Environmental Assessment:

Solway Solar Project

The Human and Environmental Impacts of Constructing and Operating the

66 MW Solway Solar Project

April 2025

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COMMERCE DEPARTMENT

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Otter Tail Power Company (Otter Tail) proposes to construct and operate the Solway Solar Project, an up to 66 megawatt (MW) solar energy generating system and associated facilities in Beltrami County, Minnesota. Otter Tail must obtain a site permit from the Minnesota Public Utilities Commission before it can construct the proposed Solway Solar Project.

Sources

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

Project Mailing List

To place your name on the project mailing list contact docketing.puc@state.mn.us or (651) 201-2246 and provide the docket number (24-309), your name, email address, and mailing address. Please indicate whether you would like to receive notices by email or U.S. mail.

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Contents

Appendices

Figures

Tables

Acronyms and Abbreviations

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

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

Definitions

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

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

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

distribution line means power lines that operate below 69 kilovolts.

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

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

land control area means the 487 acre area for which Otter Tail is assumed to have site control through ownership. The site permit application refers to this as the "Project Area." For this document, it applies to the area for the solar facility as well as area for collection corridors, substation and transmission lines. The term is used to bound a review area.

large electric power generating plant means electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts or more (Minnesota Statute 216E.01, subdivision 5).

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

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

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

preliminary development area means the approximate 267 acre area within the land control area where Otter Tail proposes to build the solar facilities. This area does not include the collection corridors or required setbacks. This area is also referred to as the project boundary. The site permit application refers to this as the "Project Footprint."

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

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

solar energy generation system means a set of devices whose primary purpose is to produce electricity by means of any combination of collecting, transferring, or converting solar-generated energy (Minnesota Statute 216E.01, subdivision 9a). The site permit application refers to this as the "solar energy conversion facility."

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

1 Introduction

Otter Tail Power Company (Otter Tail or applicant) is proposing to construct and operate the Solway Solar Project (project), an up to 66 megawatt (MW) solar energy generating system in Lammers Township, Beltrami County, Minnesota. Otter Tail must obtain a site permit from the Minnesota Public Utilities Commission (Commission) before it can construct and operate the project. The project will connect to the electrical transmission grid at the Solway Combustion Turbine Generating Station (Solway Station) located adjacent to the project site.

The applicant filed a site permit application (SPA) on October 11, 2024, and the Commission found the application to be substantially complete on January 28, 2025.

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

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

1.1 How is this document organized?

The EA addresses the matters identified in the scoping decision.

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

- **Chapter 1** briefly describes the state of Minnesota's role; discusses how this EA is organized; and provides a summary of potential impacts and mitigation.
- **Chapter 2** describes the project—design, construction, operation, and decommissioning.
- **Chapter 3** summarizes the regulatory framework, including the site permit process, the environmental review process, other approvals that might be required for the project, and the criteria the Commission uses to make its decisions.
- **Chapter 4** describes the environmental setting; details potential human and environmental impacts from the Otter Tail Solway Solar Project; and identifies measures to mitigate adverse impacts. It summarizes the cumulative potential effects of the project and other projects and lists unavoidable impacts and irreversible and irretrievable commitments of resources.
- **Chapter 5** identifies the sources used to prepare the document.

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

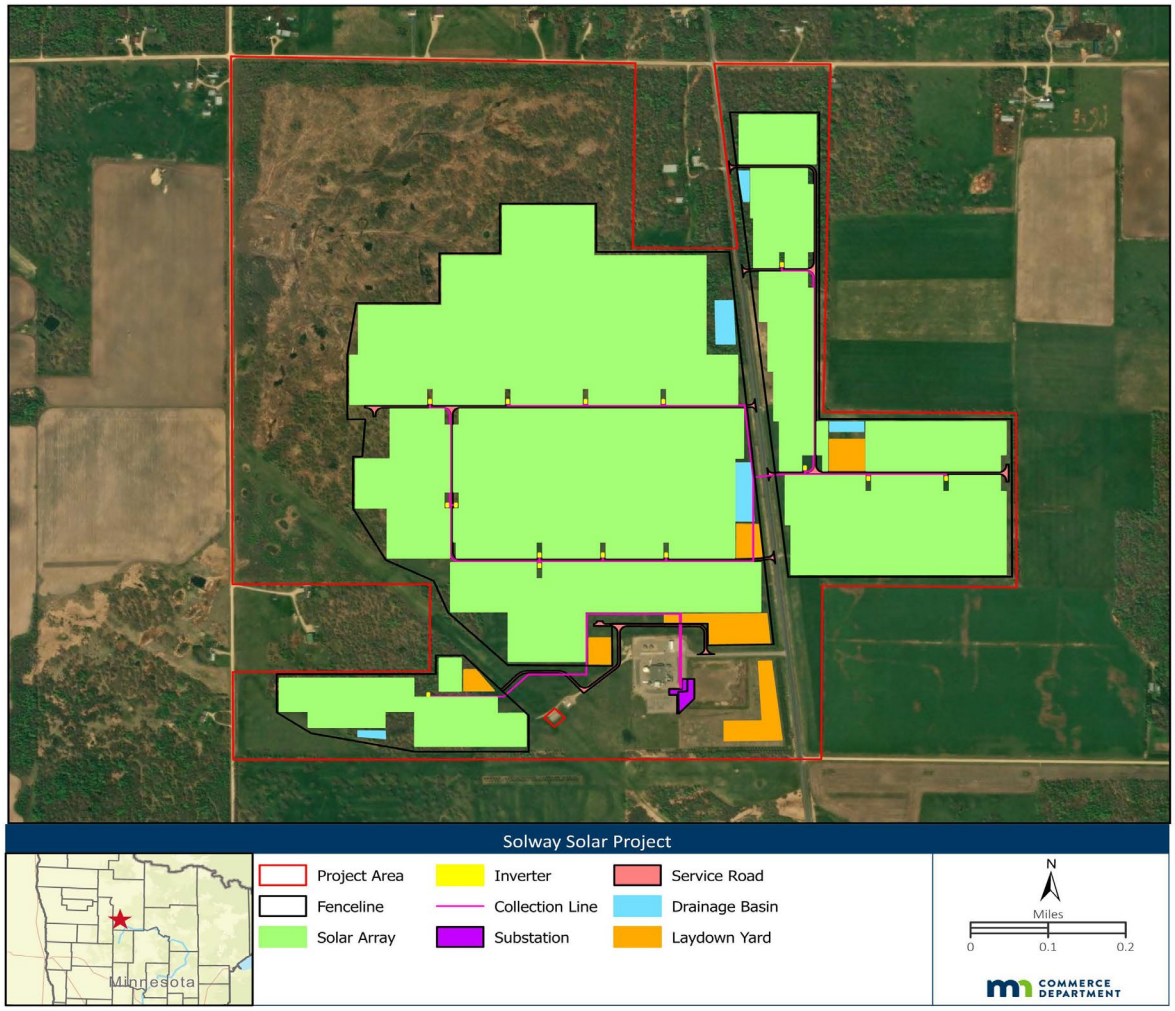
1.2 What does the applicant propose to construct?

Otter Tail proposes to construct and operate an up to 66 MW solar energy generating system and associated facilities on a site of approximately 487 acres in Lammers Township in Beltrami County, Minnesota.

The project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, access roads, security fencing, above-ground and below-ground electric collection lines, a project substation and associated facilities (Figure 1). Otter Tail proposes to locate the solar facilities in blocks within the 487 acres of land owned by the applicant. Based on preliminary design, Otter Tail anticipates 266.7 acres within the 487 acre site will be developed for the solar facilities. The solar facilities will be connected to the project substation via 34.5 kilovolt (kV) underground electric collection lines. To connect the project substation to the transmission grid, a short aboveground 115 kV gen-tie line (<500 ft in length), will run from the project substation to the existing Solway Combustion Turbine Station. The applicant anticipates project construction to begin October 2025 with completion and operation by the end 2026.

The nameplate capacity of the Project will be up to 66 MW. Otter Tail will be limited to 50 MW of injection rights based on its existing MISO interconnection. However, Otter Tail plans to size the project slightly larger, at up to 66 MW, to minimize the overall effects of electrical losses and maximize energy delivered to the grid during solar production hours. The as-built nameplate capacity of the project will be determined during final engineering phases based on the panels selected. The project's annual energy output is expected to be approximately 101,616 megawatt hours (MWh), at a projected net capacity factor of approximately 23.2 percent.

Figure 1. Proposed Solway Solar Project



1.3 What is the state of Minnesota's role?

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

To build the project, the applicant needs a site permit from the Commission. The project may also require additional approvals from other federal and state agencies and local governments, for example, a driveway permit from Beltrami County or a Construction Stormwater Permit from the Minnesota Pollution Control Agency (MPCA). A site permit supersedes local zoning, building, and land use rules.[2] The Commission's site permit decision must be guided, in part, however, by consideration

[2] Minnesota Statutes 216E.10, subd. 1.

of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[3]

Otter Tail applied to the Commission for a site permit for the project on October 11, 2024.[4] The Commission must consider whether the record supports issuing a site permit and what conditions should be placed on the site permit.[5]

To ensure a fair and robust airing of the issues, the Minnesota Legislature set out a process for the Commission to follow when considering site permit applications.[6] In this instance, an EA has been prepared and a public hearing will be held. The goal of the EA is to describe potential human and environmental impacts of the project (*the facts*), whereas the intent of the public hearing is to allow interested persons the opportunity to advocate, question, and debate what the Commission should decide about the project (*what the facts mean*). The record developed during this process—including all public input—will be considered by the Commission when making decisions on the applicant's site permit application.

1.4 What is the public's role?

Minnesota needs your help to make informed decisions.

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

1.5 What is an Environmental Assessment?

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

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

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[3] Minnesota Statutes 216E.03, subd. 7.

