of collection lines at a wind facility measured electric and magnetic fields of the Project's 27.5 kV collection lines, slightly lower voltage than the electrical collection lines proposed for the Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at one meter above ground and up to 16.5 milliGauss directly beneath overhead 27.5 kV lines (McCallum et al., 2014). As demonstrated here, both electric and magnetic fields will be well below the international guidelines of 4.2 kV/m and 833 milliGauss, respectively. Additionally, since the transformers are enclosed in a grounded metal case (i.e., shielded), they typically do not emit much electric and magnetic fields.

Stray voltage from electrical facilities is often a concern in agricultural areas, particularly on dairy farms. Stray voltage is an unintended transfer of electricity between two grounded objects and is typically caused by improperly grounded electrical equipment in farm buildings or by a faulty utility connection. All electrical components in the Project, including inverters and transformers, will be grounded in accordance with NESC. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the Project will be negligible. Should a fault occur during operation of the Project, it would be quickly identified by Project monitoring systems and corrected.

The nearest residence to the solar arrays is 228 feet away; the nearest residence to an inverter, electrical collection line, and transformer is approximately 609 feet away; the nearest residence to the gen-tie line is 835 feet away; and the nearest residence to the BESS is approximately 261 feet

away (see Map 6). At this distance, both electric and magnetic fields would have dissipated to background levels before reaching the residence. As such, impacts will be negligible and no mitigation measures are proposed.

5.2.7 Noise

Noise is measured in units of decibels 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 the average human ear does not hear as well, such as very high and very low frequencies.

The Project is located in an agricultural and rural residential area. Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. According to American National Standards Institute / Acoustical Society of America S12.9-2013/Part 3, rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA.

Background noise in the area surrounding the Project is typically a result of farming equipment/operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined below in Table 5.2.7-1.

Table 5.2.7-1 Common Noise Sources

Sound Pressure Level (dBA)	Common Noise Source
110	Rock band at 5 meters
100	Jet flyover at 300 meters
90	Gas lawn mower at 1 meter
85	Food blender at 1 meter
75	Shouting at 1 meter
70	Vacuum cleaner at 3 meters
60	Normal speech at 1 meter
55	Large business office
50	Dishwasher in next room, quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quite rural nighttime
0	Threshold of hearing

Source: MPCA, 2015

The MPCA has the authority to adopt noise standards pursuant to Minnesota Statute Section 116.07, subd. 2. The adopted standards are set forth in Minnesota Rule Chapter 7030 as A-weighted noise levels. Different standards are specified for daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L_{10}) and 50 percent of

any hour (L_{50}). Household units, including farmhouses and rural residential areas, are included in Noise Area Classification 1. Table 5.2.7-2 shows the MPCA state noise standards.

Table 5.2.7-2 MPCA State Noise Standards - Hourly A-Weighted Decibels

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

Source: Minnesota Rules 7030.0040

Noise sensitive areas near the Land Control Area consist of residential homes, a church, and a community center. These noise sensitive areas are all located in the unincorporated community of Reading and so are held to the Noise Area Classification 1 limits shown in Table 5.2.7-2. The MPCA provides guidance on noise propagation and attenuation in the 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. 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 approximately 3 dBA. The human ear can usually tell the difference when sound changes by 3 dBA, and a 5 dBA change is clearly noticeable.

The Applicant identified noise sensitive areas within 3,200 feet of the Land Control Area and summarized the proximity of these noise sensitive areas to the Land Control Area in Table 5.2.7-3.

Table 5.2.7-3 Proximity of Noise Sensitive Areas within 3,200 feet of the Land Control Area

Radial Distance from Site to Receptors (feet)	Number of Receptors
<100	4
100 - 200	17
200 - 400	21
400 - 800	13
800 - 1,600	8
1,600 - 3,200	16

5.2.7.1 Impacts and Mitigation Measures

During construction, noise will be emitted by construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring on a given day. Construction associated noise will likely be perceptible at adjacent residences (see Map 8 - Noise Receptors). Grading equipment, bobcats, and other construction equipment are anticipated to emit noise between 76-85 dBA at 50 feet (U.S. Department of Transportation Federal Highway Administration, [USDOT], 2017). Noise associated with these types of equipment will primarily occur during the initial site preparation, which will include grading and access road construction and is expected to last approximately six weeks. Summit Lake anticipates pile driving of the rack

supports to create the most noise measured at 101 dBA at 50 feet (USDOT, 2017). Table 5.2.7-4 shows the typical sound pressure levels in dBA at 50 feet for various construction equipment (USDOT, 2017).

Table 5.2.7-4 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
Source: USDOT, 2017	

Installation of each rack support with pile driving takes between 30 seconds to 2 minutes depending on the soil conditions; Summit Lake anticipates this activity will take up to 8 weeks across the site. Finally, installation of the solar panels on the tracking similar would emit noise levels similar to general construction equipment described above. Typically, a forklift is used to place individual panels on the tracking rack system. The noise from any of these construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Note that construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location. These noise impacts will be temporary and limited to daytime hours.

The main source of noise from the Project during operation will be from the inverters, which include the air conditioners housed in each inverter, and, to a lesser extent, from the transformers and rotation of the tracking system. For the BESS units, the main source of noise will be from the cooling fan. Table 5.2.7-5 summarizes the anticipated distance to reach the most stringent MPCA noise standard (50 dBA) from a range of inverters and trackers under consideration for use at the Summit Lake Project. Table 5.2.7-5 also provides the dBA at 50 feet so noise levels can be calculated at greater distances.

Table 5.2.7-5 Operational Unit Noise Levels

Type	Equipment Model	Distance to 50 dBA	Distance to Nearest Residence (ft)	Noise Level at Nearest Residence (dBA)
Inverter	TMEIC Solar Ware Ninja PVU-L0920GR	58 feet	609	29.6
Tracker	ATI DuraTrack HZ v3	52 feet	228	37.1
BESS	TESLA Megapack 2 XL	292 feet	261	50.7

Table 5.2.7-5 Operational Unit Noise Levels				
Type	Equipment Model	Distance to 50 dBA	Distance to Nearest Residence (ft)	Noise Level at Nearest Residence (dBA)
[1] Noise estimates from the manufacturer are preliminary and conservative; therefore, the estimated distance to a dBA of 50 and dBA at 50 feet represent the worst-case scenario.				

The results of noise modeling conducted by technology manufacturers outlined in Table 5.2.7-5 show that noise levels will be less than 50 dBA at the nearest residence. Because the inverters are located within the middle of the solar arrays, the noise levels from the Solar Facility equipment are not expected to be discernible from background noise levels at homes in the vicinity. Map 8 shows the location of the residences near the Project. During construction, Summit Lake plans to limit construction to daylight hours.

Although initial noise calculations indicate that sound levels from the BESS may marginally exceed 50 dB at the nearest noise receptor, these calculations represent conservative, worst-case estimates that build in safety margins. The actual operational noise from the BESS will be lower than these estimates due to operational constraints or noise mitigation. Summit Lake is committed to ensuring compliance with the Minnesota state noise standard of 50 dBA and will implement any necessary measures to maintain noise levels below this threshold during facility operation. Possible measures include, but are not limited to, adding baffle kits to BESS units to decrease operational noise, constructing earthen berms or acoustic barriers along the site perimeter, and adjusting operational settings to meet the Minnesota state noise standard.

5.2.8 Public Services and Infrastructure

5.2.8.1 Public Services

Public services are those typically provided by a government entity to its citizens and those services are used to benefit public health and safety. These services can include emergency services, potable water, sanitary systems, and utilities. Rural water systems including Lincoln-Pipestone Rural Water, Red Rock Rural Water, and Rock County Rural Water provide water to residents of Nobles County (Nobles County, 2001). Sewage is serviced by residential septic tanks and/or drain fields. Approximately five telephone service providers and 16 broadband providers operate in Nobles County. (Minnesota DOC, 2024; Minnesota Department of Employment and Economic Development [MN DEED], 2023).

5.2.8.2 Transportation

The major roadways in the area are County State Aid Highway 25 which intersects the Land Control Area, Interstate 90 approximately 4.5 miles south of the Land Control Area, and U.S. Highway 59 approximately 4.5 miles east of the Land Control Area. Other than County State Aid Highway 25, which intersects the southwestern portion of the Land Control Area, roads that surround or bisect the Land Control Area are local county or township roads. Roads that border or intersect the Land Control Area include Lais Avenue, McCall Avenue, Monroe Avenue, 170th Street, 180th Street, 190th Street, 198th Street, and 200th Street. Roads within a mile of the Land

Control Area include: 160th Street, 197th Street, 199th Street, 210th Street, Moser Avene, Monarch Avenue, and Reading Avenue, Nystrom Avenue, and Knauf Avenue.

Annual Average Daily Traffic (AADT) counts from Minnesota Department of Transportation's (MNDOT's) Traffic Mapping Application are provided for roads that surround or bisect the Land Control Area in Table 5.2.8-1 and displayed on Map 7 – Existing Infrastructure and AADT (MNDOT, 2024a). AADT is not available for some county and township roads and, as such, these roads are not included in the table.

Table 5.2.8-1 Annual Average Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
McCall Avenue (Sequence numbers: 16217, 16218, 16220)	2023	356 (16218), 503 (16217), 243 (16220)
County State Aid Highway 25	2023	1,018
200th Street (Sequence numbers: 16215, 16219)	2023	376 (16215), 394 (16219)
Nystrom Avenue	2011	215
Source: MNDOT, 2024a		

There will be a total of 14 access points to the Project from public roadways, 13 to the Solar Facility and one access point to the Project Substation and BESS.

There are no railroads within one mile of the Land Control Area. There is an Ellis & Eastern regional railway approximately 6.5 miles south of the Land Control Area that runs east-west and Union Pacific Railroad Company approximately 8.4 miles southeast of the Land Control Area (MNDOT, 2024b).

The nearest Federal Aviation Administration-registered airport to the Summit Lake Project is the Worthington Municipal Airport located approximately 2.0 miles north of Worthington and 7.0 miles southeast of the Land Control Area. This airport operates two asphalt runways and is used primarily for transient and local general aviation (AirNav, 2024). Aerial imagery was reviewed to identify any private landing strips within a mile of the Land Control Area, none were identified.

5.2.8.3 Emergency Services

If emergency personnel were needed for the Summit Lake Project, multiple agencies would likely respond, depending on the situation. These agencies include the City of Wilmont Fire Department, Worthington Fire Department, Worthington Police Department, Nobles County Sheriff's Office and Sanford Regional Hospital Ambulances.

5.2.8.4 Local Utilities

Rural water systems including Lincoln-Pipestone Rural Water, Red Rock Rural Water, and Rock County Rural Water provide water to residents of Nobles County (Nobles County, 2001). No active wells or septic fields are present within the Land Control Area based on a review of Minnesota Department of Health (MDH) records (MDH, 2024a). Electric Service in the study area is provided by Nobles Cooperative Electric (Commission, n.d.)

5.2.8.5 Regional Utilities

The Project is located adjacent to the existing Nobles Substation. There are three transmission lines at least partially within the Land Control Area, and two transmission lines that are adjacent to the Land Control Areas (Energy Information Administration, 2022). The transmission lines interconnect to the Nobles Substation from the west, south, and east and the approximate locations are displayed on Map 7. Two of the electric lines operate at 345 kV, one operates at 115 kV, one operates at 161 kV, and one does not have its voltage publicly available. Three of the lines are operated by Xcel Energy and two of the lines do not have their operators listed in publicly available data.

The National Pipeline Mapping System was searched to assess whether pipelines are present within or adjacent to the Land Control Area. National Pipeline Mapping System pipeline data consists of gas transmission pipelines and hazardous liquid pipelines jurisdictional to the Pipeline and Hazardous Materials Safety Administration. There are no pipelines in the Land Control Area. One natural gas transmission pipeline is mapped approximately 8.6 miles southeast of the Land Control Area and generally runs from east to west (National Pipeline Mapping System, 2024).

The Nobles Wind Farm is located southwest of the Land Control Area and has been in operation since 2010. The Nobles Wind Farm is owned and operated by Xcel Energy and provides 201 MW of energy to the electrical grid via the wind farm Point of Interconnection, the Nobles Substation.

5.2.8.6 Public Communications

Landline telephone service in the Study Area is provided to farmsteads, rural residences and businesses by Centruytel of Minnesota and Frontier Communications of Minnesota (Minnesota DOC, 2024). Cellular services in the Study Area are provided by carriers including AT&T, T-Mobile and Verizon. Cable service providers include Bluepeak, Mediacom and Vast Broadband. Other services that are operating in Nobles County including, fixed wireless, satellite, Digital Subscriber Line, and fiber, include Centurylink, Consolidated Communications Fidium, Federated Broadband, Frontier, HughesNet, Lismore Cooperative Telephone Company, LTD Broadband, Midcontinent Communications, MVTV Wireless, Premier Communications, Rise Broadband, Southwest Minnesota Broadband Services, Starlink, Viasat, Inc., Woodstock Communications and Woodstock Wave (MN DEED, 2023).

5.2.8.7 Emergency Communications

There are three towers that are a part of the ARMER in Nobles County (The RadioReference Wiki, 2020). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. For the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Summit Lake Solar Project; the nearest ARMER towers are located in the cities of Rushmore and Worthington, which are each approximately 7 miles southwest and southeast of the Land Control Area, respectively (The RadioReference Wiki, 2020).

5.2.8.8 Impacts and Mitigation Measures

Public Services and Local Utilities

Summit Lake will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Summit Lake will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design of the Project will minimize and avoid impacts to underground utilities; if conflicts are unavoidable, Summit Lake will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start.

Transportation

Access to the Preliminary Development Area will be via existing county and township roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Preliminary Development Area are shown on Map 7. During the construction phase, temporary traffic impacts are anticipated on some public roads near the Preliminary Development Area, primarily from construction personnel traveling to and from the Project and slow-moving construction vehicles.

Construction traffic will use the existing county roadway system to access the Preliminary Development Area and deliver construction materials and personnel. Traffic during construction is estimated to be approximately, on average 150-180, pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 18 to 49 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on stage of construction and delivery timeline of equipment. Overweight or oversized loads are unlikely. If they are required, Summit Lake will obtain the appropriate approvals prior to construction.

For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day, AADT. Since the area roadways have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However, these delays should be minimal for the relatively short construction delivery period. Where collection and communication lines cross county roads, the lines will be directionally bored underneath the road to avoid surface impacts and traffic interruptions.

After construction is complete, traffic impacts during the operations phase of the Project will be negligible. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the facilities as needed, but traffic function will not be impacted as a result. Additionally, Summit Lake is also coordinating with Nobles County and the townships to protect local roads.

Summit Lake used the Federal Aviation Administration Notice Criteria Tool to determine the need for filing 7460-1 Notice of Proposed Construction forms (see Appendix B). The results indicated the Project does not exceed the Notice Criteria. As such, Project facilities will not exceed

obstruction standards and would not be a hazard to air navigation. No mitigation measures are anticipated or proposed for air traffic.

Emergency Services

Construction and operation of the Summit Lake Project will have minimal impacts on the security and safety of the local populace. Summit Lake will develop an Operations and Emergency Action Plan that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response and fire response equipment on site, extreme weather, injury, and criminal behavior. Additionally, construction will comply with local, state, and federal regulations regarding installation of the Project facilities and standard construction practices. Established industry safety codes and procedures will be followed during and after construction of the Project; these include clear signage during all construction activities and fencing of all Project facilities to prevent public access. Hazard mitigation measures will be utilized to avoid BESS fire safety risks including storing lithium-ion batteries in weather-proof enclosures that include fully integrated system of heating, ventilation, and air conditioning for temperature control, sensors, and controls for remote monitoring, and built-in fire detection and suppression.

Regional Utilities

As described in Section 2.1, the Project will interconnect into the Nobles Substation, which is associated with the Nobles Wind Farm and adjacent to the Land Control Area. The Project is not expected to affect existing transmission lines that interconnect to this substation. However, during the actual interconnection process, there is a slight possibility that customers may experience brief flickering or very short outages as the Nobles Substation is temporarily shut down and service is being restored. The timing and duration of any service interruptions would be determined and communicated to consumers by the interconnecting utility.

Public Communications

Summit Lake does not anticipate any impacts to existing utilities, such as public communication towers. If cell tower signal or broadband interference is identified during or after construction of the Project, Summit Lake will address the interference on a case-by-case basis and in accordance with the anticipated conditions of the Site Permits.

Emergency Communications

While there are ARMER towers in the Project Study Area (i.e., within 7.0 miles), the Project will not impact this communication system as Project facilities are proposed below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Summit Lake anticipates the structures for the gen-tie line to be less than 150 feet tall. As such, no mitigation is proposed.

5.2.9 Land Use and Zoning

5.2.9.1 Land Use

Land use/cover information from the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) was reviewed to identify existing land uses in the Land Control Area (Dewitz and USGS, 2021). Table 5.2.9-1 presents the NLCD land use/cover categories within the Land Control Area and Map 9 provides an overview of the NLCD land use/cover types in the Land Control Area.

Table 5.2.9-1 Land Use Within the Land Control Area

Land Use Type	Acres in Land Control Area	Percent of Total Acreage
Agricultural [1]	1,888.9	94.9%
Developed	82.4	4.1%
Forested	0.4	< 0.1%
Herbaceous	2.1	0.1%
Emergent Herbaceous Wetlands	14.9	0.8%
Barren Land	0.7	< 0.1%
Open Water	0.2	< 0.1%
PROJECT TOTAL	**1,989.6**	**100.0%**

[1] Agricultural land consists of the NLCD categories cultivated cropland and hay/pasture.
Source: Dewitz and USGS, 2021

Most of the Land Control Area is within a rural landscape, and the NLCD data indicates that the primary land use category is agricultural (1,888.9 acres/94.9 percent). The remainder of the Land Control Area is characterized as developed land (82.4 acres/4.1 percent), emergent herbaceous wetlands (14.9 acres/0.8 percent), and smaller amounts of herbaceous land (2.1 acres/0.1 percent), forested land (0.4 acre/less than 0.1 percent), barren land (0.7 acre/less than 0.1 percent), and open water (0.2 acre/less than 0.1 percent).