[4] Otter Tail, Solway Solar Project, Site Permit Application (SPA) to the Minnesota Public Utilities Commission for a Large Electric Generating Facility, October 11, 2024, eDocket ID: 202410-210888-01 (through -10), 202410-210889-01 (through -10), 202410-210890-01 (through -03)

[5] If the Commission grants a site or route permit, it chooses which of the studied locations is most appropriate. In this matter only one site location is studied

[6] *See generally* Minnesota Statute 216E.

1.6 Where do I get more information?

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

If you would like more information or if you have questions, please contact Commerce staff: Tessa Kothlow, tessa.kothlow@state.mn.us, 651-539-2732 or Commission Staff: Cezar Panait, cezar.panait@state.mn.us, 651- 201-2207.

Information about the project, including the site permit application, notices, and public comments, can be found on eDockets: https://www.edockets.state.mn.us/documents by searching "24-309" under "Docket #'s". Information is also available on Commerce's webpage for the project: https://eera.web.commerce.state.mn.us/web/project/15909.

1.7 What permits are needed?

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

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

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

1.8 What are the potential impacts of the project?

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

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

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

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

1.8.1 Human Settlement

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

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

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

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

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

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

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

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

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

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

1.8.2 Human Health and Safety

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

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

Public Safety and Emergency Services Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. There is the potential to encounter land has previously been impacted by hazardous substances, and if this occurs, hazardous materials must be documented, monitored, and disposed in coordination with MPCA. Potential impacts are anticipated to be minimal. Impacts would be short- and long-term and can be minimized.

1.8.3 Land-based Economies

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

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

Forestry Potential impacts to forestry management are anticipated to be minimal. A negligible loss of forest in Beltrami County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

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

1.8.4 Archeological and Historic Resources

Impacts to archaeological and historic resources are anticipated to be negligible to minimal. Impacts would be localized. Impacts can be mitigated through siting and construction monitoring.

1.8.5 Natural Resources

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

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

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

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

Surface Water The impact intensity level is anticipated to be minimal. Direct impacts to surface waters are not expected. Indirect impacts to surface waters may occur. These impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

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

Vegetation The solar facility will convert forested and agricultural land to perennial vegetation for the life of the project. Potential impacts of the solar facility can be mitigated through development of a vegetative management plan (VMP).

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

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

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

1.9 What factors guide the Commission's decision?

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

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

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

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

B. Effects on public health and safety.

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

D. Effects on archaeological and historic resources.

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

F. Effects on rare and unique natural resources.

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

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

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

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

K. Electrical system reliability.

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

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

N. Irreversible and irretrievable commitments of resources.

The Commission is also guided by the "state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric

energy security through efficient, cost-effective power supply and electric transmission infrastructure."[7]

1.10 Solar Facility Siting Factors – Analysis and Discussion

This analysis applies the siting factors to the project. Some factors are described in just a few words. Other factors are more descriptive and include a list of elements that, when grouped, make up the factor.

Factor G (application of design options) and **Factor L** (costs dependent on design) do not apply as the design of the proposed project is the only design under consideration. **Factor H** (use of parallel or existing right-of-way) and **Factor J** (use of existing transportation, pipeline and electrical transmission systems) do not apply as those factors are specifically for routing permit projects. **Factor K** (reliability) is not discussed further here as the project is anticipated to maintain or improve the reliability of the electrical system. **Factor M** (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) are discussed in Section 4.8 and Section 4.9, respectively, of this EA.

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

Table 1 Application of Siting Factors- Solar Facility

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

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

Airports	●	●
Roads	○	●
Utilities	●	●

Factor B: Public Health and Safety

Element	Construction	Operation
EMF	●	●
Emergency Services	●	●
Medical Devices	●	●
Public Safety	●	●
Stray Voltage	●	●
Worker Safety	●	●

Factor C: Land-based Economies

Element	Construction	Operation
Agriculture	○	○
Forestry	○	○
Mining	●	●
Tourism	●	●

Factor D: Archaeological and Historic Resources

Element	Construction	Operation
Archeological	●	●
Historic	●	●

Factor E: Natural Resources

Element	Construction	Operation
Air Quality	●	●
Climate Change	●	●
Geology and Groundwater	●	●
Soils	●	●
Surface Water	●	●
Topography	●	●
Vegetation	●	●
Wetlands	●	●
Wildlife	●	●
Wildlife Habitat	●	●

Factor F: Rare and Unique Resources

Element	Construction	Operation
Fauna	●	●
Flora	●	●

Factor I: Use of Existing Generating Plants		
Element	**Construction**	**Operation**
Existing Plants	O	O

1.10.1 Discussion

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

FACTOR A: HUMAN SETTLEMENT

Aesthetics Visual impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Because there are existing energy and infrastructure facilities nearby (Figure 8), the project will not be an entirely new type of feature on the landscape. For those with high viewer sensitivity, for example, neighboring landowners, visual impacts are anticipated to be moderate to significant, while for those that travel through the project area, visual impacts are likely to be minimal, although noticeable.

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

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

Land Use and Zoning Land use impacts are anticipated to be long-term and localized. The proposed solar facility is consistent with local land use ordinances and comprehensive land use plans. Constructing the project will change land use from agricultural to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized.

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

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

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

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

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

FACTOR C: LAND-BASED ECONOMICS

Agriculture Potential impacts to agricultural producers are anticipated to be minimal—lost farming revenues will be offset by easement agreements. A negligible loss of farmland in Beltrami County would occur for the life of the project. The project will not impact prime farmland. Potential impacts are localized and unavoidable but can be minimized.

Forestry Potential impacts to forestry management are anticipated to be minimal—tree clearing will be offset by the County's larger forestry-based economy. A negligible loss of forest in Beltrami County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

FACTOR E: NATURAL RESOURCES

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

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

Wildlife and Habitat Impacts wildlife are anticipated to be minimal to moderate during construction and operation of the project. Additional BMPs can be implemented to avoid impacts to local and rare and unique wildlife (e.g., migratory birds.)

FACTOR I: POWER PLANTS

The project would be constructed adjacent to Otter Tail's Solway Combustion Turbine Generation Station, would interconnect at the associated substation, and would use existing interconnection rights associated with the station. Thus, the project makes fair use of an existing power plant site.

1.11 What's next?

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

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

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

2 Proposed Project

Otter Tail proposes to construct and operate the Solway Solar Project, an up to 66 MW solar farm in Lammers Township, Beltrami County, Minnesota. The project will occupy approximately 487 acres just north of the city of Solway. The project will interconnect to the electrical transmission grid through a short aboveground 115 kV gen-tie line that will run from the project substation to the existing Solway Combustion Turbine Generating Station (Solway Station). This chapter describes the project and how it would be constructed, operated, and decommissioned.

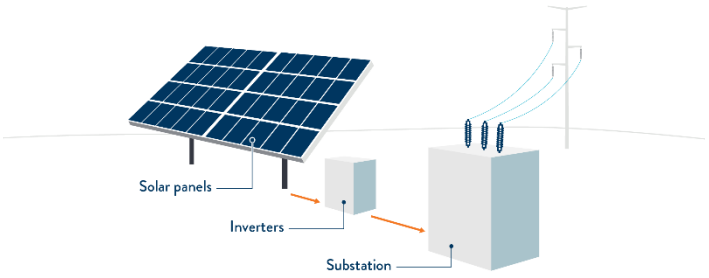
2.1 Solar Facility

2.1.1 How do solar facilities generate electricity?

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

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

Figure 2. Solar Facility Schematic



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

2.1.2 Where is the Project located?

The Project is located in Lammers Township in Beltrami County, Minnesota (Figure 1).

As shown in Figure 1, the solar facility is located at 7707 Centerline Road NW, Solway, MN 56678 in Lammers Township in Beltrami County, just north of the City of Solway. The project sits in the south-western corner of Beltrami County; markedly, east of Lammers Road NW, south of Thoren Drive NW, north of Herman Drive NW, and approximately 2.5 miles west of Becker Rodd NW. Table 2 summarizes the project location. The project area comprises 487 acres of land owned by the applicant with the solar facilities occupying approximately 267 acres within the area. The site is currently used predominately as agricultural – specifically pasture and haying – and deciduous forest.

Otter Trail selected the site based on proximity to existing electric transmission infrastructure, sufficient solar resource, sufficient land control, consistency with local land uses, and minimal anticipated impact to natural and cultural resources, and minimal impacts to prime farmland.[8]

Table 2: Project Location

Township	Range	Sections	Township	County
147 N	35 W	04, 07-11, 14-23, 27-29	Lammers	Beltrami

2.1.3 How is the solar facility designed?

The Project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, above-ground and below-ground electric collection lines, a project substation and interconnection facilities, supervisory control and data acquisition (SCADA) system, access roads, security fencing and gates, laydown areas, [9] an operation and maintenance facility, up to three weather stations, stormwater drainage basins, and a short aboveground 115kV transmission line. [10]

2.1.3.1 Solar Arrays

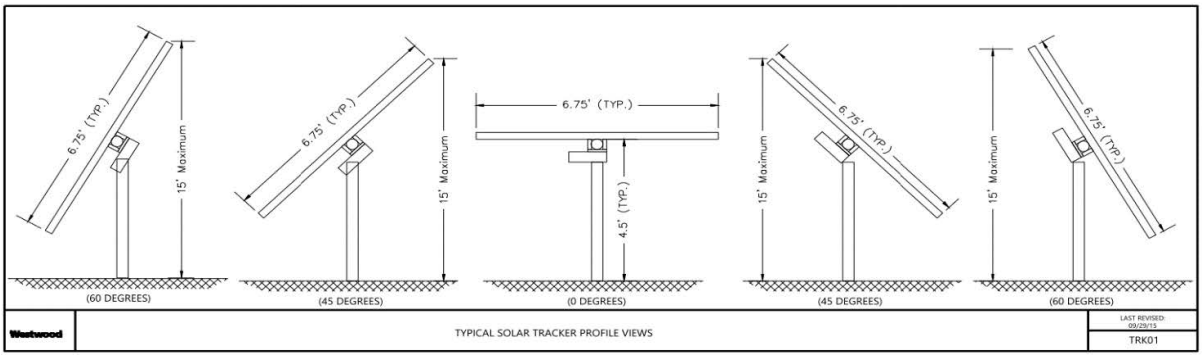
Otter Tail anticipates using bifacial PV panels with tempered glass that are approximately four feet long by eight feet wide, and one to two inches thick. PV panels are constructed of dark, light-absorbing materials to limit reflection; today's panels reflect as little as 2 percent of incoming sunlight. Figure 3 provides a visual reference for the PV panels that will be affixed on a linear axis tracking rack system aligned in rows north and south. Small motors connected to the tracking rack system will slowly rotate the panels to track the sun throughout the day: tilting east in the morning, paralleling the ground at zero degrees mid-day, and tilting west in the afternoon. Figure 4 illustrates the design of tracking the solar resource to maximize the projects production of electricity and the capacity value.

Based on preliminary panel selection, when tilted to their highest position (early and late in the day), the top edge of the solar panels could be up to 12 feet above the ground, when at a 60-degree angle, depending on manufacturer, topography, and vegetation constraints. The applicant has not made a final selection of solar panels but anticipates using approximately 100,000 PV panels with total capacity of up to 66 MW. The solar facilities will occupy approximately 55 percent of the project area.[11]

[8] SPA, p. 13
[9] SPA, p. 12
[10] SPA, p. 22
[11] SPA, pp. 19-20

Figure 3. Typical Solar Array

Figure 4. Typical Solar Tracking Profile



2.1.3.2 Electrical Collection System

The direct current (DC) electrical energy generated by the solar panels (about 1,500 volts DC) will be collected and delivered via electrical cables to inverters to convert the power from DC to alternating current (AC). The DC electrical collection cables will be mounted underneath the panels in a hanging harness system to minimize soil disturbance and trenching along the rows of panels. [12]

Figure 5. Inverter

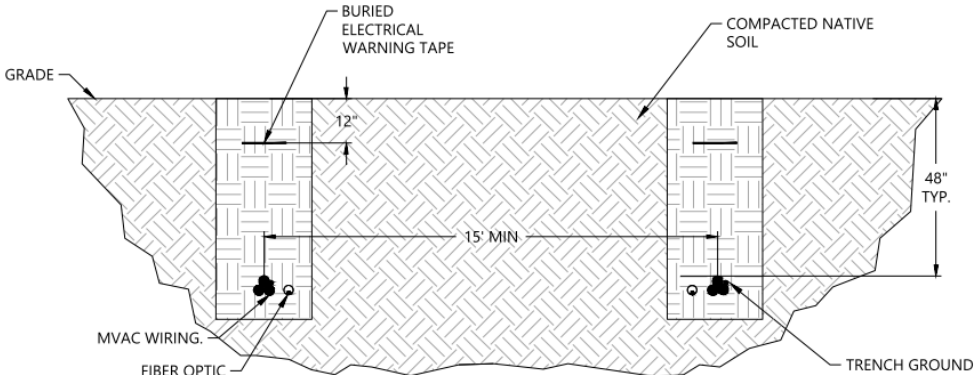
The inverter feeds the AC output voltage to a transformer to step up the AC power to 34.5 kV. Inverters, transformers, and a Supervisory Control and Data Acquisition (SCADA) system are housed together on a "skid". From a distance, inverters skids will look like one-half of a semi-trailer box, as shown in Figure 5. The project's preliminary design

[12] SPA, pp. 20-21

includes 15 inverter skids which will be placed atop pile foundations and measure 15 feet wide by 20 feet long by 12 feet high. The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. [13]

An underground AC collection system will then transmit the electrical energy (34.5 kV AC) from the skid to the project substation (Figure 6). The AC cabling will be located at least 36 inches below grade, approximately four feet deep and 1-2 feet wide in below-ground trenches. [14]

Figure 6: Underground Cabling



2.1.3.3 PROJECT SUBSTATION

The project substation is proposed to be located inside the project fence in the southeast portion of the project site and is estimated to occupy 0.6 acres of land (Figure 1). The project will include a 34.5/115 kV step-up substation with metering and associate interconnection equipment for interconnection at the Solway Station (Figure 8) The project will require less than 500 feet of new 115 kV overhead generation tie-line to facilitate the interconnection. Other components of the substation include supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, metering, and control equipment according to the specifications of the Interconnection Agreement with MISO.

Underground 34.5 kV AC collector lines from the inverters will deliver energy to the substation. The collector system voltage will be stepped up from 34.5 kV to 115 kV at the substation. The number of poles and dead-end structure height are still pending final engineering design. The project substation will be graded and overlain with crushed rock. Secondary containment areas for the transformer will be installed as necessary. [15]

2.1.3.4 OPERATIONS AND MAINTENANCE FACILITY

The operations and maintenance (O&M) facility is proposed to be located adjacent to the project substation. The O&M facility is planned to cover 0.5 acres including both the O&M building and

[13] Id.
[14] Id.
[15] SPA, p. 21

parking area. The building will be used to conduct maintenance and repair of project equipment and solar module components, store parts, tools, and other equipment, and store other operation and maintenance supplies. Otter Tail anticipates that a new well will provide water service for the O&M building and an on-site septic system will provide for sanitary needs. [16]

2.1.3.5 Security Fencing

All solar arrays will be fenced for security. Permanent security fencing will be installed along the perimeter of the project. The fencing will consist of an agricultural woven wire fence topped with one foot of 3-4 strands of smooth wire for a total fence height of eight feet above grade. Interior chain-link fencing with a height of six feet above grade topped with one foot of barbed wire will be installed along the perimeter of the project substation and O&M building to comply with the Nation Electric Safety Code (NESC). The substation security fencing will be designed to prevent public and wildlife from gaining access to the facility. All access points around perimeter and interior fences will have locked gates and signage will be posted to warn of high voltage equipment and to warn unauthorized persons not to enter fenced areas.[17]

2.1.3.6 Access Roads

Although the total length of the access roads will depend upon final site design, the preliminary layout anticipates approximately three miles of graveled access roads that leads to the inverters and PV arrays. Otter Tail anticipates installing a total of six permanent access points and all entrances will have lockable gates. The access roads will be approximately 20 feet wide. Otter Tail will work with Beltrami County, Lammers Township, and MnDOT to facilitate and pay for required upgrades that meet the required public road standards which may include road improvements, additional aggregate and driveway changes. [18]

2.1.4 How would the solar facility be constructed?

Otter Tail anticipates that construction of the solar facility will begin in October 2025 with an in-service date no later than December 31, 2026. This section summarizes construction activities. Unless otherwise noted, this summary has been adapted from Section 4.3 and Appendix H, the *Draft Agricultural Impact Mitigation Plan* (AIMP), of the site permit application.

Otter Tail anticipates that construction will begin in October 2025 and last approximately 12 to 14 months to meet an in-service goal of late 2026. The actual construction schedule is dependent upon permitting, final design, delivery of equipment, and workforce availability.

Construction will begin after all necessary permits and approvals have been received. Project construction will begin with workforce mobilization and the initial site preparation including vegetation removal, grubbing, grading, and any necessary tree removal. Otter Tail anticipates seven laydown yards on approximately 10 acres of the project area. Some grading will be required to provide a more level workspace and maintain soil stability in areas with a slope greater than five percent; however, slopes within the project area are predominantly less than five percent. Depending on

[16] SPA, p. 22-23
[17] Id.
[18] Id.

construction timing, Otter Tail may plant a cover crop compatible with the project's Vegetation Management Plan (VMP) to stabilize soils until construction begins.

Typical construction equipment will be used for the project – scrapers, bulldozers, dump trucks, motor graders, vibratory compactors, pile drivers, watering trucks, pickup trucks, and backhoes. Additional specialty equipment could include a skid steer loader, concreate truck and boom truck, a high reach bucket truck, a medium duty crane, forklift, and a truck-mounted auger or drill rig. Upon completion of construction, heavy equipment will be removed from the project site.

During construction, increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Traffic delays should be minimal for the relatively short construction delivery period for the project.[19] Traffic volume during construction will predominantly come from equipment and work vehicles travelling to and from the site.

The applicant estimates that the project will create approximately 70 to 80 jobs at peak.[20] Further, up to two full-time permanent positions to operate and maintain the project facilities will result upon project completion.

Access Roads

Permanent access roads and permanent turnouts will be developed. Construction of access roads will start with stripping and segregating the topsoil the anticipated 20-foot-wide road width, and the subgrade will be compacted. The road will be installed with or without geo-fabric, depending on soil type, and four to twelve inches of gravel will be laid. Drainage ditches will be shaped as identified on the final grading plan.

Solar Arrays

Once grading is complete, the solar facilities will be constructed in blocks, and multiple blocks may be constructed simultaneously. The racking system supports will be constructed using steel piles driven into the ground. 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. During array and racking assembly, panels will be staged in advance throughout the project 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. Final construction activities for the solar arrays will include completing electrical connections, terminations and grounding, and installing cable management systems.

Project Substation

Once grading is complete, construction work within the project substation will begin with the installation of concrete foundations. One of two methods will be used to install the foundations. Option 1 would 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. Installation of

[19] SPA, p. 61
[20] SPA, p. 67

concrete foundations and embedments 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 substation's control system. Crushed rock will cover the area of the substation and adequate lighting will be installed around the substation for worker safety during construction and operation.