Agricultural land in the Land Control Area is used for row-crop production of predominantly corn and forage crops (USDA, 2022). Developed land identified within the Land Control Area generally consists of public roads, and a few small areas around the municipal boundary of Reading. Forested land identified within the Land Control Area consists of windbreaks surrounding farmsteads that are adjacent to the Land Control Area. The small amount of barren land identified in the NLCD data is associated with a roadside ditch along McCall Avenue. Emergent herbaceous wetlands, herbaceous land, and open water identified in the NLCD data are concentrated in Township 103N, Range 41W, in the southeast corner of Section 14 and the southwest corner of Section 13. A detailed and more accurate description of wetlands within the Land Control Area, including a summary of the wetland field delineation, is provided in Section 5.5.5.

A significant amount of development is present in the area directly south of the Land Control Area (refer to Map 9). The southern Land Control Area boundary overlaps the north and east municipal boundary of Reading, and as such several residences are adjacent to the Land Control Area. In addition, several farmsteads and concentrations of agricultural outbuildings are directly adjacent

to the Land Control Area, generally situated near public roads. A detailed list of residences within one mile of the Land Control Area is provided in Table 5.2.1-1.

Commercial and industrial developments are also present within the Town of Reading and along County State Aid Highway 25. For example, the Nobles Substation and two other aboveground facilities associated with the wind farm are present in Section 23, just north of the location of the Project Substation and BESS facility. Access to the Nobles Substation is from County State Aid Highway 25, while access to the other two facilities is off of McCall Avenue. Several existing transmission lines interconnect to the Nobles Substation from the west, south, and east. Finally, the Nobles Wind Farm is directly south of the southernmost portion of the Land Control Area in Section 22.

5.2.9.1 Zoning

A comprehensive plan is a land-use and community-planning tool used to guide the direction and intent of growth for a county or municipality. Generally, comprehensive plans discuss existing and future land uses, population and housing trends, economic development goals and opportunities, and environmental characteristics of the county or municipality.

The Nobles County Comprehensive Plan and zoning ordinance were reviewed to identify any conflicts with the preliminary Project design as presented in this Joint Application. According to Nobles County zoning information, the Land Control Area is zoned as Agricultural Preservation and Rural Residential (Nobels County, 2001). According to the Nobles County Solar Energy Ordinance, the definition of a Solar Energy System includes both solar energy generating and storage equipment; given the size of the Solar Facility and BESS, the Project is specifically considered a Large Solar Energy System according to the Nobles County Solar Energy Ordinance. The Nobles County Solar Energy Ordinance states that Large Solar Energy Systems are conditionally permitted in the Agricultural Preservation and Rural Residential Districts. Summit Lake corresponded with Nobles County to acquire zoning information in GIS format, but this information is not available at this time. Instead, Nobles County provided zoning information based on the townships, ranges, and sections where the Project is located.

The Nobles County Comprehensive Plan (2001) states that, similar to other counties in southwestern Minnesota, agricultural production will continue to be the predominant industry in the county. However, the plan lists a number of opportunities for industry diversification that would contribute to future economic growth, including opportunities related to renewable and green energy sources.

Summit Lake is coordinating with Nobles County and Summit Lake and Elk Townships to confirm that the Project is in alignment with applicable current and future zoning and to obtain any required permits or approvals.

5.2.9.2 Impacts and Mitigation Measures

Within the 1,989.6-acre Land Control Area, approximately 1,481.6 acres will be needed to construct and operate the Project, based on the preliminary design described throughout this Joint Application; this 1,481.6-acre area is referred to as the Preliminary Development Area and includes

both the Solar Facility and the BESS (see Figure 2.1-1). Table 5.2.9-2 provides the total acres of each USGS NLCD land use category within the Preliminary Development Area.

Table 5.2.9-2 Land Use within the Preliminary Development Area

Land Use Type	Acres in Preliminary Development Area	Percent of Preliminary Development Area
Agricultural [1]	1,479.4	99.8%
Developed	1.6	0.1%
Forested	--	--
Herbaceous	--	--
Emergent Herbaceous Wetlands	0.6	< 0.1%
Barren Land	< 0.1	< 0.1%
Open Water	--	--
PROJECT TOTAL	**1,481.6**	**100%**

[1] Agricultural land consists of the NLCD categories cultivated cropland and hay/pasture.
Source: Dewitz and USGS, 2021.
Note: A double dash indicates that this land use/cover category is not present in the Preliminary Development Area.

The predominant land use type within the Preliminary Development Area is agricultural land (1,479.4 acres/99.8 percent). Agricultural land will be converted to solar energy generation and energy storage use for the life of the Project. The conversion of agricultural land within the Preliminary Development Area will have a minimal impact on the availability of agricultural land in Nobles County. As discussed further in Section 5.3.1, of the 457,658 acres in Nobles County, approximately 80 percent (approximately 366,330 acres) are currently used for agricultural production (U.S. Department of Agriculture [USDA], 2022). Conversion of 1,479.4 acres of land that is currently used for agricultural production to operate the Project would reduce the amount of actively cultivated agricultural land in the county by less than one percent.

A small amount of developed land (1.6 acres/0.1 percent) is also present in the Preliminary Development Area, primarily associated with public roads and a few smaller developed areas around the municipal boundary of Reading. Construction and operation of the Project is not anticipated to impact developed land. Solar facilities will be setback from the county and township road rights-of-way that bisect the Project. Electrical cables connecting the blocks of solar arrays will be directionally bored under public roadways. Similarly, areas categorized as herbaceous, emergent herbaceous wetland, and barren land will not be impacted by the solar facility or the BESS facility (see Table 5.2.9-2).

As noted above, development of large solar energy and battery storage systems within the Nobles County Agricultural Preservation and Rural Residential Districts are conditionally permitted uses (Nobles County, 2021). However, because the Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the Site Permits are the only land use permit required.

5.2.10 Recreation

The Applicant reviewed publicly available GIS information to identify recreation areas that could be affected by the Project. No federal, state, county, or locally owned or managed parks, forests, refuges, recreation areas, or wildlife conservation areas were identified within the Land Control Area. In addition, a review of recent aerial imagery indicates that no parks are located within the Town of Reading. The nearest public recreation area is the Groth Wildlife Management Area, which is about 0.5 mile north of the northernmost portion of the Land Control Area (see Map 10).

A segment of the Nobles County Trails snowmobile trail bisects a narrow portion of the Land Control Area in Township 103N, Range 41W, Section 23. This segment of the snowmobile trail travels along the ditch associated with County State Aid Highway 25. Another segment of the Nobles County Trails travels along 200th Street parallel to the Land Control Area boundary in Section 24; the snowmobile trail is shown on the opposite side of 200th Street from the Land Control Area.

5.2.10.1 Impacts and Mitigation

Construction and operation of the Project is not anticipated to impact recreational opportunities on designated public lands as none are located within or adjacent to the Land Control Area. However, construction of the Project is likely to overlap with various Minnesota hunting seasons. The timing of construction will be communicated to landowners within and adjacent to the Land Control Area in advance and the Land Control Area would be off limits to hunting during active construction. After construction is complete, hunting in areas adjacent to the Project would be allowed to continue as before, but no hunting would be allowed within the Project fencelines. No impacts to recreational opportunities are anticipated and no mitigation measures are proposed.

5.2.11 Socioeconomics

Socioeconomic information for the Project Study Area is based on data from the U.S. Census Bureau's QuickFacts and Explore Census Data websites. The U.S. Census websites provide a wide variety of data points. The discussion herein 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 of the Project Study Area and represent the socioeconomic characteristics that potentially could be affected by construction and operation of the Project include total population in 2020 and 2023, percent population change, per capita income, the percentage of the population below poverty level, the unemployment rate, and the top three industries (see Table 5.2.11-1).

Table 5.2.11-1: Socioeconomic Characteristics of the Project Study Area

Demographic Category	Minnesota	Nobles County
2020 Census Population (April 1, 2020) [1]	5,706,804	22,289
Population Estimates July 1, 2023 [1]	5,737,915	21,727
Percent Change 2010 - 2023[1]	+0.5%	-2.5%
Per Capita Income (U.S. Dollars) [1]	$44,947	$29,786
Unemployment Rate (%) [2]	3.9	3.0

Table 5.2.11-1: Socioeconomic Characteristics of the Project Study Area		
Demographic Category	**Minnesota**	**Nobles County**
Persons in Poverty (%) [1]	9.3	11.1
Top Three Industries [2, 3]	E, M, R	M, E, R

[1] U.S. Census Bureau, 2023

[2] U.S. Census Bureau, 2022

[3] Industries are defined under the 2012 North American Industry Classification System and abbreviated as follows: E = Educational, Health and Social Services; M = Manufacturing; R = Retail Trade;

Data are provided at the county level to characterize the socioeconomics in the Project Study Area and at the state level for the purpose of comparison. The Project is in a rural area within Summit Lake and Elk Townships and no incorporated communities are located within the Land Control Area. The nearest metropolitan area is Sioux Falls, South Dakota which is approximately 50 miles southwest of the Project. The Land Control Area is directly adjacent to the boundary of the unincorporated community of Reading; because Reading is unincorporated, U.S. Census Bureau information is not available for this community. The nearest metropolitan area is Sioux Falls, South Dakota which is approximately 50 miles southwest of the Project.

Based on the U.S. Census Bureau data, the population of Nobles County is 21,727 persons, which represents less than 1 percent of the total population of Minnesota. The per capita income of Nobles County is $29,786, which is significantly lower than the state average. The unemployment rate in Nobles County (3.0 percent) is lower than the state average of 3.9 percent; however, the percentage of individuals classified as living below the poverty level in Nobles County is higher than the state average at 11.1 percent and 9.3 percent, respectively. The primary industries in Nobles County are classified as manufacturing (24.6 percent), followed by educational services, and health care and social assistance (20.8 percent), and retail trade (10.7 percent) (U.S. Census, 2022).

According to the Experience Sioux Falls website, 57 hotels and motels, three bed and breakfasts, and five campgrounds are available in the greater Sioux Falls area (Experience Sioux Falls, 2024). These residence and temporary housing statistics suggest the local area could support an influx of construction workers, if needed. In addition, there are three hotels and one motel in the City of Worthington and two hotels in the City of Luverne, both of which are closer to the Project, that could provide lodging for construction personnel (Booking.com, 2025).

5.2.11.1 Impacts and Mitigation

The Project is designed to be socioeconomically beneficial to the landowners, local governments, and communities. Landowner compensation is established by voluntary leases or purchase agreements between the landowners and Summit Lake for Summit Lake's lease or purchase of the land.

Construction of the Project would provide temporary increases to the revenue of the Study Area through increased demand for lodging, food services, fuel, transportation and general supplies. Temporary construction jobs will generate indirect economic benefits for the Study Area, as employees spend their income on local goods and services and pay local sales tax. During peak

construction, an estimated 250 jobs will be created, with an average of 175 jobs throughout the period of construction.

The Project will also create new, temporary local job opportunities for various trade professionals that 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 Nobles 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 because 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 and BESS must be comprised of Minnesota licensed electricians because most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

NG Renewables, Summit Lake's parent company, has a strong track record of using local labor for construction. In a recent example, for construction of the Louise Solar Project in Mower County, Minnesota (Commission Docket No. IP-7039/GS-20-647), 90 percent of the total labor hours (106,261 of 117,800) were performed by Minnesota residents (as defined in Minnesota Statutes section 290.01, Subd. 7).

Summit Lake will issue a Request for Proposals to find contractors to construct the Solar Facility and BESS. In the Request for Proposals, Summit Lake will include a preference for contractor bids that propose to use local personnel to the greatest extent feasible while also aligning with the Project's budget, timeline, industry standards, and corporate safety policies. The contractor selected for the Project will be required to work with appropriate entities (e.g., labor unions, local subcontractors, and other vendors) to develop and implement a construction staffing model that maximizes local hiring and the local economic benefits for the Project, while ensuring the Project is safely built on time and on budget.

Effects on temporary or permanent housing for construction personnel and long-term personnel are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities in Worthington, Luverne, or in Sioux Falls, South Dakota. The operations and maintenance of the facility will require approximately four long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Nobles County, and within the Sioux Falls metropolitan area or the City of Worthington, to accommodate construction laborers and long-term personnel.

In general, the socioeconomic impacts associated with the Project will be positive; therefore, no mitigative measures are proposed. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. The Project will provide production tax payments to Nobles County of approximately $400,500 annually over 30 years. Additionally, Summit Lake and Elk Townships will receive approximately $100,100 annually over 30 years. For a total annual payment of approximately $500,500 to local

governments. In addition, lease payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production.

5.3 Land Based Economies

5.3.1 Agriculture

According to the USDA's 2022 Census of Agriculture, of the 457,658 acres that comprise Nobles County, 366,330 acres (80 percent) are actively cultivated farmland. A total of 938 individual farms are located in Nobles County, with the average farm size at 391 acres. The top crops (in acres) cultivated in Nobles County include corn, foraging crops (hay and haylage, grass silage, and greenchop), and oats. Cattle tops the list of livestock inventory in Nobles County, followed by hogs and pigs, poultry, and sheep and lambs (USDA, 2022).

The market value of agricultural production in Nobles County in 2022 was approximately $761 million. Livestock, poultry, and their products accounted for approximately 62 percent of the total value of agricultural production, while crop sales accounted for the remaining 38 percent (USDA, 2022). While cultivated cropland is present in the Land Control Area, no areas used for animal husbandry or specialty crop production are located within the Land Control Area.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses. Current land use could be row crop agricultural production, pasture, woodland, or other land uses; not all prime farmland is currently used for agricultural production. Details about prime farmland within the Land Control Area are provided in Section 5.5.4.

During early coordination with Nobles County, the Nobles County Drainage System Coordinator (Drainage System Coordinator) noted that several county-owned drainage systems are present within the Land Control Area. The Drainage System Coordinator expressed a desire to maintain sufficient area around the existing drainage tiles to allow for routine maintenance and repair and to avoid damage to the drain tiles. Summit Lake is coordinating with Nobles County and a drain tile contractor, ISG, to identify ways to allow the Project and the existing drain tiles to coexist for the life of the Project. As part of the initial coordination with ISG, it was indicated that the amount of space necessary to work on public drain tile typically ranges from 50-75 feet from the drain tile centerline. Accordingly, setbacks ranging between 50-75 feet from the public drain tile center line should be adequate to provide the County with continued access to repair, maintain and replace public drain tile. ISG is also in the process if performing a feasibility study to determine whether some public drain tile can be abandoned or moved to accommodate the Project. The feasibility study should also provide the necessary information to determine whether a 50-or 75-foot setback, or some combination thereof, from the center line of public drain tile should be applied across the Project. Summit Lake will continue to coordinate with Nobles County during the site permitting process regarding setbacks and potential alterations of the public drain tile system within the Project. Upon successfully securing site permits for the Project, Summit Lake anticipates seeking permission from Nobles County to alter the location of public drain tile based on the results of the ISG feasibility study as well as input from Nobles County and affected landowners. Additional details about early coordination with Nobles County are provided in Section 6.0 and copies of correspondence are provided in Appendix B.

5.3.1.1 Impacts and Mitigation Measures

Within the 1,989.6-acre Land Control Area, approximately 1,481.6 acres will be needed to construct and operate the Project, based on the preliminary design described throughout this Joint Application. Approximately 1,479.4 acres (99.8 percent) of the land in the Preliminary Development Area is agricultural land according to the USGS NLCD data (see Table 5.2.9-2). Agricultural land in the Preliminary Development Area will be converted to solar energy generation and battery storage use for the life of the Project. The conversion of agricultural land within the Preliminary Development Area will have a minimal impact on the availability of agricultural land in Nobles County. Of the 457,658 acres in Nobles County, approximately 80 percent (approximately 366,330 acres) are currently used for agricultural production (USDA, 2022). Conversion of 1,479.4 acres of agricultural land to construct and operate the Project would reduce the amount of agricultural land in the county by less than one percent and will not result in a significant impact to agricultural-based economies in the Project Study Area.

Due to the amount of agricultural land in the Preliminary Development Area, Summit Lake developed an Agricultural Impact Mitigation Plan for the Project. Summit Lake met with the Minnesota Department of Agriculture (MDA) on November 12, 2024, to introduce the Project and discuss the contents of the Agricultural Impact Mitigation Plan and any site-specific measures that should be included. The Project Agricultural Impact Mitigation Plan incorporates best management practices (BMPs) for siting; pre-construction, construction, and post construction methods; operational procedures; and decommissioning and restoration procedures that will be used to avoid and minimize impacts on soil and site productivity such that pre-construction agricultural productivity is rapidly returned to the site following Project decommissioning. A copy of the Agricultural Impact Mitigation Plan was sent to MDA for review on December 16, 2024. The MDA responded on December 24, 2024, and commented that the AIMP was very well done and they have no comments. A copy of the Agricultural Impact Mitigation Plan is provided in Appendix F and copies of correspondence with MDA are provided in Appendix B.