Inverters and Step-up Transformers

Once grading is complete, construction for the inverter skids will begin with installation of pile foundations that typically measure 15 feet wide by 20 feet long. The inverter skid will then be installed on these foundations with an approximate complete structure heigh of 12 feet above grade. Each inverter skid will contain an inverter, transformer, and SCADA system.

Electrical Collector System

Otter Tail anticipates using above-ground kV DC collector cables to collect and transmit DC power from the panels to the inverters. The DC collection system will be installed underneath the panels in a hanging harness system under the arrays. The AC collection system will be installed at least 36 inches below grade, approximately four feet deep and 1-2 feet wide in below-ground trenches. Cabling will be done in accordance with the agricultural impact mitigation plan (AIMP); during trench excavation topsoil and subsoil will be segregated and stockpiled. Cables will be laid in the trenches and the area will be backfilled with native subsoil followed by topsoil to return the surface to its finished grade. Given this preliminary design, electrical collection technology is rapidly evolving, and finalizations 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.

Stormwater Drainage

Otter Tail has preliminarily designed five drainage basins throughout the project footprint, ranging in size from approximately 0.25 acre to 1.5 acres. Drainage basins would have topsoil removed and temporarily stored. Subsoil would then be excavated to a depth of four to seven feet and the sides of the drainage basin sloped to design requirements (including inlet/outlet areas). Topsoil would be replaced and the basins will vegetated with a wet seed mix. This stormwater system will be designed to capture, route, and treat stormwater runoff for volume control and water quality per Minnesota's Construction Stormwater General Permit. A construction stormwater permit and associated Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction and implemented during construction. The size and location of stormwater drainage basins will be finalized concurrent with final engineering.

Security Fencing

Otter Tail will install permanent security fencing around the perimeter of the project site. Perimeter fencing is anticipated to be agricultural woven wire fence topped with one foot of 3-4 strands of smooth wire for a total fence height of eight feet above grade. 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 perimeter security fence will have locked gates as access points with signage. The project will also install interior chain link fencing, with a height of 6 feet above grade topped with 1-2 feet of barbed wire, along the perimeter of the project substation and O&M building. Security lighting will be installed and mounted on ten-foot-tall poles at each inverter and access points. The project may also install security cameras.

RESTORATION

After construction, final clean-up activities will include removal of construction debris, de-compaction of soil as required, removal of temporary erosion control structures, final grading, and restoration of fences and required reseeding.

Otter Tail has prepared a draft VMP (Appendix I of the site permit application) to guide site preparation; installation of prescribed seed mixes; management of invasive species and noxious weeds; control of erosion/sedimentation; and maintenance strategies for the establishment and perpetual management phases. In accordance with the project's AIMP and VMP, disturbed areas will be reseeded with site-specific native seed mixes. Native vegetation establishment is expected to last three years. Once vegetation at the site has been established, dormant mowing, haying and/or grazing maintenance strategies will be implemented; best management techniques will vary and depend on seed mix type to ensure safe operation of the facility.[21] Mechanical removal and selective use of herbicides may be used to treat unwanted woody species that may shade out panels, as well as noxious and perennial weeds. Otter Tail is also maintaining the option to utilize grazing as a management tool for the project.[22]

2.1.5 How would the solar facility be operated and maintained?

Otter Tail estimates the service life of the project is at least 35 years.[23] Operational staff will be actively engaged during the construction phase of the project. Following commissioning, control of the solar facility will transfer from the construction team to the operations staff. The operations team will be responsible for ensuring operations and maintenance are conducted in compliance with all applicable permits and regulatory requirements, industry practices, and manufacturer's recommendations. It is anticipated that up to two new full-time staff will operate and maintain the project.

The applicant indicates that a maintenance plan will be created for the project to ensure performance of the solar facility. All maintenance activities will be performed by qualified personnel. Maintenance activities will be performed during the day to the extent that they do not disrupt energy production, but some maintenance activities may be performed in the evenings to minimize lost generation. Maintenance activities that have the potential for substantial noise generation will be performed during the daytime to minimize impacts to residents.

Maintenance of the project will include inspection of electrical equipment, visual and noise inspections, vegetation management, and snow removal (as needed), a more detailed breakdown of regular operations and maintenance tasks is listed in Table 3. The electrical performance of the project will be monitored in real-time by a SCADA system. The SCADA system allows for early notification of

[21] SPA, p. 32
[22] SPA, Appendix I - Vegetation Management Plan
[23] SPA, p. 33

abnormal operations, which facilitates prompt maintenance and repair. On site personnel will have ready access to site operating data and will be notified of faults and alarms as well as abnormal operations on a real time basis.

Table 3. Regular Operations and Maintenance Tasks[24]

Equipment	Task
PV Field	Visual check of the panels, wiring and junction boxes visual check, PV strings measurement of the insulation, PV strings and string boxes faults, PV panels washing, and vegetation management (if necessary, at site)
Electric Boards	Case visual check, fuses check, surge arresters check, torque check, DC voltage and current check, and grounding check
Inverter	Case visual inspection, air intake and filters inspections, conversion stop for lack of voltage, AC voltage and current check, conversion efficiency inspection, datalogger memory download, fuses check, grounding check, and torque check
Support Structures	Visual check, PV panels torque check on random sample

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

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

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

[24] SPA, Table 7, p. 36

If the project is not repowered, Otter Tail will decommission the project and remove the project facilities. Decommissioning would include removal of the solar arrays (panels, racking, and steel foundation posts), inverters/transformers, project substation, O& M building, fencing, lighting, access roads. Above-ground electrical and communications cabling would be removed as well as below-ground cabling would be removed to a depth of three feet (cables buried below three feet will be left in place).

Otter Tail anticipates that the total estimated cost to decommission (demolition and restoration) the project is approximately $6,266,000. Estimated net salvage/scrap value is approximately $646,000, offsetting partial decommissioning cost resulting in $5,620,000 estimated net decommissioning cost.[25] The decommissioning bond will be posted no earlier than the tenth anniversary of operation. The cost of decommissioning will be updated every five years after the tenth year of operation.

2.2 Project Costs

Otter Tail estimates the total installed capital cost and annual operating costs for the project are expected to be in the range of $70 to $100 million. Total installation costs will range from $69,250,000 to 99,100,000--a more thorough breakdown of installation costs is presented in Table 4 below. Operation cost annually for the project over its 35 year life will range from $600,000 to $800,000. The project cost is contingent on various factors such as construction labor, project equipment and materials, electrical and communication systems, taxes/tariffs, and final design considerations. Actual costs will depend on final material, labor costs, and salvage value from decommissioning. Otter Tail indicates that the costs are estimated and expect to reflect actual project costs within approximately 10%.[26]

Table 4. Estimated Project Installation Cost Ranges

Project Component	LOW Estimated Cost ($USD)	HIGH Estimated Cost ($USD)
Planning and State Permitting	500,000	600,000
Acquisition and "Downstream" Permits (includes land purchase)	2,500,000	3,500,000
Design	3,250,000	4,000,000
Procurement	33,000,000	50,000,000
Construction	30,000,000	41,000,000
Total Installation Cost	**69,250,00**	**99,100,00**

2.3 Project Schedule

Otter Tail anticipates the Solway Solar Project will begin commercial operation by the year-end of 2026. Table 5 shows Otter Tail's estimated development and construction milestones.

[25] SPA, Appendix K – Draft Decommissioning Plan
[26] SPA, Appendix G -- Estimated Project Costs

Table 5. Anticipated Project Schedule[27]

Activity	Anticipated Timeframe
Land Acquisition	Complete
MISO Interconnection Application	Submitted July 8, 2024
Commission Site Permit	October 2025
Downstream Permits	Prior to construction
Equipment Procurement and Contractor Selection	April through September, 2025
Construction	October 2025 through September 2026
Testing and Commissioning	October 2026
Commercial Operation Date	December 31, 2026

[27] SPA, p. 6

3 Regulatory Framework

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

3.1 What Commission approvals are required?

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

The project requires a site permit from the Commission because it meets the definition of a *large electric power generating plant*, which means any electric power generating equipment designed for or capable of operation at a capacity of 50 MW or more.[28] Because the project was selected through a competitive bidding process approved by the Commission under Minn. Stat. 216B.2422, the project is exempt from the certificate of need requirement in Minn. Stat. 216B.243.

3.2 What is environmental review?

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

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

Minnesota law provides the Commission with two processes to review site permit applications. The alternative process, which applies to solar generating facilities, such as the project, requires preparation of an EA and a public hearing.[29]

3.3 What permitting steps have occurred to date?

The Commission accepted the site permit application as complete on January 28, 2025. Public information and scoping meetings were held in Solway, Minnesota on December 19, 2024, and online on December 18, 2024.

[28] Minnesota Statutes 216E.01, subd. 5.
[29] Minnesota Statutes 216E.04, subd. 1 and 5; Minnesota Rule 7850.3700, subp. 1. (Applicants are free to elect the alternative process if their project qualifies for it)

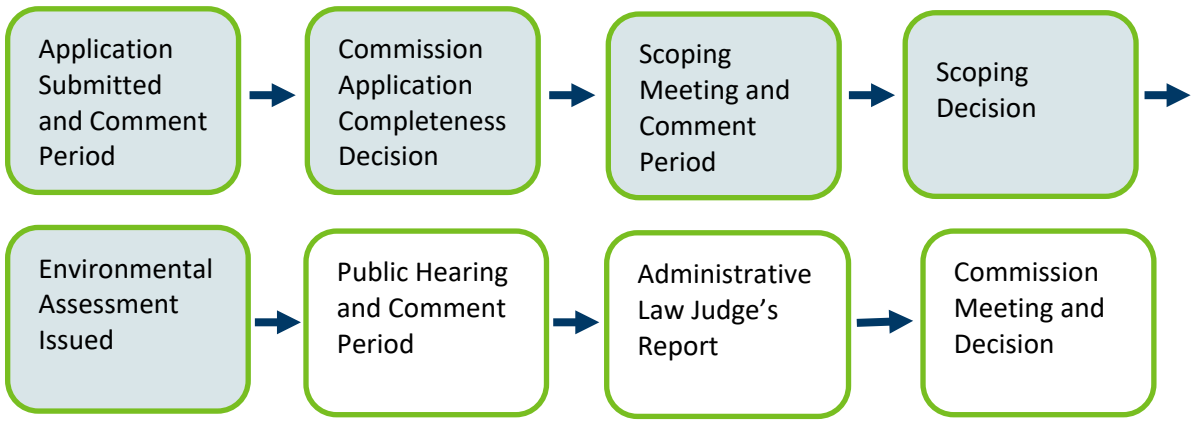
Application Filing and Acceptance

Otter Tail provided the required written notice of its intent to file a site permit under the alternative process on September 20, 2024.[30]

Otter Tail filed an application for a site permit application for the Solway Solar Project on October 11, 2024.[31] The Commission accepted the site permit application as substantially complete in its order dated January 28, 2025.[32] The order also referred the matter to the Office of Administrative Hearings for appointment of an administrative law judge (ALJ) to conduct a public hearing for the project. Commission staff provided a *Sample Site Permit for a Solar Energy Generating System* on March 6, 2025.