Agricultural production would continue in the surrounding areas during construction and operation of the Project. The revenue lost from removing land from agricultural production will be offset by the leases and purchase options between Summit Lake and the landowners. Areas disturbed during construction will also be repaired and restored to pre-construction contours and characteristics to the extent practicable. This restoration will allow the Project's land surfaces to drain properly, blend with the natural terrain, re-vegetate, and avoid soil erosion. Agricultural production could be allowed to continue in the area within the Land Control Area but outside the fence of the Preliminary Development Area during construction and operation of the Project. Any areas outside of the fenceline that are not used for agricultural production will be seeded with the permanent seed mix in accordance with the Agricultural Impact Mitigation Plan. Similarly, if haying or grazing vegetation management strategies described in the Vegetation Management Plan are used, some agricultural activities would continue within the Preliminary Development Area.

Based on discussions with Nobles County, Summit Lake is aware of county-owned drain tile in the Land Control Area. Summit Lake has obtained drain tile mapping from the Drainage System Coordinator for the Land Control Area and is working with the county and a drain tile contractor, ISG, to develop appropriate mitigation measures, including design adjustments to provide buffers on each side of the drain tile that will allow the county continued access for maintenance activities.

The preliminary Project layout presented herein includes some design changes to accommodate drain tile; however, coordination with the county and the drain tile contractor is ongoing and additional design changes may be necessary prior to finalizing the Project layout. Summit Lake will provide an updated design to the Commission when available. Additional details about early coordination with Nobles County are provided in Section 6.0 and copies of correspondence are provided in Appendix B.

No areas used for animal husbandry are located within the Land Control Area; therefore, no impacts to livestock are anticipated.

5.3.2 Forestry

There are no forestry operations in the Land Control Area or Preliminary Development Area.

5.3.2.1 Impacts and Mitigation Measures

Impacts on forestry operations from construction and operation of the Project will not occur.

5.3.3 Mining

Based on review of MNDOTs Aggregate Source Information System and the County Pit Map for Nobles County, there are no gravel pits in the Land Control Area (MNDOT, 2023a; MNDOT, 2003). In the Aggregate Source Information System data and on the Nobles County Pit Map, three gravel pits are shown between 2.7 and 3.7 miles southwest of the Land Control Area, between the towns of Reading and Rushmore, and another gravel pit is shown about 1.4 miles north of the Land Control Area.

5.3.3.1 Impacts and Mitigation Measures

No active or inactive mining operations are present in the Preliminary Development Area. As such, impacts on mining operations from construction and operation of the Project are not anticipated; therefore, no mitigative measures are proposed.

5.3.4 Tourism

Primary tourism activities in the vicinity of Project facilities are associated with the recreational activities discussed in Section 5.2.10, and local community festivals and events described in Section 5.2.2. Examples of local community festivals include cultural events like the International Festival and the Nobles County Fair, both hosted by the City of Worthington which is about 5.0 miles southeast of the Land Control Area (Explore Southwest Minnesota, 2024).

5.3.4.1 Impacts and Mitigation Measures

Summit Lake Solar will construct the Project facilities within the limits of the Land Control Area and no road closures are anticipated to be necessary during active construction. The annual events hosted by the City of Worthington are not held within or directly adjacent to the Land Control Area; most of these events are held within city limits or in areas outside of the Land Control Area.

No impact on public access to these events is anticipated during construction or operation of the Project.

No impacts on tourism are anticipated and therefore no mitigative measures are proposed.

5.4 Archaeological and Historic Resources

In addition to requiring Site Permits from the Commission, the Summit Lake Project is subject to the Minnesota Historic Sites Act (Minnesota Statutes section 138.661-138.669), which requires state agencies to consult with the Minnesota State Historic Preservation Office (SHPO) regarding any potential impacts on state or federal designated or listed historic properties.

Summit Lake retained Tetra Tech to conduct a Phase I investigation of the Land Control Area to identify archaeological sites and historic structures that could be affected by the Project. The Phase I investigation was conducted in two phases: in 2022 and 2023 Tetra Tech conducted a file search and Phase I field inventory of an initial Project boundary in October and November 2022 and summarized its findings in a February 2023 report. The Land Control Area for the Project was later expanded to the 1,989.6-acre area described in this Joint Application and shown on Figure 2.1.1. In fall 2024, Tetra Tech conducted additional Phase I field inventory of all areas not covered in the 2022 field survey to ensure that all areas that would be affected by the Project were reviewed. A summary of the findings is provided below.

5.4.1 Previously Documented Cultural Resources

Tetra Tech conducted a review of records on file with the SHPO and the Office of the State Archaeologist archaeological site portal, as well as a review of historical resources including county history, U.S Department of the Interior General Land Office plats, county atlases, topographic maps, and aerial photographs. The records review included the Land Control Area and the area within a one-mile buffer (CR Study Area).

The records review identified three previous investigations within the CR Study Area. All three previous investigations were conducted on behalf of the Nobles Wind Farm. These previous investigations overlap a small part of the southernmost portion of the Land Control Area, but the majority of the Land Control Area has not previously been surveyed.

No previously documented archaeological sites were identified within the Land Control Area; however, one archaeological site was identified within the CR Study Area (i.e., outside of the Land Control Area). The site is a Pre-Contact isolated find and is recommended as not eligible for listing in the National Register of Historic Places.

No previously inventoried architectural resources were identified within the Land Control Area; however, six previously inventoried farmsteads are present within the CR Study Area at distances between 0.4 and 1.0 mile from the Land Control Area boundary. None of these farmsteads have been evaluated for National Register of Historic Places (NRHP) listing.

5.4.2 Phase I Field Inventory

Tetra Tech conducted an initial Phase I field inventory of the Land Control Area in October and November 2022. After the Land Control Area was expanded, Tetra Tech conducted an additional Phase I field inventory in November 2024 to capture all areas not covered in the 2022 field survey. Between the two field inventory efforts, the entire 1,989.6-acre Land Control Area was surveyed.

One cultural material scatter consisting of Post-Contact and modern materials was identified within the Land Control Area as a result of the 2022 field inventory. The cultural material scatter appears to be associated with a farmstead that was identified near this location during review of historical aerial maps from circa 1914 to circa 1991. The farmstead appears to have been razed sometime between 1991 and 2003 and the area was converted to cultivated cropland. Tetra Tech's opinion is that the cultural material scatter was created during the removal of the farmstead and subsequent conversion to cultivated cropland in the late 1990s. The cultural material scatter is modern in origin and would not be considered an archaeological site per Office of the State Archaeologist guidelines. For this reason, Tetra Tech recommended no further assessment of the cultural material scatter.

A second cultural material scatter of Post-Contact materials (Site 21NO0093) was identified during the Phase I field inventory, along a wooded earthen berm in the southern portion of the Land Control Area. A review of the historic maps and aerial photographs did not reveal any structures in the vicinity of the Site 21NO0093. A review of 1954 aerial photography revealed ground disturbance at the site, and subsequent aerial photographs revealed the site became more vegetated over time. Based on the absence of any historically documented structures and interview information, the site may represent episodic dumping during the first half of the twentieth century associated with the unincorporated community of Reading. Tetra Tech recommends avoidance of Site 21NO0093. If Project activities cannot avoid the site, then additional investigations may be warranted to assist with the NRHP evaluation of the site.

5.4.3 SHPO Consultation

Tetra Tech submitted the Phase I inventory report to the Minnesota SHPO on February 12, 2025. SHPO's response is pending.

5.4.4 Impacts and Mitigation

The Phase I investigations of the Land Control Area in 2022 and 2024 did not identify Pre-Contact archaeological sites or architectural resources eligible for listing or listed in the NRHP that would be affected by the proposed Project. Site NO0093 is a Post-Contact cultural material scatter identified in the southern portion of the Land Control Area. Tetra Tech recommends avoidance of the site, or if avoidance is not possible, further evaluation of the site is recommended. Project infrastructure that is planned for this area consists of installation of below-ground collection and communication lines for the Solar Project; no solar arrays, inverters, or other components of the Solar Facility or BESS would be installed in this location. Pending the results of SHPO's review of the Phase I inventory report, Summit Lake will work with SHPO to develop appropriate avoidance measures for this site. Potential avoidance measures may include boring the collection lines under the site or routing the collections lines around the site boundary. If avoidance is not

possible, Summit Lake will conduct additional investigations and work with SHPO to determine the NRHP eligibility potential of this resource.

With appropriate mitigation or avoidance measures in place for Site NO0093, the construction and operation of the Project is unlikely to affect historic properties listed in, eligible for, or potentially eligible for listing in the NRHP. No additional mitigation measures specific to archaeological or historic resources are proposed beyond those described for Site NO0093.

Before construction of the Project begins, Summit Lake will prepare an Unanticipated Discoveries Plan that will outline the steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction.

5.5 Natural Environment

5.5.1 Air Quality

Section 109(b) of the Clean Air Act requires that the EPA establish National Ambient Air Quality Standards "requisite to protect" public health and welfare (40 Code of Federal Regulations Part 50). The Clean Air Act identifies two classes of National Ambient Air Quality Standards: 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 National Ambient Air Quality Standards for six criteria pollutants: ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. Minnesota is in compliance with the primary and secondary National Ambient Air Quality Standards for all criteria pollutants (MPCA, 2023b).

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, on an hourly basis, for ozone, particulate matter less than 2.5 microns in diameter, sulfur dioxide, nitrogen dioxide, and carbon monoxide. The pollutant with the highest Air Quality Index value for a particular hour sets the overall Air Quality Index for that hour. The Air Quality Index 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, 2024c).

The Project is located nearest to the air quality monitor in Marshall, Minnesota. This station monitors for ozone and $PM_{2.5}$. The Air Quality Index for Marshall for the past five years is provided in Table 5.5.1-1 (MPCA, 2024d). Note that data from 2024 is not available at the time this Application is filed.

Table 5.5.1-1 Days in Each Air Quality Index Category (Marshall, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2023	206	142	10	2	0
2022	303	51	0	2	0

Table 5.5.1-1 Days in Each Air Quality Index Category (Marshall, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2021	263	91	3	2	0
2020	309	51	0	0	0
2019	305	53	0	0	0
Source: MPCA, 2024d					

Air quality has been considered good or moderate for the majority of the past five reported years in Marshall. Since 2019, the largest number of days classified as moderate occurred in 2023. Thirteen days in 2021 and 2023, combined, were considered unhealthy for sensitive groups. Each of these days occurred between May and September and were likely the result of wildfire smoke. Two days each were classified as unhealthy in 2021, 2022, and 2023, most of which were confirmed to be the result of wildfires in Canada. No days have been classified as very unhealthy.

5.5.1.1 Impacts and Mitigation Measures

Impacts on air quality from construction of the Project as proposed in this Joint Application would 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 speed limits. 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.

Air emissions during construction would primarily consist of emissions from construction equipment and would include carbon dioxide, nitrogen oxides, and particulate matter. Dust from earthmoving activities would also contribute to particulate matter emissions. Impacts from the Project are expected to be negligible because of the temporary nature of the emissions and -dust producing construction phases. Applicable BMPs will be used during construction and operation of the Project to minimize dust emissions if the wind erosion becomes an issue. Estimated construction emissions are summarized below in Table 5.5.1-2. Detailed construction emission calculations are included in Appendix H.

Table 5.5.1-2 Construction Related Criteria Pollutant Emissions

Construction Activity	CO (tpy)	NO_X (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Off-Road Engines	130.26	28.52	7.16	4.55	4.55	0.06
Unpaved Road	-	-	-	0.76	0.08	-
Earthmoving	-	-	-	182.53	19.33	-
PROJECT TOTAL	**130.26**	**28.52**	**7.16**	**188.53**	**23.96**	**0.06**

Table 5.5.1-2 Construction Related Criteria Pollutant Emissions

Construction Activity	CO (tpy)	NO_X (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)

Note: CO = carbon monoxide, NO_X = nitrogen oxides, VOC = volatile organic compounds, PM_{10} = particulate matter less than 10 microns in diameter, $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter, SO_2 = sulfur dioxide, and tpy = tons per year.

Air permits are required for stationary sources of air emissions if the source has the potential to emit any regulated pollutant in amounts greater than permitting thresholds. Additionally, air permits are required for stationary sources that operate equipment that is regulated by the New Source Performance Standards (40 Code of Federal Regulations Part 60) or National Emissions Standards for Hazardous Air Pollutants (40 Code of Federal Regulations Parts 61 and 63) (MPCA, 2025).

During operations, the Project will not generate direct air emissions. Some indirect emissions will be generated from commuter and maintenance vehicles; however, mobile sources of emissions are not regulated by the MPCA air permitting program. The Project does not include any equipment regulated by the New Source Performance Standards (40 Code of Federal Regulations Part 60) or National Emissions Standards for Hazardous Air Pollutants (40 Code of Federal Regulations Parts 61 and 63). Therefore, no air permit is required for the Project.

5.5.2 Climate Change and Greenhouse Gas Emissions

The effects of climate change have been tied to an increase in greenhouse gas emissions from human-related activity, including transportation, energy production, and industry (EPA, 2024d). A key element in addressing climate change is the reduction of greenhouse gas emissions produced each year. In 2007, Minnesota passed the Next Generation Energy Act, which set statutory goals to reduce greenhouse gas emissions by 80 percent between 2005 and 2050 (MPCA, 2024e), from 177.5 million tons per year of carbon dioxide equivalent (CO_2e) in 2005 down to 88.8 million tons per year CO_2e by 2030, Minnesota is currently on track to meet this goal (MPCA, 2024e).

In February 2023, the Minnesota Legislature passed "100 Percent by 2040" legislation,[1] a carbon-free energy standard, which is likely to increase Minnesota's renewable energy needs by compelling utilities to obtain additional electricity from renewable sources beyond that currently required by the Renewable Energy Standards set forth in Minnesota Statutes section 216B.1691 and further reduce carbon from energy sources. The "100 Percent by 2040" standard requires utilities to generate or procure sufficient electricity generated from a carbon-free technology, such as solar, equivalent to at least the percentages of the electric utility's total retail sales to retail customers in Minnesota by the end of the year indicated in Table 5.5.2-1.

Table 5.5.2-1 Carbon Free-Standard Milestones

Year	Percent of Retail Electric Sales as Carbon-Free Energy
2030	80% for public utilities; 60 % for other electric utilities

[1] Governor Walz signed the "100 Percent by 2040" legislation into law on February 7, 2023.

Table 5.5.2-1 Carbon Free-Standard Milestones	
Year	**Percent of Retail Electric Sales as Carbon-Free Energy**
2035	90% for all electric utilities
2040	100% for all electric utilities

The Project will contribute to Minnesota's on-going success in reducing greenhouse gas emissions by providing a renewable source of energy as an alternative to more carbon-intensive sources of energy, such as coal and natural gas.

5.5.2.1 Impact of Project on Climate Change

The Project will offset a large quantity of greenhouse gas emissions by providing renewable electricity and will increase carbon sequestration of the soil by converting approximately 1,482 acres of predominately agricultural land to herbaceous land (see Section 5.5.4.1). However, some greenhouse gas emissions will be produced during the fabrication, construction, and operating phases of the Project. Estimated emission calculations from construction of the Solar Facility and BESS are provided in Appendix H.

During operation, the Project is expected to produce enough renewable electricity to service 33,200 homes and to offset approximately 356,928 tons per year CO_2e. This is equivalent to removing nearly 77,065 passenger vehicles from the road annually (EPA, 2024b). In addition, the Project will convert approximately 1,482 acres of predominately row crop agricultural land to herbaceous land. Agricultural lands and herbaceous lands can both act as carbon sinks. The carbon storage capacity of herbaceous lands is about 65 percent higher than that of agricultural lands (Walston et al, 2021).

Greenhouse gas emissions are generated throughout the life of a solar project at a rate of about 42 grams CO_2e per kilowatt hour (Intergovernmental Panel on Climate Change, 2014). The Solar Facility is expected to generate 18,636 tons per year CO_2e averaged over the 30-year project lifetime. These emissions are not generated uniformly. Approximately 60-70 percent of these emissions occur during the upstream manufacturing and construction stage. Operational processes, including lighting, emergency generators, and maintenance activities, accounts for 21-26 percent of these emissions. The final 5-20 percent of greenhouse gas emissions are expected due to decommissioning and disposal of Project components (National Renewable Energy Laboratory, 2012).

Activities associated with the construction of the Project will result in greenhouse gas 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 greenhouse gas emissions released upon combustion of those fuel volumes. Construction activities are expected to produce a total of 5,751.42 tons CO_2e. Greenhouse gas 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. A summary of construction-

related greenhouse gas emissions is included in Table 5.5.2-1. Detailed construction emission calculations are included in Appendix H.

Table 5.5.2-1 Construction Related Greenhouse Gas Emissions

Construction Activity	CO_2 (tpy)	CH_4 (tpy)	N_2O (tpy)	CO_2e (tpy)
Off-Road Engine Emissions	5,732.58	0.23	0.05	5,751.42
Commuters and Delivery Vehicles	1,429.39	0.00	0.00	0.00
PROJECT TOTAL	**7,161.97**	**0.23**	**0.05**	**5,751.42**

Note: CO_2 = carbon dioxide, CH_4 = methane, N_2O = nitrous oxide, CO_2e = carbon dioxide, equivalent, and tpy = tons per year. CO_2e is calculated using the methodology outlined in Code of Federal Regulations Title 40 Part 98 Subpart A.

During the operational stage, up to six permanent full-time workers will staff the solar farm and maintenance activities will require the use of three to ten maintenance trucks per day. The commuter vehicles and maintenance trucks will generate a minor amount of greenhouse gas emissions. Utilities required to support operation of the solar farm include electricity, water, and sanitation. Approximately 1,350 kilowatt hours per month of electricity may be purchased from the grid if needed to meet operational needs such as lighting, cameras, and comfort heating. Approximately 77.9 tons per year CO_2e will be generated during the operating phase of the Project.

Summit Lake plans to install a private well or tie into rural water service, if available, and install a septic field to support operations. Approximately 600 gallons of water are expected to be used per day. This minor use of water is not expected to have a noticeable impact on the water supply. The septic system is expected to process 600 gallons per day. The septic system will be designed, installed, and maintained to withstand weather events associated with climate change, including increased heavy rains.

5.5.2.2 Impact of Climate Change on Project

The MDNR publishes historical climate data from the years 1895 to 2024. This data shows that the average temperature of Nobles County, Minnesota has been increasing at a rate of 0.15 degrees Fahrenheit per decade to reach an annual average temperature of 47.98 degrees Fahrenheit in 2024. Over the 30-year lifespan of the Project, the annual average temperature could increase by 0.45 degrees Fahrenheit. The annual precipitation has increased at a rate of 0.22 inches per decade to 32.51 inches in 2024. Over the lifespan of the Project, precipitation could increase an additional 0.66 inches per year (MDNR, 2024c). Additionally, the frequency and intensity of heavy rainfall is increasing across the state (MDNR, 2024c). The MDNR climate office has defined mega-rain events as rainfalls of more than 6 inches over 1,000 square miles in 24 hours or less. Sixteen mega-rain events have been recorded in the past 50 years. Of these, 11 events have occurred since the year 2000 (MDNR, 2024d). Over the next 30 years, Nobles County is predicted to have minor risk of flooding (Risk Factor, 2024). Nobles County experienced a period of extreme drought in 2012 and 2013. Currently, the county is ranked as severe drought (U.S. Drought Monitor, 2024). The Project has been designed with consideration of the potential climate changes during the lifetime

of the Project, including increased heavy rainfalls, stronger wind gusts, and increased temperatures.

5.5.2.3 Impacts and Mitigation Measures

Greenhouse gas emissions from human-related activity are a contributing factor to climate change. The Project is a mitigative measure that will reduce the effects of climate change by offsetting greenhouse gas emissions compared to electricity production by coal or natural gas fired power plants. Additionally, the Project will increase the carbon sequestration and water management capacity of approximately 1,482 acres of land in the Preliminary Development Area.

The Project has been designed and sited to withstand the weather events typically experienced in southwestern Minnesota, as well as the potential for increased severity of storms and periods of drought due to climate change discussed above (MPCA, 2024f). In an effort to minimize impacts on the facility infrastructure and equipment, the Project location was selected to avoid areas subject to flooding and pooled water during a 100-year rainfall event. Permanent drainage systems and stormwater ponds are sized appropriately to store and treat precipitation from more severe storms. Additionally, perennial vegetation plantings will replace current row crop agriculture in the Preliminary Development Area, increasing water uptake and slowing runoff.

Southwestern Minnesota can experience a range of weather events including high winds, hail, high and low temperatures, and heavy snowfall. Solar modules and related equipment will be designed to withstand storms that are potentially stronger than normal with minimal equipment downtime. During operation, Summit Lake will use industry best practices to reduce the impact of high winds and weather events, including options such as optimized stow regimes to reduce equipment exposure and installing dampening equipment to reduce oscillation during high winds. The system will be designed so that equipment can be isolated when necessary and includes an appropriate level of redundancy to allow for maintenance, repairs, and potential replacement of equipment damaged by storms. Lighting will be provided throughout the site to allow for adequate visibility during nighttime repairs.

Project infrastructure will be designed to comply with all applicable industry, local, and state building codes and standards. Civil and structural design will include safety factors for increased wind and snow loads, as set by the current standards. The electrical system will be designed for reliability, robustness, and compliance with the current codes and standards.

5.5.3 Geology and Groundwater

5.5.3.1 Geology

The Land Control Area is located in the Coteau Moraines subsection of the North Central Glaciated Plains section of the Prairie Parkland Province as classified by the MDNR Ecological Classification System. This subsection consists of shallow deposits of wind-blown silt (loess) over glacial till to deeper deposits of loess. Topography ranges from gently undulating to steeply rolling and hilly. Approximately 600 to 800 feet of glacial till sits over bedrock (see Map 11) (MDNR, 2024b). The Minnesota Geological Survey County Atlas indicates the depth to bedrock to be approximately 550 feet (Minnesota Geological Survey, 2022).

Karst landscapes can develop where limestone and dolostone are at or near the surface. Limestone is composed mostly of the mineral calcite (calcium carbonate); dolostone is composed mostly of the mineral dolomite (calcium magnesium carbonate). Over time, the carbonate minerals in these rocks are dissolved by rain and groundwater, creating karst. In Minnesota, limestone and dolostone underlie the southeastern corner of the state, and erosion has removed most of the glacial cover and exposed the carbonate bedrock. Karst is characterized by sinkholes, caves, springs, and underground drainage dominated by rapid conduit flow. The MDNR has documented regions prone to surface karst feature development across the state (MDNR, 2024e). Regions prone to surface karst feature development are not located in the Land Control Area. The regions prone to karst are located in the southeast portion of the state and the Project is located in the southwest portion of the state.

5.5.3.2 Groundwater

The Land Control Area is located in MDNR Ground water Province 5 (Western), which is characterized by fine-grained (e.g., clay and silt) glacial sediment. Limited extents of surficial and buried sand aquifers are located within the province and fractured bedrock is commonly buried deeply beneath the glacial sediment and is of limited use as an aquifer (MDNR, 2024f).

Summit Lake reviewed publicly available GIS data to identify EPA-designated sole source aquifers, wells listed on the County Well Index, Drinking Water Supply Management Areas, and MDH Wellhead Protection Areas. None of these features were identified within the Land Control Area.

The EPA defines a sole source aquifers or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2024e). According to the EPA Sole Source Aquifers webmap, there are no EPA designated sole source aquifers within the Land Control Areas (EPA, 2024f).

The County Well Index is a database that contains subsurface information for over 533,000 water wells drilled in Minnesota. The County Well Index is maintained by the Minnesota Geological Survey in partnership with the MDH. The data is derived from water-well contractors' logs of geologic materials encountered during drilling (MDH, 2022). According to the County Well Index, there are no active wells within the Land Control Area. One sealed well that was used as an environmental bore hole is located in an agricultural field in the south-central portion of the Land Control Area. The closest active well is for domestic use and is approximately 72 feet to the southwest of the Land Control Area (MDH, 2022).

The MDH enforces the federal Safe Drinking Water Act including the National Primary Drinking Water Regulations created under the Act (MDH, 2024b). These regulations are legally enforceable standards and treatment techniques that apply to public water systems to protect drinking and source water. As a result, Minnesota adopted the State Wellhead Protection Rule (Minnesota Rules 4720.5100-4720.5590) in 1997 (MDH, 2024b). The MDH is responsible for administering the State Wellhead Protection Program. Under the Wellhead Protection Program, public water systems are required to develop and implement a plan that protects its drinking water source. Wellhead

Protection Areas are approved surface and subsurface area surrounding a public water supply well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (MDH, 2019). Drinking Water Supply Management Areas contain the Wellhead Protection Area but are outlined by clear boundaries, like roads or property lines. The Drinking Water Supply Management Area is managed in a Wellhead Protection plan, usually by a city (MDH, 2024b). There are no Drinking Water Supply Management Areas or Wellhead Protection Areas located within the Land Control Area. The nearest Drinking Water Supply Management Area and Wellhead Protection Area is the Worthington Malcom Drinking Water Supply Management Area and Wellhead Protection Area, which is located approximately 6 miles to the south of the Land Control Area. The nearest Wellhead Protection Area is 6.1 miles to the south of the Land Control Area (MDH, 2019).

5.5.3.3 Impacts and Mitigation Measures

Impacts to geology and groundwater resources from construction and operation of the Project are not anticipated. The potential for the Project to impact these resources is limited. Due to the thickness of surficial materials (approximately 550 feet) excavation or blasting of bedrock is not anticipated. Impacts on geologic resources are not anticipated and mitigation is not expected to be necessary.

Impacts on groundwater resources, including aquifers, are not anticipated as water supply needs will be limited. In addition, the depth of piers is only anticipated to reach a maximum depth of 15 feet (see Section 4.1.1.1) and nearby wells indicate an average static water level of 54 feet. Geotechnical analysis will also be completed prior to pier installation to determine soil characteristics (see Section 4.4.1.1). Project facilities are not likely to affect the use of existing water wells because there are no active wells within the Preliminary Development Area. Any dewatering required during construction will be discharged to the surrounding upland surface areas, thereby allowing it to infiltrate back into the ground to minimize potential impacts. Dewatering filter bags, straw structures or similar best management practices may be used when dewatering. Any areas affected by dewatering or associated materials will be restored (see Section 4.4.5). If dewatering is necessary, the Project will obtain a Water Appropriation Permit from MDNR.

O&M building and BESS water requirements will be satisfied with a single domestic-sized water well or via a tie in with rural water lines where available. Based on the small amount of impervious surface area that will be created by the Project components, estimated to be 32.3 acres for the Solar Facility and 16.0 acres for the BESS, the Project will likely have minimal impacts on regional groundwater recharge.

Concrete foundations may be required for some Project components and geotechnical soil testing will determine final installation process. Similarly, the exterior security fencing may require concrete foundations in some locations. If concrete is needed, it will be locally sourced; an on-site concrete batch plant will not be required for the Project. Concrete foundations have the potential to impact aquifers or impede groundwater movement; however, given the limited depth and size of potential concrete foundations (see Section 4.4.1), it is unlikely that they will have an impact on the groundwater in the area.

The closest documented active domestic use well is approximately 72 feet to the southwest of the Land Control Area and 305 feet from the Preliminary Development Area. Most land within the Preliminary Development Area will be vegetated in accordance with the Vegetation Management Plan, thereby minimizing the risk of impacts on private wells in the area. Vegetated ground cover will prevent the sedimentation of surface water and also aid in the filtration of contaminants from surface water prior to infiltration into the ground. Construction of the Project facilities is not anticipated to require subsurface blasting; therefore, disturbances to groundwater flow from newly fractured bedrock are not anticipated.

Prior to the start of construction, Summit Lake will obtain a National Pollutant Discharge Elimination System permit from the MPCA to discharge stormwater from construction facilities. Best management practices will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. Best management practices may include, but not limited to, silt fence, erosion control blanket, straw bales, or temporary seeding. A Stormwater Pollution Prevention Plan will be developed for the Project prior to construction that will include Best management practices such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion. Summit Lake will submit the Stormwater Pollution Prevention Plan to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

5.5.4 Soils

Soil characteristics within the Land Control Area were assessed using the Soil Survey Geographic database (Soil Survey Staff, 2024). The Soil Survey Geographic database is a digital version of the original county soil surveys developed by the USDA Natural Resources Conservation Service (NRCS) for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the Soil Survey Geographic database to information about the component soils and their properties (USDA, NRCS, 2024). Table 5.5.4-1 and Map 12 show the soil types located within the Land Control Area.

Approximately 40.8 percent of the Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating some wetlands are likely to be present as one of many wetland characteristics is hydric soil (see Section 5.5.5). None of the soils in the Land Control Area are prone to wind or water erosion. Approximately 63.4 percent of the Land Control Area is underlain by soils that are prone to compaction. Additional discussion about the soil map units within the Land Control Area and their corresponding soil characteristics can be found in the Agricultural Impact Mitigation Plan (see Appendix F).

Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure as a result of mechanical deformation caused by heavy equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Soils in the Land Control Area are prone to compaction and rutting (see Appendix F).

Table 5.5.4-1 Summary of Soils within the Land Control Area

Map Unit Symbol	Map Unit Name	Land Control Area (acres / %)	Farmland Designation [a]	Hydric Soil [a]	Wind Erodible [b]	Water Erodible [c]	Compaction Prone [d]	Slope Range [e]
L78A	Canisteo clay loam, 0 to 2 percent slopes	138.7 / 7.0%	Prime farmland if drained	Yes	No	No	Yes	0-5%
L107A	Canisteo-Glencoe complex, 0 to 2 percent slopes	11.0 / 0.6%	Prime farmland if drained	Yes	No	No	Yes	0-5%
L79B	Clarion loam, 2 to 6 percent slopes	645.6 / 32.4%	All areas are prime farmland	No	No	No	No	0-5%
L134B	Clarion-Crooksford complex, 1 to 5 percent slopes	8.4 / 0.4%	All areas are prime farmland	No	No	No	No	0-5%
L102C2	Clarion-Storden complex, 6 to 10 percent slopes, moderately eroded	18.5 / 0.9%	Farmland of statewide importance	No	No	No	No	>5-8%
L136A	Crooksford silty clay loam, 1 to 3 percent slopes	15.9 / 0.8%	All areas are prime farmland	No	No	No	No	0-5%
L170B	Estherville-Round lake complex, 2 to 6 percent slopes	24.9 / 1.3%	Farmland of statewide importance	No	No	No	No	0-5%
L146A	Glencoe silty clay loam, 0 to 1 percent slopes	38.7 / 1.9%	Prime farmland if drained	Yes	No	No	Yes	0-5%
L152B	Lowlein-Round lake complex, 1 to 6 percent slopes	5.1 / 0.3%	All areas are prime farmland	No	No	No	No	0-5%
L85A	Nicollet clay loam, 1 to 3 percent slopes	421.3 / 21.2%	All areas are prime farmland	No	No	No	Yes	0-5%
L140A	Ocheda silty clay loam, 1 to 3 percent slopes	9.0 / 0.5%	All areas are prime farmland	No	No	No	Yes	0-5%
L135A	Okabena silty clay loam, 1 to 3 percent slopes	19.1 / 1%	All areas are prime farmland	No	No	No	Yes	0-5%
L163A	Okoboji silty clay loam, 0 to 1 percent slopes	11.6 / 0.6%	Prime farmland if drained	Yes	No	No	Yes	0-5%
L158B	Round lake sandy loam, 1 to 6 percent slopes	6.2 / 0.3%	Farmland of statewide importance	No	No	No	No	0-5%
L129B	Terril loam, 2 to 6 percent slopes	3.6 / 0.2%	All areas are prime farmland	No	No	No	No	0-5%
L133A	Waldorf silty clay loam, 0 to 2 percent slopes	2.0 / 0.1%	Prime farmland if drained	Yes	No	No	Yes	0-5%

Table 5.5.4-1 Summary of Soils within the Land Control Area

Map Unit Symbol	Map Unit Name	Land Control Area (acres / %)	Farmland Designation [a]	Hydric Soil [a]	Wind Erodible [b]	Water Erodible [c]	Compaction Prone [d]	Slope Range [e]
L83A	Webster clay loam, 0 to 2 percent slopes	610.2 / 30.7%	Prime farmland if drained	Yes	No	No	Yes	0-5%
PROJECT TOTAL		**1,989.6 / 100.0%**						

Source: Soil Survey Staff, 2024.

[a] Obtained directly by query of the Soil Survey Geographic geospatial database.

[b] Includes soils in wind erodibility groups 1 and 2.

[c] Includes soils with a slope >15 percent or soils with a K value of >0.35 and slopes greater >5 percent.

[d] Includes soils that are somewhat poorly drained to very poorly drained soils in loamy sands and finer textural classes.

[e] Representative slope values are taken directly from the SSURGO database. The SSURGO database provides representative slope values for all component soil series. Slope classes represent the slope class grouping in percent that contains the representative slope value for a major component soil series. For example, a soil mapped in the 2-6% slope class has an average slope of 4%, which is within the 0-5% slope range.

Slope is a land surface characteristic that affects constructability, water erosion, revegetation, compaction and rutting, among other properties. Nearly all of the soils (1,971.1 acres, 99.1 percent) within the Land Control Area are nearly level soils with representative slopes falling within the 0 to 5 percent slope range. The remaining 18.5 acres (0.9 percent) of soils within the Land Control Area have a representative slope range of 5-8 percent (see Appendix F). As such, slope is not anticipated to create issues during construction or restoration of the Project.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses. Current land use could be row crop agricultural production, pasture, woodland, or other land uses; not all prime farmland is currently used for agricultural production. Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA NRCS, 2024).

The NRCS also recognizes farmlands of statewide importance, which are defined as lands other than prime farmland that are used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, and vegetables). Farmlands of statewide importance have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by the appropriate State agencies, typically in association with local soil conservation districts or other local agencies.

Table 5.5.4-1 lists the soils considered prime farmland and soils of statewide or local importance within the Land Control Area. Map13 - Farmland Classifications depicts the distribution of prime farmland, prime farmland if drained, and not prime farmland in the Land Control Area.

5.5.4.1 Impacts and Mitigation Measures

Soils

Impacts and mitigation for soils are described at a high level below. A more detailed discussion is provided in the Agricultural Impact Mitigation Plan (see Appendix F).

Approximately 36.6 percent of soils that will be impacted by the Project are well drained, moderately well drained, or somewhat excessively drained and suited for the existing agricultural production. The Project is located on level to nearly-level topography, which is consistent with the current use for agricultural production.

Impacts to soils will occur during the construction and decommissioning stages of the Project. Construction may require some amount of grading to provide a level surface for the solar arrays, Project Substation, and BESS. Because the Preliminary Development Area is in relatively level existing agricultural fields, the Project will minimize grading to the extent practicable. Additional

soil impacts during construction will come from the installation of the direct-embedded piers that support the structural framework of the solar arrays, and small areas of foundations for the inverter skids, the Project Substation, O&M building, and BESS. Based on the electrical configuration, impacts to soils will differ. Should the below-ground collection configuration be used, installation of electrical cables will require trenching the cables to a depth of four feet below grade for installation. If the hybrid collection system is used, soil impacts due to trenching will be limited to the areas between the rows of panels to the inverter / transformer skids and then to the Project Substation as described in Section 4.1.1. From a soils perspective, the hybrid collection system will have fewer soil impacts than the below-ground system due to the reduced volume of trenching necessary. Details about construction and operation activities for the Solar Facility and BESS are provided in Sections 4.1.1 and 4.1.2, respectively.