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

Figure 7. Permitting Process Summary[33]



Scoping Process

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

Scoping includes a public meeting and comment period that provide opportunities for interested persons to help develop the scope (or contents) of the EA.[34] The purpose of the public information and scoping meetings is to provide information and answer questions about a proposed project and

[30] Otter Tail Power Company, Notice of Intent to Submit a Site Permit Application Under the Alternative Permitting Process, September 20, 2024, eDocket ID: 20249-210387-01
[31] Solway Solar Project, Site Permit Application to the Minnesota Public Utilities Commission for a Large Electric Generating Facility, October 11, 2024, eDocket ID: 202410-210888-01 (through -10), 202410-210889-01 (through -10), 202410-210890-01 (through -03)
[32] Commission, *Order*, January 28, 2025, eDocket ID: 20251-214494-01
[33] Read from left to right; shaded steps are complete
[34] Minnesota Rule, 7850.3700, subp. 2.

the permitting process. The meeting and associated comment period also provides an opportunity to gather input regarding potential impacts and mitigative measures that should be studied in the EA.

On December 6, 2024, the Commission and Commerce issued a joint *Notice of Public Information and Environmental Assessment Scoping Meeting* and associated public comment period.[35]

Commission and Commerce staff held a remote-access public meeting on December 18, 2024. One individual from the public attended this meeting, and there were no comments. The following evening, on December 19, 2024, Commission and Commerce staff jointly held a public meeting in Solway, Minnesota. Approximately nine people attended this meeting; three attendees asked questions in relation to details of the project.[36] Written comments were received from one state agency and two labor unions.[37]

Public comments addressed general impacts and concerns related to the project; specifically, general project operation and management, PV panel materials (durability), and storm water management strategies (watershed pollution concerns). Written comments made by two labor unions both expressed support of the project. The DNR commented on equipment used for the project as well as environmental mitigations for construction and operation procedures. [38]

Otter Tail Power Company had no reply comments for the public comments provided.

SCOPING DECISION

The scoping decision identifies the issues studied in this EA.

After considering public comments and recommendations by staff, Commerce issued a scoping decision on January 31, 2025 (**Appendix A**). The scoping decision identifies the issues to be evaluated in this EA.

3.4 Are other permits or approvals required?

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

A site permit from the Commission is the only state permit required for siting the project. However, various federal, state, and local approvals might be required for activities related to construction and operation of the project. These subsequent permits are referred to as “downstream” permits and

[35] Commission and Commerce *Notice of Public Information and Environmental Review Scoping Meeting*, December 6, 2024, eDocket ID: 202412-212769-01

[36] Oral Comments on the Scope of Environmental Assessment, Public Scoping and Information Meetings, Solway, Minnesota, December 19, 2024, and virtual meeting, December 18, 2024, eDocket ID: 20251-214172-02

[37] Written Comments on the Scope of Environmental Assessment, eDocket ID: 20251-214172-01

[38] Minnesota Department of Natural Resources, Comments on the Scope of Environmental Assessment, eDockets ID: 20251-21369-01

6must be obtained by the permittee prior to construction.[39] Table 6 lists potential downstream permits that might be required, several of which are discussed below.

3.4.1 Federal

The United States (U.S.) Army Corps of Engineers (USACE) "regulates the discharge of dredged or fill material into waters of the United States, including wetlands."[40] Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exists. The USACE is also charged with coordinating with Indian tribes regarding potential impacts to traditional cultural properties.

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

A permit is required from the U.S. Fish and Wildlife Service (USFWS) for the incidental taking[41] of any threatened or endangered species. As a result, USFWS encourages project proposers to consult with the agency to determine if a project has the potential to impact federally listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

Table 6. Potential Downstream Permits

Unit of Government	Type of Application	Purpose	Anticipated for Project
Federal			
U.S. Army Corps of Engineers	Section 404 Clean Water Act – Dredge and Fill	Protects water quality by controlling discharges of dredged and fill material	Possible
U.S. Environmental Protection Agency	Spill Prevention, Control and Countermeasures Plan	Protect facilities with oil storage of more than 1,320 gallons	Possible
U.S. Fish and Wildlife Service	Threatened and Endangered Species Consultation	Consultation to mitigate impacts to federally listed species	Possible

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

[40] USEPA, *Section 404 Permit Program*, (2015), https://www.epa.gov/cwa-404/permit-program-under-cwa-section-404

[41] 16 U.S. § 1532(19) (defining "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).

Unit of Government	Type of Application	Purpose	Anticipated for Project
	Nest Removal Permit under Bald and Golden Eagle Protection Act	Required in the event of removal of a bald eagle nest	Possible
	Section 10 Endangered Species Incidental Take Permit	Potential impacts on federally endangered or threatened species	Possible
State			
Department of Natural Resources	License to Cross Public Lands and Waters	Prevent impacts associated with crossing public lands and waters	No
	State Threatened and Endangered Species Consultation	Consultation to mitigate impacts to state-listed species	Possible
	Water Appropriation Permit	Balances competing management objectives; may be required for construction dewatering	Possible
	Utility Crossing License	Required to cross state land with utility infrastructure	Possible
Minnesota Pollution Control Agency	Construction Stormwater Permit	Minimizes temporary and permanent impacts from stormwater	Yes
	Section 401 Clean Water Act – Water Quality Certification	Ensures project will comply with state water quality standards	Possible
State Historic Preservation Office	National Historic Preservation Act Section 106 Consultation	Ensures adequate consideration of impacts to significant cultural resources	Yes
Department of Health	Well Construction Permit	Installation of a water supply well	Possible
Department of Agriculture	Agricultural Impact Mitigation Plan	Establishes measures for protection of agricultural resources	Yes
Department of Labor and Industry	Electrical Inspection	Necessary to comply with electric code.	Yes
Department of Transportation	Utility Accommodation on Trunk Highway ROW Permit	Controls utilities being placed along or across highway rights-of-way (ROW)	Possible
	Driveway Permit	Required for driveways off state highways	Possible
	Oversize/Overweight Permit	Controls use of roads for oversize or overweight vehicles	Possible
Board of Water and Soil Resources	Wetland Conservation Act	Ensures conservation of wetlands	No

Unit of Government	Type of Application	Purpose	Anticipated for Project
Local			
Beltrami County	Noxious Weed Compliance	Controls eradication of noxious weeds	Yes
	Building Permit Application	Required for the construction of any structure within a designated Shoreland Zone	Possible
	ROW Permit	Required for any obstruction or excavation within a County ROW	Possible
	Driveway Approaches	Required for any driveway approaches that connect to a County Highway	Possible
	Oversize or Overweight Vehicle Permit	Required for transport of oversize or overweight vehicles within a roadway ROW under Beltrami County jurisdiction	Possible
	Access Driveway/Entrance Permit	Required for moving, widening or creating a new driveway access to County roads	Possible
	Drainage and Ditching Work Within County Highway ROW	Required to working within public road right-of-way	Possible
	Grading and Filling Permit	Required for the movement of more than 10 cubic yards of material within shoreland	Possible
	Permit for Installation of Object/Structures withing County Highway ROW (Utility Permit)	Required for installation of a utility, tile inlet/outlet, or other object of any kind within the highway ROW	Possible
	Subsurface Sewage Treatment System Ordinance Permit	Required prior to construction of septic system	Possible
Lammers Township	Driveway Approaches	If required for driveway access	Possible
	Utility Permits on Township Road ROW	If required for collection and/or feeder lines in Township ROW	Possible
Beltrami County Environmental Services Department and Minnesota Board of Water and Soil Resources (BWSR)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	Possible

3.4.2 State

Potential impacts to state lands and waters, as well as fish and wildlife resources, are regulated by the DNR. Licenses are required to cross state lands or waters.[42] Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a *Public Waters Work Permit*.[43] Utility infrastructure that will be crossing DNR managed lands require the agency to provide a Utility Crossing License.[44] Not unlike the USFWS, DNR encourages project proposers to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

Construction projects that disturb one or more acres of land require a general *National Pollutant Discharge Elimination System / State Disposal System Construction Stormwater Permit* ("CSW Permit") from the MPCA. This permit is issued to "construction site owners and their operators to prevent stormwater pollution during and after construction."[45] The CSW Permit requires use of best management practices; development of a Stormwater Pollution Prevention Plan; and adequate stormwater treatment capacity once the project is complete. Projects must be designed so that stormwater discharged after construction does not violate state water quality standards. Specifically, projects with net increases of one acre or more to impervious surface must be designed to treat water volumes of one-inch times the net increase in impervious surface. PV panels are impervious, and are counted towards total impervious surface along with access roads, buildings, etc. The area beneath the panel, however, is pervious if properly vegetated. To account for this, MPCA developed a solar panel calculator that estimates the amount of stormwater retained by PV solar facilities. This amount can be applied as a credit towards the total amount of stormwater treatment needed for a project.[46]

A Clean Water Act Section 401 *Water Quality Certification* from MPCA might also be required. "Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates that the discharge complies the applicable water quality standards."[47] The certification becomes a condition of the federal permit.

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

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

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[42] Minnesota Statutes 84.415

[43] DNR, *Requirements for Projects Involving Public Waters Work Permits*, (n.d.), http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.

[44] DNR, *Utility Crossing License,* (2023), https://www.dnr.state.mn.us/permits/utility_crossing/index.html

[45] MPCA, *Construction Stormwater*, (2023), https://www.pca.state.mn.us/business-with-us/construction-stormwater

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

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

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

The Minnesota Department of Labor and Industry requires an electrical inspection as a component of an electrical permit.[48]

A permit from the Minnesota Department of Transportation (MnDOT) is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway rights-of-way.[49] Coordination would be required to construct access roads or driveways from trunk highways.[50] These permits are required to ensure that use of the right-of-way does not interfere with free and safe flow of traffic, among other reasons.[51]

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

3.4.3 Local

Beltrami County local permits may be required as a component of this project, including: [52]

- Transportation Permit to transport oversized and overweight loads on county roadways
- Access Driveway/Entrance Permits in order to move, widen or create a new driveway access to county roads
- Drainage and Ditching Work Within County Highway Right-of Way Permit in order to work within public road rights-of-way
- Grading and Filling Permit for the movement of more than 10 cubic yards of material within shoreland
- Installation of Object/Structures Within County Highway Right-of-Way (Utility Permit) in order to install a utility within the highway right-of-way
- Individual Sewage Treatment Systems Permit which must be given prior to the installation of any individual sewage treatment system in the County

[48] Minnesota Department of Labor and Industry, *Electrical Permits, Contractors,* (n.d.), https://www.dli.mn.gov/business/electrical-contractors/electrical-permits-contractors
[49] Minnesota Rules, Part 8810.3300, subp. 1.
[50] MnDOT, *Land Management*, (2022), https://www.dot.state.mn.us/utility/forms.html
[51] MnDOT, *Utility Accommodation on Trunk Highway Right of Way: Policy OP002,* (2017), http://www.dot.state.mn.us/policy/operations/op002.html
[52] Beltrami County, Public Works Department-Highway Division, (n.d.), https://www.co.beltrami.mn.us/living-here/roads-bridges/permits-and-applications/

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

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

3.5 Do electrical codes apply?

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

The project must meet requirements of the National Electrical Safety Code.[53] These standards are designed to safeguard human health "from hazards arising from the installation, operation, or maintenance of conductors and equipment in electric supply stations and overhead and underground electric supply lines."[54] They also ensure that facilities and all associated structures are built from materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided operational maintenance is performed.

3.6 Are any issues outside the scope of this EA?

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

The EA will not address following topics:

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

[53] Minnesota Statutes 326B.35 and Minnesota Rule 7826.0300, subp. 1; requiring utilities to comply with the most recent edition of the National Electric Safety Code when constructing new facilities or reinvesting capital in existing facilities

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

4 Project Impacts and Mitigation

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

4.1 How are potential impacts measured?

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

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

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

4.1.1 Potential Impacts and Mitigation

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

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

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

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

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

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

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

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

4.1.2 Regions of Influence

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

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

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

Table 7. Regions of Influence for Human and Environmental Resources

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

4.2 Project Setting

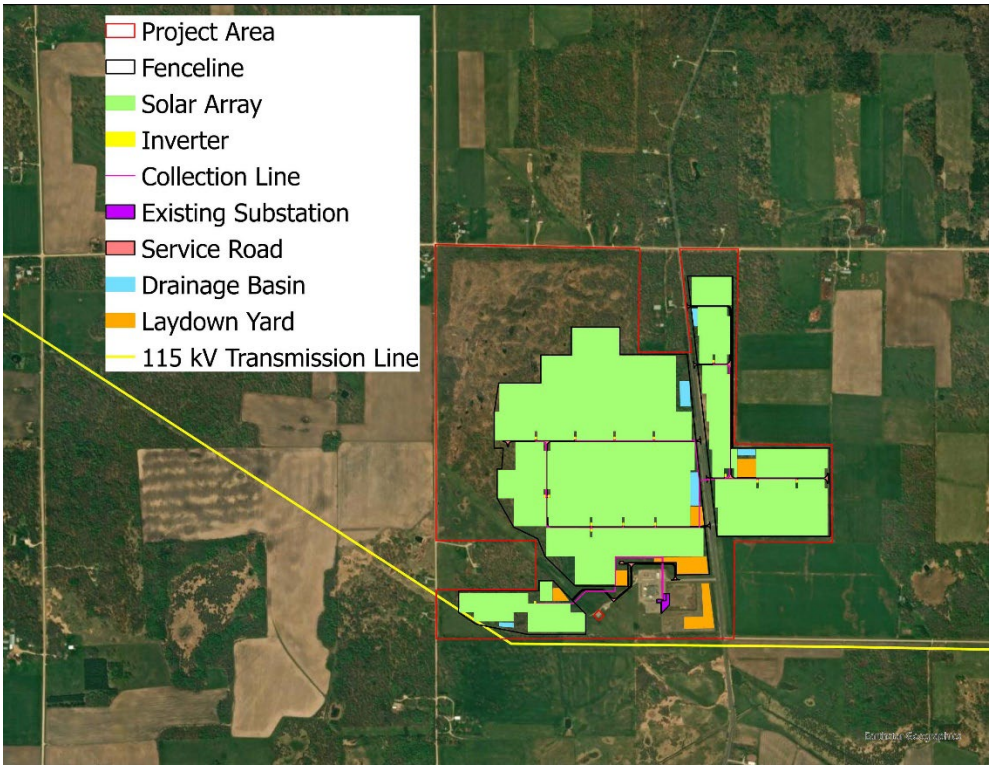
The project is in a rural area in Beltrami County, approximately 12.5 miles northwest of Bemidji and 1.6 miles north of the city of Solway. Beltrami County's population has a lower positive growth-rate than the rest of Minnesota. The project area consists of low-density residential property, forested land, and agriculture in Solway. There is also an existing power plant (Otter Tail's Solway Combustion Turbine Generation Station), transmission infrastructure (one 115 kV transmission line), utility natural gas pipeline (owned by the Great Lakes Gas Transmission Company), and roadways (Centerline Road NW and Herman Drive NW) within the project area.

The proposed solar facility is located in Lammers township, north of the city of Solway in Beltrami County, Minnesota. The solar facility is located east of Lammers Road NW, south of Thoren Drive NW,

north of Herman Drive NW, and approximately 2.5 miles west of Becker Road NW (Figure 1). Further, Centerline Road NW, a paved roadway, runs north to south through the project area. The topography of the project site is relatively flat to the south and southeast, with the central north and western portions containing rolling topography with multiple pockets of small wetland depressions that move northeast to central-southwest. Low-density residential areas are predominately in the northern and western most sides adjacent to the project area. Viewshed is dominated by open forested vegetation, pasture, and agricultural areas.

The proposed project is in the Laurentian Mixed Forest Province, Northern Minnesota Drift and Lake Plains Section, and Chippewa Plains Subsection (212Na).[55] Pre-settlement vegetation was a mixture of deciduous and coniferous forests dominated by white pine, red pine, and hardwoods on moraines, and jack pine on lake and outwash plains. Wetland areas were dominated by sedge meadow communities. The current land use in the project area is predominately agricultural and deciduous forest.

Figure 8: Area Energy Infrastructure



The majority of the land cover in the 487 acre project area is 188 acres of deciduous forest. Cumulatively, the second largest land use within the project area is agricultural, with 177 acres of pasture and 58 acres of cultivated crops (soybean, hay, alfalfa, and corn. Developed (low intensity, open space), shrub/scrub, and grassland/herbaceous are the other land uses that are each currently

[55] DNR, *Ecological Classification System: Ecological Land Classification Hierarchy,* (n.d.), https://www.dnr.state.mn.us/ecs/index.html

making approximately 1 percent of project area. Figure 8 shows the developed land use within the project area includes built features such as public roads, industrial wells, an electric utility peaking plant, a natural gas pipeline, and additional supporting electrical transmission infrastructure.

4.3 Human Settlement

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

4.3.1 Aesthetics

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

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

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

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

The existing landscape in the project area is rural consisting of relatively flat topography in the southern and eastern regions with rolling topography in the central, northern, and western regions. Land use is dominated by agricultural practices such as haying and grazing with some row crops of soybeans, hay, alfalfa, and corn. Additional land use within the project area comprises forests, wetlands, and grasslands. There is little developed land within the project area but includes existing energy infrastructure such as the Otter Tail's Solway Combustion Turbine Generation Station.

Low-density residential areas concentrated to the northern and western most sides of the project area. There are no residences or businesses within the area of land control; however, there are nine residences within 0.25 miles of the project footprint and fourteen residences within 0.26 to 0.5 miles

of the project footprint. The closest residence to the land control area is 0.05 miles to the north and west of the project footprint.[56]

4.3.1.1 POTENTIAL IMPACTS

The visible elements of the solar facility will consist of new PV panel arrays, transformers and inverters, weather stations, an O&M facility, a new substation, a short transmission line, and security fencing surrounding the project.

The solar arrays area will be the greatest visual impact and be the most noticeable change in the landscape, converting approximately 267 acres of fields into solar production. Although the change will be noticeable, there are other existing infrastructure features in the landscape including gravel roads and the power plant with supporting infrastructure. The project will be immediately adjacent to Otter Tail's Solway Combustion Turbine Generating Station that has been operating in the area since 2003. How an individual viewer perceives the change from a field of corn to a field of solar panels depends, in part, on how a viewer perceives solar panels. Will the viewer consider the harvesting of solar energy to be like harvesting crops or will the viewer see an agricultural use be replaced by an industrial use?