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil. Topsoil shall have temporary and permanent stabilization measures established in accordance with the Project's Stormwater Pollution Prevention Plan. These measures would primarily include silt fencing on the downside of all hills, near waterways, and near drain tile inlets. This silt fencing would control soil erosion via stormwater. Check dams and straw waddles will also be used to slow water during rain events in areas that have the potential for high volume flow. Additional discussion on temporary erosion and sediment control measures that will be utilized can be found in the Agricultural Impact Mitigation Plan (see Appendix F). Internal roads will be constructed of inorganic fill (road aggregate base) to match the surrounding existing ground elevations to allow existing drainage patterns to persist. Once the necessary grading is complete, subsoil will be placed followed by topsoil, blending the grade into existing topography. Decompaction with chisel plows prior to disking and planting will typically be a standard method of soil preparation in areas proposed for seeding to native grasses, forbs, and pollinator species. Agricultural equipment capable of operating within the approximate 20-foot-wide space between panel lines when panels are oriented vertically would be used to decompact, prepare a seedbed, and plant suited seed mixes.

Following construction, Summit Lake will restore disturbed areas to pre-construction conditions to the extent practicable. Soil erosion will be minimized by implementing environmental protection measures. These measures will include BMPs for erosion and sediment control, such as temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. Compaction and rutting are potential limitations in the Preliminary Development Area. Summit Lake will design construction access and manage construction passes to minimize the number of trips occurring on a given soil and will implement wet weather procedures any time that rutting is observed. Deep compaction is not anticipated to be a significant problem as the number of construction equipment passes over a given area is limited, and construction equipment consists of smaller, low-ground-pressure tracked vehicles, however, Summit Lake will follow measures outlined above and as outlined in the Agricultural Impact Mitigation Plan (see Appendix F) to assess and address compaction in the Land Control Area..

Additionally, recent research on the environmental impacts of solar farms indicates that there could be some net benefits to soil resources over the lifecycle of the Project. Writing in Cleantechnica, one of the world's top cleantech-focused news sites, engineer Jeff Broberg highlights the utility and specific benefits of using native plants on solar sites (Broberg, 2016).

"[Compared to row crops,] storm water runoff is reduced 23 percent for the 2-year storm (2.9 inches of rain) and 8 percent for the 100-year storm.

Further, we expect a mix of prairie plants to provide superior hydrologic performance compared to monocrop turf-grasses that are common on solar sites in some areas of the country. In 2008, the U.S. Geological Survey completed a five-year storm water study in cooperation with a consortium of 19 cities and towns in the area of Madison, Wisconsin that revealed 'striking differences between turf and prairie vegetation.'

The study found 'prairie vegetation had greater median infiltration rates than those with turf grass,' and roots in the prairie vegetation plot were 'found to a depth of 4.7 feet compared with 0.46 feet in the turf.'

In addition to superior stormwater management, native plants improve the soil with organic matter over the 20 to 30-year life the Project, allowing microorganisms and soil fauna to recover after years of intensive compaction and pesticide and fertilizer application. And, over time, native plants out-compete weeds allowing ground cover to be maintained with just a single annual mow, reducing operating costs."

With the proper implementation of environmental protection measures intended to prevent, minimize, and/or reclaim soil erosion effects, no unmitigated loss of soil will result from the Project. Additionally, taking 1,479.4 acres of agricultural land out of production will give the soils an opportunity to rest and regenerate. Agricultural land within the fenced area of the Solar Facility will be converted to open, herbaceous (i.e., grassland) cover with the exception of the Project Substation and O&M building, BESS, inverters, and access roads which will be converted to developed land and impervious surfaces (48.4 acres). Summit Lake will utilize a shorter prairie seed mix within the panel footprint, taller prairie plantings in the open spaces between the fence and array, and a wet seed mix for wet areas including wetlands. The mixes are designed to be native and are developed with prairie specialists in coordination with the Minnesota Interagency Working Group to design a mix that will allow for successful operation of the solar facility, promote pollinator habitat, establish stable ground cover successfully, reduce erosion, reduce runoff, and improve infiltration. Seed mixes that will be used for the Project are discussed in more detail in the Vegetation Management Plan in Appendix D.

Prime Farmland

As shown in Table 5.5.4-2, all of the soils within the Preliminary Development Area are classified as prime farmland, prime farmland if a limiting factor is mitigated (e.g. drained) or farmland of statewide importance; however, it is important to note that the prime farmland designation is independent of current land use (USDA NRCS, 2024).

Table 5.5.4-2 Farmland Classifications within the Preliminary Development Area

Farmland Classification	Preliminary Development Area (acres / %)
Prime Farmland	1,128.0 / 56.7%
Prime Farmland if Drained	812.1 / 40.8%
Farmland of Statewide Importance	49.6 / 2.5%

Table 5.5.4-2 Farmland Classifications within the Preliminary Development Area	
Farmland Classification	**Preliminary Development Area (acres / %)**
Not Prime Farmland	0.0 / 0.0%
PROJECT TOTAL	**1,989.6 / 100.0%**
Source: Soil Survey Staff, 2024.	

Prime farmland within the Preliminary Development Area will be placed in a permanent cover of perennial vegetation according to seeding and management specifications as described in the Vegetation Management Plan (see Appendix D) to the benefit of wildlife and the soil. As discussed in Section 3.3 and the Prime Farmland Assessment in Appendix E, removing the land from agricultural production may be beneficial for limiting nitrogen infiltration into groundwater supply, thereby improving groundwater quality. Upon decommissioning, the land would be returned to its pre-construction agricultural use. Summit Lake anticipates that the property will be restored to agricultural use on decommissioning of the Project.

Initial post-construction revegetation efforts and maintenance of vegetation during operations and maintenance will consider selecting suited plants, managing seeding times for late spring early summer when soil moisture is optimum for germination, use of mulch, and other BMPs. Existing tile drainage systems will be maintained during Project operations; refer to discussion in Section 5.3.1.1 regarding county-owned drain tile in the Land Control Area. Aside from the temporary impacts discussed throughout this section, the primary post-construction impact to prime farmland is that the land will not be farmed for approximately 30 years.

5.5.5 Surface Waters

The Project is located in the Des Moines River – Headwaters (HUC8: 07100001) and Rock River (HUC8: 10170204) watersheds (MDNR, 2023). The Des Moines River – Headwaters watershed is approximately 1,334 square miles and spans seven counties. The Rock River watershed is approximately 1,679 square miles and spans four counties. Agricultural use is the dominant land use in both watersheds (MPCA, 2024g).

5.5.5.1 Lakes, Ponds, Rivers, Streams, and Ditches

The MDNR Hydrography Dataset identifies two intermittent streams and two ponds within the Land Control Area (MDNR, 2024g). The streams are located in the north-central and northeast portions of the Land Control Area. The ponds are located in the central and southwest portions of the Land Control Area. Surface water resources are depicted on Map14.

An on-site wetland and waterway delineation was conducted between October 10 and 18, 2022, and July 29 and 31, 2024 to identify and characterize wetlands and waterways per U.S. Army Corps of Engineers (USACE) methodology. The delineation encompassed the entirety of the Land Control Area. The intermittent stream in the north-central portion of the Land Control Area was not identified in the field and is classified as upland. The eastern 800 feet of the intermittent stream in the northeast portion of the Land Control Area was identified and classified as wetland. The remainder of the stream was not identified and classified as upland. Both ponds were identified in the field; however, both were classified as wetlands. The wetland and waterway delineation did

not identify any other lakes, ponds, rivers, streams or ditches within the Land Control Area. The Wetland Delineation Report is included as Appendix I.

5.5.5.2 Minnesota Public Waters

The MDNR Public Waters Basin and Watercourse Delineations dataset does not identify MDNR Public Waters Inventory watercourses or basins within the Land Control Area. The closest Public Waters Inventory watercourse is an unnamed intermittent stream mapped within an agricultural field and is approximately 75 feet from the east-central boundary of the Land Control Area. The nearest Public Waters Inventory Basin is approximately 3,500 feet north of the Land Control Area and is associated with the Groth State Wildlife Management Area (MDNR, 2024h).

5.5.5.3 Water Quality

There are no impaired waters within the Land Control Area (MDNR, 2024i). The nearest impaired water is 0.53 mile to the east of the Land Control Area.

5.5.5.4 Floodplains

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map classifies the Land Control Area as an "Area of Minimal Flood Hazard" (FEMA Flood Insurance Rate Map Panel 27105C0250C) (FEMA, 2024). This designation indicates that the Land Control Area outside both 100- and 500-year floodplains. The closest FEMA floodplain is an area designated as Zone A (100-year) and is located approximately 1.4 miles to the northwest of the Land Control Area. The floodplain is associated with the Jack Creek within the Groth Wildlife Management Area.

5.5.5.5 Wetlands

The MDNR National Wetland Inventory for Minnesota identifies eighteen wetlands within the Land Control Area (MDNR, 2019). They are all in an agricultural setting and are farmed wetlands, agricultural ditches or pastures adjacent to row-crops. They are clustered in the southwest, central, and northwest portions of the Land Control Area. Seventeen of the wetlands are classified Palustrine Emergent and one is classified as Palustrine Scrub-Shrub.

An on-site wetland and waterway delineation was conducted between October 10 and 18, 2022, and July 29 and 31, 2024 to identify and characterize wetlands and waterways per USACE methodology (Tetra Tech, 2024b). The delineation covered the entirety of the Land Control Area. The National Wetland Inventory wetlands and ponds and streams identified in section 5.5.5.1 were investigated during the delineation. In addition, aerial imagery was used to preliminarily identify farmed wetlands for subsequent field investigation. The delineation identified 34 wetlands totaling 48.7 acres within the Land Control Area (see Table 5.5.5-1). The wetlands are primarily classified as Palustrine Emergent wetland communities. One wetland is classified as a Palustrine Emergent and Palustrine Forested wetland complex. The wetlands are located in a agricultural setting and are farmed, excavated or seasonal in nature.

Table 5.5.5-1 Delineated Wetlands within the Land Control Area		
Wetland ID	**Cowardin Classification [1]**	**Acres**
WA001	PEMAf	0.36
WA003	PEMAx	0.16
WA004	PEMAx	0.15
WA008	PEMAf	0.15
WA009	PEMAf	0.17
WA010	PEMAx	0.22
WA024	PEMAx	0.32
WA030	PEMAf	0.13
WA033	PEMAf	0.12
WA047	PEMA/PEMAf/PEMAx	2.25
WA048	PEMAx	0.21
WA056	PEMA	0.16
WA066	PEMAx/PEMAf	0.24
WA069	PEMAx	0.04
WA073	PEMAx	0.18
WA075	PEMAf	0.18
WB001	PEMAx	1.01
WB002	PEMAx	0.07
WB003	PEMAx	0.20
WB004	PEMA/PEMC/PEMCx	19.14
WB005	PEMAf	1.12
WB008	PEMAx	0.85
WB009	PEMAx/PEMAf	0.63
WC001	PEMAf	1.02
WC002	PEMAf	0.50
WC003	PEMAf	4.47
WC004	PEMAf	0.61
WC005	PEMAf	1.13
WC007	PEMAf	0.15
WC008	PEMAf	0.84
WC010	PEMAf	5.19
WC011	PEMAf	4.36
WC012	PEMA/PFOA	1.93
WC014	PEMAf	0.37

[1] PEM – Palustrine Emergent; PFO – Palustrine Forested. Modifiers: f – farmed; x – Excavated; A – Temporarily Flooded; C – Seasonally Flooded.

An application for a Boundary and Type Confirmation as well as an Approved Jurisdictional Determination was submitted to the Nobles County Soil and Water Conservation District as well as the St. Paul District of the USACE August 2023 for the delineation conducted in October 2022. A Notice of Decision confirming the delineated wetland boundaries was provided by the Nobles County Soil and Water Conservation District on November 20, 2023. The USACE indicated they would not review the delineation until layout was drafted and impacts were calculated. In October 2024 an updated application including the 2024 revised delineation area and draft layout were submitted to the Nobles County Soil and Water Conservation District. The Soil and Water Conservation District provided an approved Notice of Decision in December 2024. The updated wetland delineation was not submitted to the USACE. The USACE previously indicated they would only review wetlands as part of a wetland permit application submittal. The updated wetland report will be submitted to the USACE should a permit be required.

5.5.5.6 Impacts and Mitigation Measures

The Project has been designed to minimize impacts to surface waters to the extent practicable. Impacts to waterbodies are not anticipated. The proposed electrical collection and communication lines associated with the Project intersect approximately 0.09 acre of wetlands. Directional boring will be used during construction of the proposed electrical collection and communication lines to avoid impacting these wetlands.

The access roads within the Solar Facility intersect approximately 0.02 acre of delineated wetlands. In addition, 0.9 acre of wetlands are located within the fenced solar facility; however, the wetlands will not be impacted by any Project components. These wetlands are all currently farmed and will be enhanced through seeding and management in accordance with the Vegetation Management Plan.

Where wetland impacts cannot be avoided, Summit Lake will obtain permits from the USACE and the Local Government Unit for the Minnesota Wetland Conservation Act. Summit Lake will coordinate with both the USACE and the Local Government Unit prior to construction regarding wetland impacts. Wetland areas within the Preliminary Development Area will be vegetated with wet seed mix in accordance with the Vegetation Management Plan (see Appendix D) and maintained in an herbaceous state for the life of the Project. Temporary impacts to wetlands are not expected to affect surface water drainage or off-site wetlands.

During construction, stormwater is not expected to impact adjacent properties. Stormwater will be contained within the bounds of the construction disturbance area. As discussed in Section 4.1.5.2, a Stormwater Pollution Prevention Plan will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent sediment from entering into adjacent surface waters. The Project Stormwater Pollution Prevention Plan will be submitted to the MPCA for review and approval prior to construction and Summit Lake will obtain coverage under the General Construction Stormwater Permit.

A permanent stormwater management system will be utilized throughout the life of the project to protect and enhance the quality of surrounding surface and sub-surface waters by removing water volume, excess nutrients, sediment, and pollutants from stormwater runoff before leaving the

project site. The permanent stormwater management system will utilize natural infiltration resulting from 55 permanent stormwater basins and vegetation beneath the solar panels to prevent and minimize the negative effects of stormwater runoff. Stormwater basins will be vegetated with wet seed mix in accordance with the Vegetation Management Plan (see Appendix D) and maintained in an herbaceous state for the life of the Project.

5.5.6 Vegetation

The Project is in the Coteau Moraines Subsection of the Prairie Parkland Province (MDNR, 2024b). The Coteau Moraines Subsection is made up of two distinct landforms: the middle Coteau and outer Coteau. The middle Coteau is made up of "rolling moraine ridges of late-Wisconsin drift mantled with loess 1 to 3 feet thick", while the outer Coteau is "a series of terminal and end moraines separated by ground moraines"; these moraines may be steep and hilly or more undulating. Pre-settlement vegetation in the Coteau Moraines Subsection consisted primarily of tallgrass prairie; wet prairies and forested areas were restricted to narrow stream margins and riparian areas. Current vegetation consists largely of row-crop agriculture; there are few remnants of pre-settlement vegetation left.

Based on the NLCD land use/cover data as presented in Table 5.2.9-1, the land cover in the Land Control Area is predominately agricultural land (1,888.9 acres; 94.9 percent). Developed lands make up approximately 82.4 acres/4.1 percent of the Land Control Area. Forested land within the Land Control Area consists of small woodlots serving as a shelter belt or wind break around farmsteads and wind rows in agricultural fields and make up approximately 0.4 acre (<0.1 percent) of the Land Control Area. In addition, based on the wetland delineation discussed in Section 5.5.5, there are 34 wetlands located within the Land Control Area. A discussion of wetland impacts is provided in Section 5.5.5.5.

5.5.6.1 Impacts and Mitigation Measures

The majority of the Preliminary Development Area consists of active agricultural fields, 1,481.6 acres of which will be converted from agricultural use to solar energy and battery storage use for the life of the Project. Most agricultural land within the Preliminary Development Area will be converted to open, herbaceous cover (i.e., within the racking area) with the exception of the Project Substation and O&M building, BESS, inverter skids, and access roads which will be converted to impervious surfaces. The Project has been designed to avoid tree clearing.

To minimize potential Project impacts to vegetation, Summit Lake anticipates site restoration, seeding, establishing, maintaining, and monitoring disturbed areas and areas below the solar modules in accordance with the Agricultural Impact Mitigation Plan and Vegetation Management Plan (see Appendices E and C, respectively). Control of invasive and noxious weeds will be ongoing during the construction and operation of the Project by mowing and selectively applying herbicides when applicable.

Summit Lake will utilize a shorter prairie seed mix within the panel footprint, taller prairie plantings in the open spaces between the fence and array, and a wet seed mix for wet areas including wetlands. The mixes are designed to be native and are developed with prairie specialists in coordination with the Minnesota Interagency Working Group to design a mix that will allow for

successful operation of the solar facility, promote pollinator habitat, establish stable ground cover successfully, reduce erosion, reduce runoff, and improve infiltration. Summit Lake's Vegetation Management Plan, including the four seed mixes, is included as Appendix D.

5.5.7 Wildlife and Their Habitats

5.5.7.1 Avian Species

The Land Control Area is located within the Mississippi Flyway, a crucial migration route for millions of birds that migrate annually between nesting habitat and wintering habitat in North, Central and South America. Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S. Code 703-711), which prohibits the taking of any migratory bird, or a part, nest, eggs, or products. Additionally, Bald and Golden Eagles are also protected under the Bald and Golden Eagle Protection Act (16 U.S. Code 668-668d) which prohibits take of an individual bird, chick, egg, or nest, including alternate and inactive nests, and prohibits disturbance that may lead to biologically significant impacts such as interference with feeding, sheltering, roosting, and breeding or abandonment of a nest.

In addition to the protections the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act provide for all migratory birds, the USFWS has also developed a list of Birds of Conservation Concern, which includes both Migratory Bird Treaty Act - and non-Migratory Bird Treaty Act -protected species, to foster proactive conservation actions by federal and state agencies and private parties by focusing first on species of concern (USFWS, 2024a). In addition, the U.S North American Bird Conservation Initiative has developed Bird Conservation Regions to "facilitate domestic and international cooperation in bird conservation" (North American Bird Conservation Initiative, 2024); each Bird Conservation Region has a list of birds present or possibly present within the region that are considered Birds of Conservation Concern.

The Land Control Area is also located within the Prairie Pothole Bird Conservation Region (Bird Conservation Region 11), (North American Bird Conservation Initiative, 2024). The USFWS identified 34 species considered Birds of Conservation Concern within Bird Conservation Region 11. Table 5.5.7-1 provides a list of each Birds of Conservation Concern species within Bird Conservation Region 11.

Table 5.5.7-1
Birds of Conservation Concern that Potentially Occur in the Land Control Area

Bird Conservation Region	Listed Birds	
	Common Name	Scientific Name
11 (Prairie Pothole)	American Golden-Plover[1]	*Pluvialis dominica*
	Baird's Sparrow	*Centronyx bairdii*
	Black Tern	*Chlidonias niger*
	Black-billed Cuckoo	*Coccyzus erythropthalmus*
	Bobolink	*Dolichonyx oryzivorus*
	Buff-breasted Sandpiper[1]	*Calidris subruficollis*
	California Gull	*Larus californicus*

Table 5.5.7-1
Birds of Conservation Concern that Potentially Occur in the Land Control Area

Bird Conservation Region	Listed Birds	
	Common Name	Scientific Name
	Chestnut-collared Longspur	*Calcarius ornatus*
	Chimney Swift	*Chaetura pelagica*
	Clark's Grebe	*Aechmophorus clarkii*
	Dunlin[1]	*Calidris alpina*
	Eastern Whip-poor-will	*Antrostomus vociferus*
	Franklin's Gull	*Leucophaeus pipixcan*
	Golden-winged Warbler	*Vermivora chrysoptera*
	Grace's Warbler	*Setophaga graciae*
	Grasshopper Sparrow	*Ammodramus savannarum*
	Henslow's Sparrow	*Centronyx henslowii*
	Hudsonian Godwit[1]	*Limosa haemastica*
	LeConte's Sparrow	*Ammospiza leconteii*
	Lesser Yellowlegs[1]	*Tringa flavipes*
	Long-billed Curlew	*Numenius americanus*
	Long-eared Owl	*Asio otus*
	Marbled Godwit	*Limosa fedoa*
	Mountain Plover	*Charadrius montanus*
	Pectoral Sandpiper[1]	*Calidris melanotos*
	Red-headed Woodpecker	*Melanerpes erythrocephalus*
	Ruddy Turnstone[1]	*Arenaria interpres*
	Short-billed Dowitcher[1]	*Limnodromus griseus*
	Short-eared Owl	*Asio flammeus*
	Sprague's Pipit	*Anthus spragueii*
	Thick-billed Longspur	*Rhynchophanes mccownii*
	Western Grebe	*Aechmophorus occidentalis*
	Willet	*Tringa semipalmata*
	Yellow Rail	*Coturnicops noveboracensis*

[1] (nb) non-breeding in this Bird Conservation Region.

The USFWS has established Waterfowl Production Areas to protect habitat determined essential to the breeding, resting, and nesting habitat for countless avian and other wildlife species (USFWS, 2024b). No Waterfowl Production Areas are within the Land Control Area.

The National Audubon Society has established Important Bird Areas. Important Bird Areas are discrete sites that provide essential habitat for one or more bird species and include habitat for breeding, wintering, and/or migrating birds (National Audubon Society, 2024). The Land Control Area is not located within or near any Important Bird Areas.

5.5.7.2 Terrestrial Species

The Land Control Areas is dominated by cultivated agriculture characterized by corn and forage crop production, with the greater surrounding area consisting of agricultural buffer strips and forested areas, creating edge habitats. This mosaic of agricultural areas with adjacent edge habitats are likely to be utilized by the following species; white-tailed deer (*Odocoileus virginianus*), common raccoon (*Procyon lotor*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), American crow (*Corvus brachyrhynchos*), eastern bluebird (*Sialia sialis*), mourning dove (*Zenaida macroura*), ring-necked pheasant (*Phasianus colchicus*), wild turkey (*Meleagris gallopavo*), American toad (*Anaxyrus americanus*), and common garter snake (*Thamnophis sirtalis*) (MDNR, 2024j). Additionally, some pollinator species may be present within the Land Control Area including bees, butterflies, and moths.

5.5.7.1 Aquatic Species

As discussed in Section 5.5.5, 34 wetlands were identified within the Land Control Area (see Table 5.5.5-1); no other surface water types were identified. One wetland is classified as a Palustrine Emergent and Palustrine Forested wetland; the others as Palustrine Emergent wetland communities. Aquatic wildlife species that may utilize these areas include muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), frog species such as leopard (*Lithobates pipiens*), green (*L. clamitans*), and mink (*L. septentrionalis*), as well as turtle and fish species and a variety of waterfowl including trumpeter swans (*Cygnus buccinator*), Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), teal (*A. carolinensis*), pintails (*A. acuta*), and others.

5.5.7.2 Impacts and Mitigation

Impacts to wildlife species from construction activities, including Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act species are expected to be minor due to the dominance of agricultural land cover types in the Preliminary Development Area. Land uses in the Preliminary Development Area are primarily agricultural (1,888.9 acres/94.9 percent), and small amounts of developed areas (82.4 acres/4.1 percent), and wetlands (14.9 acres/0.8 percent). Forested lands in the Project Area are primarily windbreaks and shelterbelts around farmsteads and make up approximately 0.4 acre/<0.1 percent of the Land Control Area. As a result, few wildlife species that use trees or forested areas as habitat will be present. The Preliminary Development Area also has very little open water or wetlands (see Section 5.5.5). Thus, few wetland- or water-dependent wildlife species would use the Preliminary Development Area for breeding or nesting. Wildlife species associated with grasslands would also be limited or largely absent.

The small number of wildlife species that may utilize habitat within the Preliminary Development Area are likely habituated to human development activities. Many of these species are also highly mobile and may avoid the area during construction. Less mobile species and ground-nesting birds, including eggs and chicks, may be more prone to impacts; however, impacts resulting from the construction of the Project are not expected to differ from current impacts of annual farming activities.

The restoration of the area following construction may provide more wildlife habitat than what is currently available under the current land use regime. Summit Lake will restore the area within the fenceline of the Solar Facility with a seed mix that will provide more suitable habitat for wildlife, including grassland birds, rodents, reptiles, and insects. While 48.4 acres within the Preliminary Development Area would be converted to impervious surfaces (i.e., access roads, Project Substation, and O&M building, BESS, and inverters) and would not serve as wildlife habitat during operations, 1,482 acres would be restored as herbaceous cover, including a seed mix with some native plants, thereby potentially benefitting and increasing the overall populations of wildlife species in the area, including birds, small mammals, reptiles, and pollinator insects.

Permanent security fencing will be installed along the perimeter of the solar arrays and Preliminary Development Area. Additional gates will be strategically installed at corners for deer egress and contact information for the site manager will be posted at the gates. The fencing around the Solar Facility will consist of an agricultural woven wire fence and will extend approximately seven feet above grade. As typically requested by the MDNR on other projects, barbed wire will not be used around the perimeter of the Solar Facility. In place of barbed wire, one foot of three to four strands of smooth wire will be placed atop of the woven wire fence for a total height of approximately eight feet above grade. Gates will be strategically installed at corners for deer egress and contact information for the site manager will be posted at the gates.

The fencing around the Project Substation and the BESS will be a 6-foot above grade chain-link fence and include one foot of barbed wire on top to comply with the NESC. This fencing will be designed to prevent the public from gaining access to electrical equipment which could cause injury or death.

Operation and maintenance activities associated with the Project are not expected to have any impacts beyond those associated with construction as described above. As noted above, the wildlife and avian species in this area are habituated to human activities associated with agricultural practices, and impacts associated with routine operations and maintenance are not expected to differ from those related to routine farming activities.

The Project has been designed to avoid adverse impacts to the greatest extent possible to higher quality habitat that exists in wooded draws, riparian areas, waterbodies, and prairie remnants that exist in portions of Southern Minnesota. Summit Lake will utilize BMPs to stabilize, protect, and mitigate potential impacts to species' habitat. These BMPs will be implemented during construction, post-construction, and operational phases of the Project. No species-specific mitigation is proposed as all potential impacts to wildlife are expected to be minimal and insignificant.

5.5.8 Rare and Unique Natural Resources

The USFWS maintains the Information for Planning and Conservation (IPaC) website to inform project proponents of the potential for federally endangered, threatened, proposed, and candidate species and designated critical habitat to be present in proposed project areas. Similarly, the MDNR maintains the Natural Heritage Information System (NHIS) database through their Natural Heritage Program and Nongame Game Research Program; the NHIS is the most complete source

of data on Minnesota's threatened and endangered species, as well as ecologically significant areas, native plant communities, and other rare natural features.

Summit Lake reviewed both the IPaC website and the NHIS database to ensure compliance with federal and state regulations regarding protected species. Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of rare and unique species and habitats.

The NHIS review was conducted for documented occurrences of federally listed species and state-listed species within one mile of the Land Control Area. The NHIS information provided here is based on a query of licensed NHIS data (per MDNR license agreement; MDNR, 2024k). In addition, a Natural Heritage Review Request to the MDNR was submitted via the MDNR's Minnesota Conservation Explorer online tool on November 14, 2024; a response from the MDNR was received on November 14, 2024, is summarized below and is included in Appendix B.

A Conservation Planning Report for the Project was also requested through Minnesota Conservation Explorer to determine the presence and potential impacts to MDNR High Value Areas. Results of this review are summarized below, and the report is included in Appendix B.

5.5.8.1 Federally Listed Species

According to the IPaC review, the following species have been identified as potentially present in the Land Control Area (see Table 5.5.8.-1) (USFWS, 2024c). Designated critical habitat is not present in the Land Control Area.

Table 5.5.8-1 Federally Listed, Proposed, and Candidate Species Potentially Present in the Land Control Area

Scientific Name	Common Name	Federal Status
Notropis topeka (=tristis)	Topeka Shiner	Endangered
Danaus plexippus	Monarch butterfly	Proposed Threatened

Topeka Shiner

The Topeka shiner is a small, sturdy minnow, typically less than three inches in length. Coloring is silver with a dark lateral stripe. The species primarily occurs in small to mid-size prairie streams in the central United States (i.e., South Dakota, Minnesota, Kansas, Iowa, Missouri and Nebraska) where it is usually found in pool and run areas containing clear, clean water. Typical Topeka shiner streams are smaller channels that flow perennially to larger streams and rivers, but the species may be found in those which lose flow seasonally. Suitable streams tend to have good water quality and cool to moderate temperatures (USFWS, 2018).

Monarch Butterfly

The monarch butterfly is a large butterfly with an approximate 3- to 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 nectar plants are available for adult

foraging and milkweed plants are present for laying eggs and as a food source for caterpillars (USFWS, 2024d).

On December 17, 2020, the USFWS published the result of their 12-month review of the monarch butterfly and determined that listing the species under the Endangered Species Act was warranted but precluded. The species meets the criteria for listing as an endangered or threatened species, but the USFWS cannot currently implement the listing due to limited staff and/or funding and because there are other listing actions with a higher priority. On December 12, 2024, the USFWS published a proposed rule to the federal register to list the monarch as threatened with a 4(d) rule (USFWS, 2024e). A final rule is expected to be published to the federal register in 12 months, and the listing made effective 30-60 days later (i.e., January or February 2026). Proposed species are not protected under the Endangered Species Act, and as such, a determination of effect is not applicable. However, federal agencies are required to confer with the USFWS on agency actions that may be likely to jeopardize a proposed species.

5.5.8.2 State Listed Species

Documented occurrences of state-listed species within one mile of the Land Control Area are shown in Table 5.5.8-2 (MDNR, 2024l).

Table 5.5.8-2 State Listed Species Potentially Present Within One Mile of the Land Control Area

Scientific Name	Common Name	State Status
Argynnis idalia occidentalis	Regal Fritillary	Special Concern

Regal Fritillary

The regal fritillary is a strong-flying, non-migratory butterfly with a wingspan up to four inches. The species is found in native tallgrass prairie habitats and was once commonly found in 32 states extending north in New England, south to Oklahoma, and west to Colorado. Today, the Western subspecies is found in portions of Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin, and Wyoming. Regal fritillaries can range widely with females potentially traveling up to 100 miles searching for three main habitat components: violet hostplants for larvae, nectar plants for adults, and native grasses to provide protection throughout the life cycle. Adults can be found foraging in both upland and wet prairie habitats; however, habitat can only be considered suitable for all life stages if violet species are present to provide shelter and forage for larvae. The density of violets seems to correlate positively to the number of butterflies within a given area. Habitat alteration has reduced the species' range and abundance (USFWS, 2024f).

Adults mate once annually in mid to late summer; however, females undergo reproductive diapause until fall. Eggs hatch in about 3 to 4 weeks and then larvae quickly seek duff material where they overwinter. When active in spring, larvae begin feeding on young violets. Mortality is high during the larvae stage. After a 2 to 4-week pupae stage in late spring, adults emerge in early summer. Dispersal of adults may be driven by localized threats or poor habitat conditions and success is dependent upon connectivity of suitable habitat, availability of nectar sources, and habitat patch sizes among other factors (USFWS, 2024f).

On August 6, 2024, the USFWS published a proposed rule listing the western regal fritillary as federally threatened under the Endangered Species Act with protective regulations issued under section 4(d) of the Act. Proposed species are not protected under the Endangered Species Act, and as such, a determination of effect is not applicable. However, federal agencies are required to confer with the USFWS on agency actions that may be likely to jeopardize a proposed species (USFWS, 2024f).

5.5.8.3 MDNR High Value Areas

The MDNR recommends identifying high value natural resources prior to development of a project. High value resources include but are not limited to

- state-listed species;
- Minnesota Biological Survey sites of biodiversity significance, MDNR Native Plant Communities, and Native Prairie;
- wetlands, calcareous fens, shorelands, floodplains, and Public Waters Inventories;
- Minnesota Wildlife Action Plan Species and Wildlife Action Network;
- public conservation and recreation lands; and
- large block and other important habitats.

State-listed species are discussed in Section 5.5.8.2; shorelands, floodplains, public waters, and wetlands are discussed above in Section 5.5.5; and public lands are discussed in Section 5.2.10. Based on a review of MDNR data and the Minnesota Conservation Explorer Conservation Planning Report (see Appendix B), the remaining high value natural resource areas are discussed below and shown on Map 15.

Native Plant Communities

Using a variety of methods including desktop review, aerial surveys, and follow-up field-based survey efforts, MDNR's Minnesota Biological Survey evaluates landscapes in Minnesota for intact ecological communities, rare plant and animal species, and Native Plant Communities. The most recent classification effort was in 2003; this version is strongly based on plant species composition and was developed using extensive data from sample plots throughout the state from a variety of habitat types including wetlands, forests, prairies, and others.

A biodiversity significance rank is assigned to each site (these are subsequently referred to as sites of biodiversity significance). Rankings are based on the proximity of site to other intact sites or isolation within agricultural, urban, or other disturbed areas (i.e., the landscape context), presence of rare species populations and the presence/extent of native plant communities. Sites are ranked as outstanding, high, moderate, and below; the Minnesota Biological Survey ranking process allows for prioritization of sites for conservation and guides management and monitoring efforts (MDNR, 2024m).

Based on review of the MDNR Native Plant Community data, there are no Native Plant Communities within the Land Control Area.

Native Prairie

The MDNR defines native prairie as areas dominated by native prairie vegetation including grasses and forbs, as well as wildlife endemic to these areas (MDNR, 2024n). Typically, they are found in areas of the state where the sod has never been broken. Native prairie as defined or mapped by the MDNR is not present in the Land Control Area.

The MDNR also has identified native prairie remnants that occur along railroad rights-of-way (MDNR, 2024o). The 1997 Minnesota State Legislature instructed the MDNR to inventory railroad lines in the state to identify native prairie that may be associated with the railroad right-of-way. Railroad rights-of-way are ranked by the MDNR as very good, good, and fair. MDNR-mapped railroad prairie rights-of-way are not present in the Land Control Area.

Calcareous Fens

Calcareous fens are rare wetlands dependent on a persistent source of calcium-rich groundwater. These areas support unique plant communities that are highly sensitive to changes in both groundwater quality and quantity (MDNR, 2024p). Reductions in groundwater upwelling rates changes in surface water can damage fen condition and/or extent, in some cases irreparably. Based on review of MDNR's data, there are no calcareous fens within 5 miles of the Land Control Area.

Minnesota Wildlife Action Plan and Wildlife Action Network

Minnesota's State Wildlife Action Plan (2015-2025) aims to address the primary issues facing Minnesota's Species of Greatest Conservation Need including habitat loss, degradation, and fragmentation, biological factors such as low reproduction, poor dispersal ability, disease, or overexploitation, and the impacts of climate change (MDNR, 2024q). Species of Greatest Conservation Need are native species with rare, declining, or vulnerable populations. All state and federally listed species that occur in Minnesota are automatically listed as Species of Greatest Conservation Need.