For residents outside the project vicinity and for others with low viewer sensitivity, such as those traveling on Lammers Road NW or Thoren Drive NW in the north-eastern corner, aesthetic impacts are anticipated to be minimal. For these viewers, the solar panels would be relatively difficult to see due to fencing and vegetation or would be visible for a very short period. For residents in the project vicinity and for others with high viewer sensitivity traveling on local roads in the project vicinity, such as Centerline Road NW, aesthetic impacts are anticipated to be moderate to significant.

Current land uses – pasture and hay, deciduous forest, and cultivated crops – will be replaced with solar infrastructure. Solar panels will occupy 55 percent of the project area and have a relatively low profile, with a maximum height of 12 feet off the ground at maximum tilt.[57] Construction of the new 0.6 acre substation, the associated transmission line, the 0.5 acre O&M facility, and the project fencing will also present new visual impacts. The project's 115 kV transmission line will be a short line, less than 500 feet in length to connect to existing interconnection facilities. In addition, the project will export power using the existing 115 kV transmission line that currently runs across the southern border of the project area.

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

Down-lit security lighting will be installed at the entrances the facility as well as outside the O&M facility and project substation, and along the perimeter fence as necessary for safety and security. Lighting will be motion-activated and down lit to minimize impacts and effects.[58] Impacts to light-

[56] SPA, p. 45
[57] SPA, p. 19
[58] SPA, p. 22

sensitive land uses are not anticipated given the rural project location coupled with minimal required lighting for operations.

MITIGATION

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

Impacts can be mitigated through standard or special permit conditions. A draft site permit (DSP) for the project is included in **Appendix C**. Section 4.3.8 of the DSP is a standard condition that requires the permittee to consider landowner input with respect to visual impacts and to use care to preserve the natural landscape.

Site-specific landscaping plans can minimize visual impacts to adjacent land uses and homes through vegetation screening, berms, or fencing. Otter Tail indicates that local feedback to date has not indicated aesthetic or visual concerns associated with the project.

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

4.3.2 Noise

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

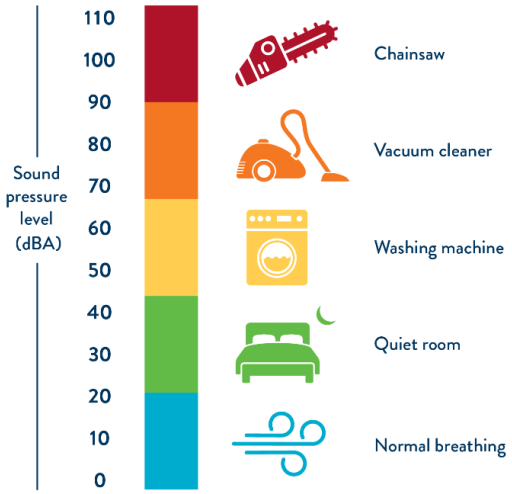
Noise can be defined as any undesired sound. It is measured in units of decibels on a logarithmic scale. The A-weighted scale ("dBA") is used to duplicate the sensitivity of the human ear.[59] A three dBA change in sound is barely detectable to average human hearing, whereas a five dBA change is clearly noticeable. A 10 dBA change is perceived as a sound doubling in loudness. Noise perception is dependent on several factors, including wind speed, wind direction, humidity, and natural and built features between the noise source and the receptor.

Figure 9 provides decibel levels for common indoor and outdoor activities.[60]

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

[60] Federal Aviation Administration (February 9, 2018) *Fundamentals of Noise and Sound*, retrieved from: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics/.

Figure 9. Common Noise Levels



In Minnesota, noise standards are based on *noise area classifications* ("NAC") corresponding to the location of the listener, referred to as a receptor. NACs are assigned to areas based on the type of land use activity occurring at that location. Household units, designated camping and picnicking areas, resorts and group camps are assigned to NAC 1; recreational activities (except designated camping and picnicking areas) and parks are assigned to NAC 2; agricultural and related activities are assigned to NAC 3.

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

Table 8. Noise Area Classifications (dBA)

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

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

Potential Impacts

The primary noise receptors are the local residences. Although there are no residences within the site, there are two residences located within 100 feet from the project area, and more than 30 residences

located within 3,200 feet[61]. Noise sensitive areas surrounding the project area consist of primarily rural residential homes which fall under the first Noise Area Classification (NAC 1). Noise receptors could also include individuals working outside in the project vicinity. Potential noise impacts from the project are associated with ambient noise of existing power generating facility, construction noise, and operational noise.

Construction

The amount of noise emitted from construction will vary and potentially be moderate to significant depending on location. However, construction associated noise will be limited to daytime hours and is temporary in nature and duration. Sound levels from grading equipment are not dissimilar from the typical tractors and larger trucks used in agricultural communities during harvest. Pile driving of the rack supports will be the most significant source of construction noise.

Federal Highway Administration Construction guidance was used to estimate noise emitted. Initial site set up including grading and access road construction utilizing grading equipment, skid steers, and other construction equipment will be between 76-85 dBA at 50 feet.[62] Otter Tail estimates this phase of construction lasting four weeks.[63]

Pile driving the rack support is anticipated to emit the most noise estimated at 101 dBA at 50 feet. Pile driving activity will vary in locations throughout the project area fluctuating noise levels at the receptors. Otter Tail estimates the pile driving phase lasting two to three months. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor.[64]

Thus, this construction noise would likely exceed state noise standards at select times and locations. Exceedances would be short-term and confined to daytime hours. Even without an exceedance, noise impacts will occur. Rhythmic pounding of foundations posts would be disruptive even if the noise associated with that activity is within state standards.

Other construction activities, for example, installation of solar panels, are anticipated to have minimal noise impacts. A forklift is typically used to place individual solar panels on the racking system. Construction activities will be sequenced, that is, site grading may occur at one location while posting driving occurs at another location while racking and panel assembly might occur at another location, at the same time.

Operation

Noise levels during operation of the project are anticipated to be minimal but subject to further inspection once final equipment models is selected. The primary noise sources of the solar facility will be the tracking motors, the inverters, and the substation transformer. Tracking motors produce low intermittent and typically produce 70 dBA at one foot.[65] The main source of noise during operation will be the substation transformer and inverters. The substation transformer is anticipated to produce

[61] SPA, p. 54
[62] SPA, p. 55
[63] Id.
[64] Id.
[65] SPA, p. 56

50 dBA at 240 feet.[66] The closest residence to any of the inverters is approximately 900 feet. Otter Tail states that the distance required for inverter noise to attenuate to the MPCA noise standard of 50 dBA is less than the 900-foot distance of the nearest residence.[67] Noise from routine maintenance activities is anticipated to be negligible to minimal. Noise from the electrical collection system is not expected to be perceptible.

MITIGATION

Sound control devices on vehicles and equipment (e.g., mufflers), conducting construction activities during daylight hours, and running vehicles and equipment only when necessary are common ways to mitigate noise impacts.

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

Section 5.1 of the DSP requires the permittee to file a noise impact assessment at least 14 days prior to the pre-construction meetings to demonstrate that the project is in compliance with the noise standard. The noise impact assessment shall summarize the results from noise propagation modeling that incorporates noise inputs from the selected equipment and the facility layout shown in the site plans required in Section 8.3 of the DSP. The permittee shall file an updated noise impact assessment including any revisions to selected equipment or facility payout prior to any modifications to the facility over its operating life.

4.3.3 Cultural Values

The ROI for cultural values is the project area. Development of the project will change the character of the area, potentially changing residents' sense of place. There are tradeoffs for rural communities between renewable energy projects and retaining the rural character of an area. Construction and operation of the project is not anticipated to impact or alter the work and leisure pursuits of residents in the project area in such a way as to impact the underlying culture of the area.

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

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

Cultural values can be informed by ethnic heritage. Residents of Beltrami County derive primarily from Native American, French, and European ancestry. Present day cultural in Beltrami County are

[66] SPA, Appendix M – Operating Equipment Noise Levels
[67] SPA, p. 57

informed by work and leisure pursuits as well as land use, for example, forestry, tourism, and recreational activities.

Cultural values are also informed by work and leisure pursuits, for example, farming and snowmobiling, as well as land use, such as agricultural cropland. Community events surrounding the project area are usually tied to seasonal/municipal events, and national holidays.

Cultural values of residences of Beltrami County are likely focused on forestry, tourism, and recreation. The county offers numerous forested parks that are sustainably harvested and managed. Attuned to the project area, cultural values for surrounding residents are likely focused on land uses such as forestry and agriculture.

POTENTIAL IMPACTS

The project contributes to the growth of renewable energy and is likely to strengthen and reinforce this value in the area. At the same time, the development of the project will change the character of the area. The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might—for some residents—change their perception of the area's character thus potentially eroding their sense of place. On whole, impacts to cultural values as a result of the project are anticipated to be minimal.

MITIGATION

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

4.3.4 Land Use and Zoning

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

The National Land Cover Database provides "spatial reference and descriptive data for characteristics of the land surface" nationwide.[68] The solar facility is located in the Laurentian Mixed Forest Province, Northern Minnesota Drift and Lake Plains Section, and Chippewa Plains Subsection (212Na). Today, land cover vegetation is predominantly aspen dominated woodland with mixed stands of birch, maple, oak, white spruce, jack pine, and red pine.[69]

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[68] U.S. Geological Survey. *The National Land Cover Database (NLDC) 2019 Products (ver 3.0)*. (2024), retrieved from: https://www.usgs.gov/data/national-land-cover-database-nlcd-2019-products-ver-30-february-2024#publications.