The State Wildlife Action Plan defines actions that can be taken to prevent further population decline, resulting in the need to list these species under state endangered species or federal Endangered Species Act regulations.

The Wildlife Action Network is a spatial dataset developed by the MDNR to assist in developing and focusing conservation efforts for species identified in the State Wildlife Action Plan (MDNR, 2024r). The Wildlife Action Network is comprised of 10 GIS data layers that represent terrestrial and aquatic habitats across the state that support Species of Greatest Conservation Need. These include lakes of biological significance, rivers and streams with high biological integrity, and high conservation value forests. The closest mapped area is located approximately 1.2 miles north of the Land Control Area.

Large Block Habitats

Large, contiguous blocks of habitat, such as forests or grasslands, can provide foraging, denning, and breeding habitats for species requiring greater separation from anthropogenic development. These areas often include more complex ecological communities, which may lead to an increased

diversity of species, and larger and more resilient species populations. Construction of a project within large block habitats may increase habitat loss and fragmentation, which is counterproductive to area-sensitive species for feeding, breeding, and sheltering. No large block habitats are present in the Land Control Area.

A review of the Reinvest in Minnesota Reserve Program mapper did not identify any conservation easements within the Land Control Area. One Reinvest in Minnesota wetland restoration easement is adjacent to the Land Control Area at the north end of the area boundary.

5.5.8.4 Impacts and Mitigation Measures

Federally Listed Species

Desktop and field-based surveys conducted by Tetra Tech July 29-31, 2024, determined that suitable stream habitat that feeds into the Missouri River in southwestern Minnesota is not present in the Land Control Area. As such, Tetra Tech determined that the potential for Topeka Shiners in the Preliminary Development Area is low.

Field-based surveys to identify suitable habitat for monarch butterflies were not conducted; however, some adult foraging habitat is likely present in some portions of the Preliminary Development Area, as is larval foraging habitat containing milkweed.

The IPaC website will be reviewed again prior to the start of construction to ensure the species list remains current. If federally listed species are identified through these reviews as potentially present in the vicinity of the Land Control Area, Summit Lake will work with the USFWS to develop avoidance and minimization measures to ensure Project activities will not result in unauthorized take of federally listed species.

State Listed Species

Field-based surveys conducted by Tetra Tech on July 29-31, 2024, determined there is low potential for occurrence of state-listed species identified as potentially present within Nobles County.

In addition, native prairie habitat was not identified in the Land Control Area during the field survey effort; as such, habitat for the regal fritillary (identified as potentially present in the course of the November MDNR Minnesota Conservation Explorer review) is likely not present in the Land Control Area. Impacts to this species are not anticipated. In addition, special concern species are not protected under state regulations; the MDNR has included recommended actions in their response to the Natural Heritage Review Request; these include modifying the location of project activities to avoid suitable habitat or modifying the timing of project activities to avoid the presence of the species (see Appendix B).

MDNR High Value Areas

The project is unlikely to have impacts on state-listed species, as discussed above. Shorelands, floodplains, public waters, and wetlands are discussed above in Section 5.5.5; and public lands are discussed in Section 5.2.10. There are no additional MDNR high value areas in the Land Control

Area, including Minnesota Biological Survey sites of biodiversity significance, Native Plant Communities, native prairie, calcareous fens, State Wildlife Action Plan species or Wildlife Action Network areas, large block habitats, or conservation easements. As such, impacts on MDNR high value areas will be avoided and no mitigative measures are proposed.

5.6 Unavoidable Impacts

Summit Lake developed the Land Control and Preliminary Development Areas to avoid impacting environmental resources whenever possible. In some cases, impacts on environmental resources could not be entirely avoided, but could be minimized by implementation of mitigation measures. A detailed discussion of the environmental impacts of the proposed Project, as well as the mitigation measures that would be used to minimize impacts is presented in Sections 4.1 through 4.5 of this Joint Application. Environmental impacts that would be minimized by the use of mitigation measures, but not entirely avoided are provided below. Most of these unavoidable impacts would occur during construction of the Project and would resolve when construction is complete.

Unavoidable impacts related to the Project that would last only as long as the construction period include:

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners;
- increased traffic on roads surrounding and bisecting the Land Control Area;
- minor air quality impacts due to fugitive dust;
- temporary impacts to wetlands present in the Preliminary Development Area;
- potential for soil erosion; and
- disturbance to and temporary displacement of some species of wildlife.

Unavoidable impacts related to the Project that would last as long as the life of the Project would include:

- changes to the existing aesthetics of landscape (from agrarian to solar and BESS facilities), which will be visible from residences and local roadways;
- changes in land use and vegetation from agricultural land of predominately corn and soybeans to a solar facility with herbaceous vegetation underneath and around the Preliminary Development Area; and
- changes in land use from agricultural land to industrial use and introduction of impervious surfaces for operation of the BESS facility.

No additional mitigation measures are proposed for the Project beyond those discussed in Sections 4.1 through 4.5. The potential costs of implementing these mitigation measures have been incorporated into the overall cost of Project development as presented in Section 2.4.

5.7 Irretrievable and Irreversible Impacts

An irretrievable commitment of resources refers to the use or consumption of resources in a way that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, and other materials (e.g., aggregate minerals, steel/metals).

Construction of the Project would require the use of fossil fuels for electricity (portable generators) and for the operation of construction and personnel vehicles and equipment. Use of raw building materials for construction would be an irretrievable commitment of resources from which these materials are produced, excluding those materials that may be recycled at the end of the Project's life cycle. The use of water for dust abatement during construction activities would also be irreversible. In addition, the commitment of labor and fiscal resources to develop and build the Project is considered irretrievable.

5.8 Cumulative Potential Effects

Cumulative impacts on environmental resources can occur if the impacts of one activity overlap either geographically or temporally with other activities, thereby resulting in cumulatively greater impacts on a particular area or important resource.

Review of the MNDOT District 7 planned projects did not identify any proposed projects that would overlap either geographically (i.e., within the Land Control Area) or temporally (i.e., during the anticipated period of construction) with the Summit Lake Project (MNDOT, 2023b). The nearest proposed MNDOT project would be reconstruction of U.S. Highway 59 within the City of Worthington that is currently planned for 2027-2028. Worthington is approximately 5.0 miles southeast of the Land Control Area.

Information regarding planned county highway and bridge projects for 2024 is available on the Nobles County Engineering Department website (Nobles County, 2024b); information regarding projects beyond 2024 is not available on the website. Review of this information did not identify any proposed projects that would be within the Land Control Area or overlap the proposed construction timeframe for the Project (i.e., second quarter of 2026 through the fourth quarter of 2027).

The Project will be constructed northeast of Reading and the Nobles Wind Farm, which is a visible feature in the existing landscape of the Study Area. The Nobles Wind Farm has been in operation since 2010 and as such has become a part of the visual landscape in the Project Study Area. The profile of the Project is much lower than that of a wind turbine, though the Solar Facility and BESS may be visible to passersby on local roadways surrounding the Land Control Area, these facilities will be similar in appearance to other existing electrical substations and commercial industrial buildings in the unincorporated community of Reading.

No other proposed projects have been identified through coordination with other state, county, and local agencies that would overlap geographically or temporally with the proposed Project and results in cumulative impacts on human settlement and environmental resources in the Project Study Area.

6.0 AGENCY AND PUBLIC OUTREACH

Summit Lake conducted early outreach to solicit feedback from federal, state, and local government agencies in support of this Joint Application. This early engagement provided Summit Lake with valuable insight into landowner, agency, and Tribal Nation preferences regarding development of Project facilities.

Table 6.0-1 identifies agencies that were contacted through meetings or a notification letter and the date that responses were received. Copies of agency correspondence are provided in Appendix B and summaries of responses received to date are provided in Sections 6.1 through 6.3.

Table 6.0-1 Summit Lake Solar Agency Correspondence

Agency	Response Date (Type)
Federal	
U.S. Army Corps of Engineers – St. Paul District	Response to Wetland Delineation Inquiry November 30, 2023
U.S. Fish and Wildlife Service – Twin Cities Ecological Services Field Office	IPaC report and auto response on November 15, 2024.
Federal Aviation Administration	Notice Criteria Tool April 23, 2024
Tribal Nations	
Bois Forte Band of Chippewa	No response to date.
Fond du Lac Band of Lake Superior Chippewa	No response to date.
Grand Portage Band of Lake Superior Chippewa	No response to date.
Leech Lake Band of Ojibwe	No response to date.
Lower Sioux Indian Community	No response to date.
Mille Lacs Band of Ojibwe	No response to date.
Minnesota Chippewa Tribe	No response to date.
Prairie Island Indian Community	No response to date.
Red Lake Nation	No response to date.
Shakopee Mdewakanton Sioux Community	No response to date.
Upper Sioux Community	No response to date.
White Earth Nation	No response to date.
Minnesota Indian Affairs Council	No response to date.
State	
Minnesota Department of Commerce – Energy Environmental Review and Analysis	Meeting November 14, 2024
	Draft Application Submitted for Preliminary Completeness Review December 16, 2024
	Preliminary Completeness Response Received January 17, 2025 and January 29, 2025

Table 6.0-1 Summit Lake Solar Agency Correspondence	
Agency	**Response Date (Type)**
	Size Determination Request Submitted January 21, 2025
	Response to Size Determination Request January 24, 2025
Minnesota Public Utilities Commission	Meeting November 14, 2024
Minnesota Department of Agriculture	Meeting November 12, 2024
Minnesota Department of Transportation	Meeting November 13, 2024
Minnesota Department of Natural Resources (MDNR)– Region 4 (Southern Region), Region Environmental Assessment Ecologist	Meeting November 18, 2024
MDNR – Energy Projects, Planner's Office	Meeting November 18, 2024
MDNR – Natural Heritage Review Request	Response received November 14, 2024
Minnesota Historical Society – State Historic Preservation Office	No response to date.
Office of the State Archaeologist	No response to date.
Minnesota Pollution Control Agency	No response to date.
County	
Nobles County Board of Commissioners, District 1	Meeting November 19, 2024
Nobles County Board of Commissioners, District 2	No response to date.
Nobles County Board of Commissioners, District 3	No response to date.
Nobles County Board of Commissioners, District 4	No response to date.
Nobles County Board of Commissioners, District 5	No response to date.
Nobles County Administrator	Meeting November 14, 2024
Nobles County Zoning Administrator	Meeting November 14, 2024
Nobles County Public Works	Meeting November 14, 2024
Nobles County Environmental Services	Meeting on December 4, 2024
Local Government Units	
Summit Lake Township	No response to date.
Elk Township	No response to date.
Other Interested Parties	
Southwest Regional Development Commission	No response to date.

6.1 Federal Agencies

6.1.1 U.S. Army Corps of Engineers

On behalf of the Applicant, Tetra Tech consulted with the USACE in November 2023 and provided the wetland delineation report. On November 30, USACE stated in a response that a delineation concurrence may not be necessary from USACE as there is not any proposed work at the site.

USACE suggests moving forward with the Applicant's project planning, and consulting with state or local authorities.

6.1.2 U.S. Fish and Wildlife Service

The Applicant submitted the Project to the IPaC website on November 15, 2024, to understand the potential for federally endangered, threatened, proposed, and candidate species and designated critical habitat to be present in proposed Land Control Area. A description of the IPaC results and recommendations is provided in Section 5.5.8.1.

6.1.3 Federal Aviation Administration

The Applicant filed a Federal Aviation Administration 7460-1 Notice of Proposed Construction forms for the max elevation and an additional 16 vertices within the solar arrays on April 12, 2024. On April 23, 2024, the Federal Aviation Administration provided Determinations of No Hazard to air navigation for each of the 30 points within the Project.

6.2 State Agencies

6.2.1 Minnesota Department of Commerce, Energy Environmental Review and Analysis and Minnesota Public Utilities Commission

The Applicant met with Energy Environmental Review and Analysis and Commission representatives (Raymond Kirsch and Bret Eknes, respectively) on November 14, 2024 to introduce the Project and discuss the schedule for filing this Joint Application. General questions about the Project and Joint Application schedule were discussed. Mr. Kirsch and Mr. Eknes noted that a 9-month timeframe for review and approval of the Project is likely ambitious given the current volume of projects under review. Additionally, recent curtailments at the Nobles Substation were discussed. Finally, Energy Environmental Review and Analysis and Commission representatives noted that at some point, the Applicant will need to submit labor statistics for the Project. No additional concerns were discussed during the meeting.

Summit Lake submitted a draft of the Joint Application to the Energy Environmental Review and Analysis unit for a preliminary completeness review on December 16, 2024. The Energy Environmental Review and Analysis unit comments were received on January 21 and 29, 2025. The agency's comments and recommendations have been incorporated into this Joint Application.

Summit Lake submitted a Size Determination Request for the Project to the Energy Environmental Review and Analysis on January 21, 2025. The Energy Environmental Review and Analysis unit responded on January 24, 2025, confirming that the Project is not associated with other planned projects in a way that would require them to be combined into a single project.

6.2.2 Minnesota Department of Agriculture

The Applicant met with Steve Roos from MDA on November 12, 2024, to introduce the Project. During this meeting, Mr. Roos asked when a copy of the Agricultural Impact Mitigation Plan would be provided for review. The Applicant committed to providing a copy of the Draft Agricultural Impact Mitigation Plan in early December and affirmed that both the Solar Facility

and BESS will be included in the Agricultural Impact Mitigation Plan. Other topics included a discussion of irrigation systems and aerial spraying operations; it was noted that the Project is not likely to affect either of these existing practices and there is no need to discuss irrigation systems or aerial spraying operations in the Agricultural Impact Mitigation Plan for the Project.

The Draft Agricultural Impact Mitigation Plan was submitted to MDA for review on December 16, 2024. The MDA responded on December 24, 2024, and commented that the AIMP was very well done and they have no comments. A copy of the Agricultural Impact Mitigation Plan is provided in Appendix F and copies of correspondence with MDA are provided in Appendix B.

6.2.3 Minnesota Department of Natural Resources

The Applicant submitted a Natural Heritage Review Request to the MDNR via the MDNR's Minnesota Conservation Explorer online tool on November 14, 2024; a response from the MDNR was received on November 14, 2024, is summarized in Section 5.5.8.2 and is included in Appendix B.

6.2.4 Minnesota Department of Transportation

The Applicant met with Stacy Kotch Egstad from MNDOT on November 13, 2024, to introduce the Project. At this meeting, Ms. Kotch Egstad requested shapefiles of the Project design when available, to better assess potential Project effects on infrastructure under MNDOT's jurisdiction. The Applicant provided the requested shapefiles on December 11, 2024. No additional responses from MNDOT have been received to date.

6.3 Nobles County and Local Government Units/Stakeholders

6.3.1 Nobles County

The Applicant presented Project information during the Nobles County Board meeting on November 19, 2024. In addition to the Board of Commissioners, multiple representatives from Nobles County were in attendance, as well as representatives from Elk and Summit Lake Townships. After presenting information about the Project, the Applicant addressed any questions or concerns the county may have about the development of the Project.

Nobles County identified county-owned and maintained drain tiles are present in the Project Land Control Area. County representatives also noted that road use agreements will be necessary for the Project. Additionally, the county recommended the Applicant coordinate with the Wilmont Fire Chief and Elk and Summit Lake Townships to further address any questions or concerns they may have.

The Applicant is working with the county to develop drain tile and road use agreements for the Project; these agreements will be executed prior to the start of construction. The Applicant has also reached out to the contacts recommended during the County Board meeting; coordination with the townships and the Wilmot Fire Chief are ongoing.

Summit Lake met with Nobles County Environmental Services representatives Loretta Halbur and Zach Reker, and the County Engineer, Aaron Holmbeck, on December 4, 2024 to review the

preliminary Project design and discuss drain tile setbacks. Summit Lake is working with the county and its drain tile contractor, ISG, to conduct a feasibility study and develop appropriate setbacks to county drain tile to provide buffers on each side of the drain tile to allow the County with continued access for maintenance, repair and replacement of existing County drain tile and to determine which drain tile can be moved to accommodate the Project. The Project layout includes a 75-foot buffer on both sides of the existing County drain tile as well as preliminary drain tile shifts to accommodate the Project based on initial assessments of ISG. However, coordination with the county and ISG is ongoing and, based on the results of ISG's feasibility study and feedback from the County, additional design changes may be necessary to accommodate the County drain tile prior to finalizing the Project layout. Summit Lake will provide an updated design to the Commission when available.

On December 3, 2024, Bruce Heitkamp, Nobles County Administrator, reached out to the Applicant to ask a question about anticipated noise levels during operation of the BESS. The Applicant provided additional information about the sound specifications of the BESS model currently contemplated for the Project. No additional correspondence has been received from Mr. Heitkamp to date.

6.3.2 Summit Lake Township

The Applicant contacted Summit Lake Township on November 14, 2024, to invite township representatives to the Nobles County Board Meeting on November 19, 2024.

6.3.3 Elk Township

The Applicant contacted Elk Township on November 14, 2024, to invite township representatives to the Nobles County Board Meeting on November 19, 2024.

7.0 REFERENCES

AirNav. 2024. Worthington Municipal Airport, Worthington, Minnesota, USA. Available online at: https://www.airnav.com/airport/KOTG. Accessed November 2024.

Booking.com. 2025. Lodging Availability for Worthington and Luverne, Minnesota. Available online at: https://www.booking.com/index.html?label=worthington-fVlDqeX0MNyavDML0oxvWwS541249457212%3Apl%3Ata%3Ap1%3Ap2%3Aac%3Aap%3Aneg%3Afi%3Atikwd-324073301989%3Alp9019546%3Ali%3Adec%3Adm&sid=c2799ebff0c7dfdc806fe68e0ca026db&aid=2036621. Accessed February 2025.

Broberg, Jeffrey S. 2016. CleanTechnica, Utility & Community Solar Should Use Native Landscaping. Published March 15, 2016. Available online at: https://cleantechnica.com/2016/03/15/utility-and-community-solar-should-use-native-landscaping/. Accessed November 2024.

Dewitz, J. and U.S. Geological Survey. 2021. National Land Cover Database (NLCD) 2021 Products. Available online at: https://www.usgs.gov/data/national-land-cover-database-nlcd-2021-products. Accessed November 2024.

Energy Information Administration. 2022. U.S. Energy Atlas. December 14, 2022. Available online at: https://atlas.eia.gov/datasets/geoplatform::transmission-lines/explore?location=43.707464%2C-95.711051%2C14.35. Accessed November 2024.

Experience Sioux Falls. 2024. Places to stay in Sioux Falls. Available online at: https://www.experiencesiouxfalls.com/places-to-stay. Accessed November 2024.

Explore Southwest Minnesota. 2024. Festivals. Available online at: https://www.exploreswmn.com/festivals. Accessed November 2024.

Federal Emergency Management Agency (FEMA). 2024. FEMA Digital Flood Rate Insurance Maps (DFIRM), Minnesota. Available online at: https://gisdata.mn.gov/dataset/water-dnr-fema-dfirm. Accessed November 2024.

Intergovernmental Panel on Climate Change. 2014. Working group 3, Annual report 5, Annex III: Technology-specific Cost and Performance Parameters. Available online at: https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_annex-iii.pdf. Accessed November 2024.

Lower Sioux Indian Community. 2025. About Us. Available online at: https://lowersioux.com/about-us/. Accessed February 2025.

McCallum, L.C., M.L. Whitfield Aslund, L.D. Knopper, G.M Ferguson, and C.A. Ollson. 2014. *Measuring electromagnetic fields (EMF) around wind turbines in Canada: is there a human health concern?* Environmental Health 13:9. Available online at: https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-13-9. Accessed November 2024.

Minnesota Department of Employment and Economic Development. 2023. Minnesota Broadband Providers by County, Released October 31, 2023. Available online at: https://mn.gov/deed/assets/providers-county_tcm1045-190762.pdf. Accessed November 2024.

Minnesota Department of Commerce (Minnesota DOC). 2020. Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternatives. Available online at: https://eera.web.commerce.state.mn.us/eera/web/doc/13929. Accessed November 2024.

Minnesota DOC. 2024. Minnesota Telephone Exchange Boundaries, March 2024. Available online at: https://www.arcgis.com/apps/OnePane/basicviewer/index.html?appid=a61fe43236994d43b097d439befb8e70. Accessed November 2024.

Minnesota Department of Employment and Economic Development. 2023. Minnesota Broadband Providers by County, Released October 31, 2023. Available online at: https://mn.gov/deed/assets/providers-county_tcm1045-190762.pdf. Accessed November 2024.

Minnesota Department of Health (MDH). 2019. Wellhead Protection Areas – GIS data. Available online at https://gisdata.mn.gov/dataset/water-wellhead-protection-areas. Accessed November 2024.

MDH. 2022. Well Information from County Well Index for the General Public. Available online at: https://gisdata.mn.gov/dataset/water-well-information-non-pws. Accessed November 2024.

MDH. 2024a. Minnesota Well Index. Available online at https://mnwellindex.web.health.state.mn.us/. Accessed November 2024.

MDH. 2024b. Laws and Rules. Drinking Water and Source Water Protection Programs. Available online at: https://www.health.state.mn.us/communities/environment/water/rules/index.html. Accessed November 2024.

Minnesota Department of Natural Resources (MDNR). 2019. National Wetland Inventory for Minnesota. Available online at: https://gisdata.mn.gov/dataset/water-nat-wetlands-inv-2009-2014. Accessed October 2024.

MDNR. 2023. MDNR Watershed Suite. Available Online at: https://gisdata.mn.gov/dataset/geos-dnr-watersheds. Accessed October 2024.

MDNR. 2024a. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed November 2024.

MDNR. 2024b. Ecological Classification System, Coteau Moraines Subsection. Available online at: https://www.dnr.state.mn.us/ecs/251Bb/index.html. Accessed November 2024.

MDNR. 2024c. Minnesota Climate Trends for Nobles County, MN. Available online at: https://arcgis.dnr.state.mn.us/ewr/climatetrends/. Accessed November 2024.

MDNR. 2024d. Historic mega-rain events in Minnesota. Modified September 9, 2024. Available online at: https://www.dnr.state.mn.us/climate/summaries_and_publications/mega_rain_events.html. Accessed November 2024.

MDNR. 2024e. Minnesota Regions Prone to Surface Karst Feature Development. Available online at: https://gisdata.mn.gov/dataset/geos-surface-karst-feature-devel. Accessed November 2024.

MDNR. 2024f. Groundwater Provinces. Available online at https://www.dnr.state.mn.us/groundwater/provinces/index.html. Accessed November 2024.

MDNR. 2024g. DNR Hydrography Dataset. Available Online at: https://gisdata.mn.gov/dataset/water-dnr-hydrography. Accessed October 2024.

MDNR. 2024h. Public Waters (PW) Basin and Watercourse Delineations. Available Online at: https://gisdata.mn.gov/dataset/water-mn-public-waters. Accessed October 2024.

MDNR. 2024i. Impaired Waterbodies, Minnesota, 2024. Available online at: https://gisdata.mn.gov/dataset/env-impaired-water-2024. Accessed October 2024.

MDNR. 2024j. Animals Homepage. Available online at: https://www.dnr.state.mn.us/animals/index.html. Accessed October 2024.

MDNR. 2024k. Licensed Natural Heritage Information System data to Merjent, Inc. (License Agreement 2023-052), data current as of February 2024.

MDNR. 2024l. Minnesota Conservation Explorer (MCE). Available online at: https://mce.dnr.state.mn.us/. Accessed November 2024.

MDNR. 2024m. Native Plant Communities. Available at https://www.dnr.state.mn.us/npc/index.html. Accessed November 2024.

MDNR. 2024n. Native Prairie Defined. Available online at https://www.dnr.state.mn.us/prairie/restore/native-prairie-defined.html. Accessed October 2024.

MDNR. 2024o. Minnesota's Railroad Rights of Way Prairie: A Report to the 1999 Legislature. Available online at https://files.dnr.state.mn.us/eco/mcbs/publications/railroad_row_booklet_scan.pdf. Accessed October 2024.

MDNR. 2024p. Calcareous Fens. Available online at https://www.dnr.state.mn.us/wetlands/calcareous-fens.html. Accessed October 2024.

MDNR. 2024q. Minnesota State Wildlife Action Plan (SWAP) 2015-2025. Available online at https://www.dnr.state.mn.us/mnwap/index.html. Accessed October 2024.

MDNR. 2024r. MNWAP Wildlife Action Network (WAN). Available online at https://gisdata.mn.gov/dataset/env-mnwap-wildlife-action-netwrk. Accessed October 2024.

Minnesota Department of Transportation (MNDOT). 2003. Nobles County Pit Map. Available online at: https://dot.state.mn.us/materials/maps/copitmaps/nobles.pdf. Accessed November 2024.

MNDOT. 2023a. Aggregate Source Information System. Available online at: https://www.dot.state.mn.us/materials/asis_GE.html. Accessed November 2024.

MNDOT. 2023b. South Central Minnesota Regional Information, MNDOT District 7. Available online at: https://www.dot.state.mn.us/d7/projects.html. Accessed November 2024.

MNDOT. 2024a. Traffic Mapping Application. Available online at: https://mndot.maps.arcgis.com/apps/webappviewer/index.html?id=7b3be07daed84e7fa170a91059ce63bb. Accessed November 2024.

MNDOT. 2024b. Minnesota Rail Viewer Application. Available online at: https://www.arcgis.com/apps/mapviewer/index.html?webmap=2c6405034bfb45869d5b47fccf22a7cc. Accessed November 2024.

Minnesota Geological Survey. 2022. Bedrock Geology – County Atlas. Available online at: https://mnatlas.org/resources/bedrock-geology-county-atlas/. Accessed November 2024.

Minnesota Pollution Control Agency (MPCA). 2015. A Guide to Noise Control in Minnesota, Revised 2015. Available online at https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf. Accessed November 2024.

MPCA. 2023a. Determine How to Manage Retired Solar Panels. https://www.pca.state.mn.us/sites/default/files/leg-sy23-50.pdf. Accessed February 2025.

MPCA. 2023b. National Ambient Air Quality Standards and Air Monitoring. October 2023. Available online at: https://www.pca.state.mn.us/sites/default/files/aq4-33.pdf. Accessed November 2024.

MPCA. 2024a. Environmental Justice. Available online at: https://www.pca.state.mn.us/about-mpca/environmental-justice. Accessed November 2024.

MPCA. 2024b. Understanding Environmental Justice in Minnesota. Available online at: https://experience.arcgis.com/experience/bff19459422443d0816b632be0c25228/page/Page/?views=EJ-areas. Accessed November 2024.

MPCA. 2024c. Minnesota Air Quality Index. Available online at: https://public.tableau.com/app/profile/mpca.data.services/viz/MinnesotaAirQualityIndex_0/AQIExternal. Accessed November 2024.

MPCA. 2024d. About Air Quality Data. Available online at: https://www.pca.state.mn.us/air-water-land-climate/understanding-the-air-quality-index-aqi. Accessed November 2024.

MPCA. 2024e. Climate Change Initiatives. Available online at: https://www.pca.state.mn.us/air-water-land-climate/climate-change-initiatives. Accessed November 2024.

MPCA. 2024f. Climate Change Impacts. Available online at: https://www.pca.state.mn.us/air-water-land-climate/climate-change-impacts. Accessed November 2024.

MPCA. 2024g. Minnesota Watershed Information. Available online at: https://www.pca.state.mn.us/business-with-us/watershed-information. Accessed November 2024.

MPCA. 2025. Air Permits. Available online at: https://www.pca.state.mn.us/business-with-us/air-permits. Accessed January 2025.

Minnesota Public Utilities Commission (Commission). n.d. Find a Utility Company. Available online at: https://mn.gov/puc/consumers/utility/. Accessed November 2024.

National Audubon Society. 2024. Audubon Important Bird Areas. Available at http://web4.audubon.org/bird/iba/virginia/Documents/Culpeper%20Basin.pdf. Accessed November 2024.

National Institute of Environmental Health Sciences (NIEHS). 2002. Electric and Magnetic Fields Associated with the Use of Electric Power. June 2002. Available online at https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Accessed November 2024.

National Pipeline Mapping System. 2024. NPMS Public Viewer. Available online at https://pvnpms.phmsa.dot.gov/PublicViewer/. Accessed November 2024.

National Renewable Energy Laboratory (NREL). 2012. Life Cycle Greenhouse Gas Emissions from Concentrating Solar Power. Available online at: https://www.nrel.gov/docs/fy13osti/56416.pdf. Accessed November 2024.

NREL. 2019. Grid-Scale Battery Storage - Frequently asked questions. Available online at https://www.nrel.gov/docs/fy19osti/74426.pdf. Accessed February 2025.

Nobles County. 2001. Nobles County Comprehensive Plan. Available online at: https://www.co.nobles.mn.us/wp-content/uploads/2016/12/nobles-county-full-comprehensive-srdc-plan.pdf. Accessed November 2024.

Nobles County. 2021. Nobles County Solar Energy Ordinance, Adopted Date: 11-3-2020, Implemented date 11-1-2021. Available online at: Solar-Energy-Ordinance-CB-Approved-11-3-2020.pdf. Accessed November 2024.

Nobles County. 2024a. Emergency Management. Available online at: https://www.co.nobles.mn.us/departments/emergency-management/. Accessed November 2024.

Nobels County. 2024b. Engineering Department, 2024 Highway and Bridge Projects. Available online at: https://www.co.nobles.mn.us/departments/public-works/engineering/. Accessed November 2024.

Nobles MN Fair. 2024. Nobles County Fair. Available online at: https://noblesmnfair.com/home/. Accessed November 2024.

North American Bird Conservation Initiative (NABCI). 2024. Bird Conservation Regions. Available at https://nabci-us.org/resources/bird-conservation-regions-map/. Accessed November 2024.

The RadioReference Wiki. 2020. Allied Radio Matrix for Emergency Response (ARMER) Site Directory. September 26, 2020. Available online at: https://wiki.radioreference.com/index.php/Allied_Radio_Matrix_for_Emergency_Response_(ARMER)_Site_Directory. Accessed November 2024.

Risk Factor. 2024. Nobles County, Minnesota Flood Factor. Available online at: https://firststreet.org/county/nobles-county/27105_fsid/flood?from=riskfactor.com. Accessed November 2024.

Soil Survey Staff. 2024. Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/. Accessed November 2024.

Solar Energy Industries Association. 2024. Circular Economy. Available online at: https://www.seia.org/iniatives/circular-economy. Accessed December 2024.

Tetra Tech, Inc. 2024a. Phase I Environmental Site Assessment. July 2, 2024.

Tetra Tech, Inc. 2024b. Wetlands and Waters Survey. October 16, 2024.

U.S. Census Bureau. 2022. Selected Economic Characteristics. American Community Survey, ACS 5-Year Estimates Data Profile, Table DP03. Available online at: https://data.census.gov/table/ACSDP5Y2022.DP03?q=DP03: Selected Economic Characteristics&g=040XX00US27_050XX00US27105_1400000US27105105100. Accessed November 2024.

U.S. Census Bureau. 2023. QuickFacts, Nobles County, Minnesota, July 1, 2023. Available online at: https://www.census.gov/quickfacts/fact/table/noblescountyminnesota,MN,US/PST045223. Accessed November 2024.

U.S. Department of Agriculture (USDA). 2022. 2022 Census of Agriculture Publications. Available online at: https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota. Accessed November 2024.

USDA, Natural Resources Conservation Service. 2024. National soil survey handbook, title 430-VI. https://directives.sc.egov.usda.gov. Accessed November 2024.

U.S. Drought Monitor. 2024. Nobles County, MN. Available online at: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_27105. Accessed November 2024.

U.S. Department of Transportation. 2017. Construction Noise Handbook. Available online at: https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook09.cfm. Accessed November 2024.

U.S. Environmental Protection Agency (EPA). 2023. Lithium-iron Battery Recycling. Available online at: https://www.epa.gov/hw/lithium-iron-battery-recycling. Accessed November 2024.

EPA. 2024a. Avoided Emissions and Generation. Available online at: https://www.epa.gov/avert/avert-web-edition. Accessed November 2024.

EPA. 2024b. Greenhouse Gas Equivalence Calculator. Available online at: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results. Accessed November 2024.

EPA. 2024c. End-of-Life Solar Panels: Regulations and Management. Available online at: https://www.epa.gov/hw/end-life-solar-panels-regulations-and-management. Accessed November 2024.

EPA. 2024d Sources of Greenhouse Gas Emissions. Updated October 22, 2024. Available online at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions. Accessed November 2024.

EPA. 2024e. Overview of the Drinking Water Sole Source Aquifer Program. Available online at https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program. Accessed November 2024.

EPA. 2024f. Map of Sole Source Aquifer Locations. Available online at: https://www.epa.gov/dwssa/map-sole-source-aquifer-locations. Accessed November 2024.

U.S. Fish and Wildlife Service (USFWS). 2018. Species Status Assessment report for Topeka shiner (*Notropis topeka*). (Version 1.0). U.S. Fish and Wildlife Service, Region 6, Denver, CO. 281 p. Available online at https://ecos.fws.gov/ServCat/DownloadFile/143361. Accessed November 2024.

USFWS. 2024a. Birds of Conservation Concern. Available online at: https://www.fws.gov/sites/default/files/documents/2024-03/usfwsbirdspeciesofconcern_1.pdf. Accessed October 2024.

USFWS. 2024b. Waterfowl Production Areas. Available online at https://www.fws.gov/story/waterfowl-production-areas. Accessed November 2024.

USFWS. 2024c. Information for Planning and Consultation (IPaC). Available online at https://ipac.ecosphere.fws.gov/. Accessed November 2024.

USFWS. 2024d. Monarch Butterfly. Available online at https://www.fws.gov/species/monarch-danaus-plexippus. Accessed November 2024.

USFWS. 2024e. Endangered and Threatened Wildlife and Plants; Threatened Status With Section 4(d) Rule for Monarch Butterfly and Designation of Critical Habitat. Proposed Rule. 89 Federal Register 100662 (December 12, 2024). Available online at: https://www.federalregister.gov/d/2024-28855. Accessed January 2025.

USFWS. 2024f. Endangered and Threatened Wildlife and Plants; Endangered Status for the Eastern Regal Fritillary, and Threatened Status With Section 4(d) Rule for the Western Regal Fritillary. Proposed Rule. 89 Federal Register 63888 (August 6, 2024).

University of Minnesota. 2024. Minnesota Solar Suitability Analysis. Available online at: https://solar.maps.umn.edu/. Accessed November 2024.

Upper Sioux Community Pezihutazizi Oyate. n.d. History. Available online at: https://www.uppersiouxcommunity-nsn.gov/history. Accessed February 2025.

Walston, L. J., Li, Y., Hartmann, H. M., Macknick, J., Hanson, A., Nootenboom, C., Lonsdorf, E., and Hellmann, J. 2021. Modeling the ecosystem services of native vegetation management practices at solar energy facilities in the Midwestern United States. Ecosystem Services. 47. 101227.

World Health Organization. 2016. Radiation: Electromagnetic Fields. Available online at https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields. Accessed February 2025.