[69] United States Geological Survey, The National Land Cover Database (NLDC) 2019 Products (version 3.0), (2024), https://www.usgs.gov/data/national-land-cover-database-nlcd-2019-products-ver-30-february-2024#publications

As shown in Table 9, the project land cover is mostly undeveloped and dominated by deciduous forests, pasture/hay, and cultivated crops. The majority land use in the 487 acre project area is currently deciduous forest making up 38.6 percent. Cumulatively, the second largest land use within the project area is agricultural, with pasture currently making up 36.3 percent and cultivated crops (soybean, hay, alfalfa, and corn) currently making up 11.9 percent.

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

Table 9. Land Cover[70]

Category	Land Control Area (Acres)	Percentage
Developed, Open Space	15.74	3.23%
Developed, Low Density	6.2	1.27%
Developed, Medium Density	1.17	0.24%
Developed, High Density	0.35	0.07%
Barren Land (Rock/Sand/Clay)	4.78	0.98%
Deciduous Forest	188.5	38.63%
Mixed Forest	1.77	0.36%
Shrub/Scrub	23.92	4.90%
Grassland/Herbaceous	6.63	1.36%
Pasture/Hay	176.97	36.27%
Cultivated Crops	57.88	11.86%
Woody Wetland	1.76	0.36%
Emergent Herbaceous Wetland	2.31	0.47%
Total	**487.98**	100%

A site permit from the Commission supersedes local zoning, building, or land use rules.[71] Though zoning and land use rules are superseded, the Commission's site permit decision must be guided, in part, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[72]

[70] SPA, Table 12, p. 63
[71] Minnesota Statutes 216E.10, subd. 1.
[72] Minnesota Statutes 216E.03, subd. 7.

The area of land control is located within Lammers Township in Beltrami County. According to the Beltrami County Parcel Map[73], the project area is zoned 2A/1B/4BB Agricultural, 2B/1B Rural Vacant Land, and 2A U/P Land and Building. Regarding the zoning ID's, the project area does not contain any areas zoned for special protection.

Beltrami County Buffer Ordinances do not have specific setbacks applicable to solar energy generation facilities; however, setbacks were considered and applied to this project based on industry best practices. For example, reasonable fencing setbacks from road ROW are within the project design to provide space for animal travel.

Potential Impacts

Development of a solar farm in this area will temporarily change the land use from predominantly forest and agriculture uses to energy generation for the life of the project. The change of land use will have a minimal to moderate impact on the rural character of the surrounding area, and a minimal impact on the county character as a whole. Although the land is being converted to be used for energy production, the land use is consistent with other infrastructure in the area such as existing Solway Station.

Mitigation

The project would convert approximately 287 acres of forest, agriculture, and cultivated cropland to solar energy production. Otter Tail intends to utilize best practices as feasible to reduce the impact on land use. The applicant references the 2018 Beltrami County Forest Management Plan that shows that Beltrami County is not planning improvements or managing forest in the project area or within two miles of the project area; therefore, there should be no land use conflicts.

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

- Section 4.3.17 of the DSP requires the applicant to prepare a vegetation management plan to prevent soil erosion and invests in soil health by establishing a plan to protect soil resources by ensuring perennial cover. The applicant's draft VMP is found in Appendix I of the site permit application.
- Section 4.3.18 of the DSP requires the applicant to prepare an AIMP that details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. The applicant's draft AIMP is found in Appendix H of the site permit application.
- Section 9 of the DSP requires the applicant to prepare a decommissioning plan focused on returning the project site to pre-construction land use at the end of the project's useful life. The applicant's draft decommissioning plan is found in Appendix K of the site permit application.

[73] Beltrami County, *Geographic Information Systems (GIS): Property Mapping*, (2024). https://www.co.beltrami.mn.us/departments/gis/

- Section 9.2 of the DSP requires removal of all project-related infrastructure.

4.3.5 Property Values

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

Impacts to property values can be measured in three ways: sale price, sales volume, and marketing time. These measures are influenced by a complex interaction of factors. Many of these factors are parcel specific, and can include condition, size, acreage, improvements, and neighborhood characteristics; the proximity to schools, parks, and other amenities; and the presence of existing infrastructure, for example, highways or transmission lines. In addition to property-specific factors, local and national market trends, as well as interest rates, can affect all three measures. The presence of a solar facility becomes one of many interacting factors that could affect a specific property's value.

Because each landowner has a unique relationship and sense of value associated with their property a landowner's assessment of potential impacts to their property's value is often a deeply personal comparison of the property "before" and "after" a proposed project is constructed. The landowner's judgments, however, do not necessarily influence the market value of a property. Professional property appraisers assess a property's value by looking at the property "after" a project is constructed. Moreover, potential market participants are likely to see the property independent of the changes brought about by a project; therefore, they do not take the "before" and "after" into account the same way a current landowner might. Staff acknowledges this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[74]

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

Large solar facilities exist in Minnesota; however, limited sales information is available. A review of the literature identified one peer-reviewed journal article that addressed impacts to property values based on proximity to utility-scale, PV solar facilities. The Lawrence Berkeley National Lab studied over 1,500 large-scale PV solar facilities in six states (including Minnesota) to determine whether home sale prices were influenced within 0.5 miles (from over 1.8 million home sale transactions).[75] In

[74] Chalmers, James, *High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation*, (2019), https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf; Department of Commerce *Rights-of-way and Easements for Energy Facility Construction and Operation*, (2022), https://mn.gov/Commerce/energyfacilities/.

[75] Elmallah, Salma et al. Shedding light on large-scale solar impacts: An Analysis of Property Values and Proximity to Photovoltaics Across Six U.S. States, Energy Policy, Volume 175, (2023), https://www.sciencedirect.com/science/article/pii/S0301421523000101 .

summary, the study found that effects, "on home sale prices depend on many factors that are not uniform across all solar developments or across all states."

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

Other studies with smaller sample sizes did not find a consistent negative impact to the sales value of properties near large solar facilities. Chisago County Environmental Services and Zoning found that home sales exceeded assessed value near the 100 MW North Star solar facility at a rate comparable to the general real estate market in the area.[76] Additionally, a study prepared by CohnReznick examined compared sale prices of properties near 10 existing large solar facilities (including the North Star project) with comparable properties, and did not find a consistent negative impact to the sales value of properties near large solar facilities.[77]

Potential Impacts

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

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

Mitigation

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

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[76] Kurt Schneider, Environmental Services Director, *Email to Commerce staff*, (2017)

[77] McGarr, Patricia L. et al. Adjacent Property Value Impact Study A Study Of Six Existing Solar Facilities, (2021), https://www.nexteraenergyresources.com/content/dam/neer/us/en/pdf/CohnReznick%20Solar%20Impact%20Study_7.26.21.pdf

4.3.6 Tourism and Recreation

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

Beltrami County offers various recreational activities such as hiking, fishing, boating, snowmobiling, birdwatching, golfing, and archery. There are also numerous public community engagement activities that attach tourists to Beltrami County such as city parks, dog parks, ice arenas, trails and golf courses. In 2020, Minnesota Department of Revenue (MDR) Tourism Economic Impact Fact Sheet listed Beltrami County as having gross tourism sales of $124,161,005, state tourism sales of $6,402,368, and 1,900 individuals employed in the tourism industry.[78]

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

The nearest recreational resource to the project area is Red Trail, a horse trail associated with Grant Creek Horse Camp and is approximately 1.1 miles northeast of the project area. Also, the Mississippi Headwaters State Forest is located 2.1 miles to the northeast of the project area.

POTENTIAL IMPACTS

Impacts to tourism and recreation are anticipated to be minimal and temporary. Due to construction, there will be short-term increases in traffic and noise that could potentially impact recreational activities in close proximity to the project area, however, impacts will be temporary. No significant long-term impacts to recreational activities are anticipated.

MITIGATION

The project area is located on private land over a mile away from the nearest public land or recreational resources. Therefore, impacts are anticipated to be minimal and temporary, no additional mitigation measures are proposed.

4.3.7 Transportation and Public Services

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

[78] MDR, *Tourism's Economic Impact of Minnesota: 2020 Tourism Facts by County*, (2020). https://mn.gov/tourism-industry/assets/22_FactSheet_tcm1135-518462.pdf

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

Water and Wastewater There are two industrial wells within the project area. Groundwater is derived from a buried Quaternary aquifer.[79] The project anticipates installing a new well to provide water services to the facility as well as an on-site septic system.

Electric Utilities The primary electric provider in the project area is Beltrami Electric Co-op, Inc. As shown in Figure 8, there is the existing Solway Combustion Turbine Generation Station as well as an existing 115 kV transmission line running south of the project area. The Solway station is where the project intends to connect to the electric grid.

Pipelines An existing utility gas pipeline spans the project area northwest to southeast and is owned by Great Lakes Gas Transmission Company. The project is designed to avoid the pipeline ROW.

Roads The gravel roadways surrounding the project area are Lammers Road NW on the western border, Thoren Drive NW on the northern border, Herman Drive NW on the southern border, and approximately 2.5 miles of the eastern border is Becker Road NW. Further, Centerline Road NW, a paved roadway, moves north to south through the project area. A primitive access road to the existing Solway Station bisects the project area and moves from the central-southwest portion to the southeast.

Railroads There are no railroads located within the project area.

Airports There are no FAA-registered airports or airstrips within 20,000 feet or 3.78 miles of the proposed project. Bemidji Regional Airport is the closest airport to the project area and is approximately 12.3 miles southeast. The airport sits at 1,384 feet in elevation and has two runways. There is one private airstrip along the north side of the project area approximately 300 feet outside the boundary.[80]

POTENTIAL IMPACTS

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

Water and Wastewater Otter Tail does not anticipate impacts to water and wastewater systems. There are two industrial wells mapped within the project area. Otter Tail states that the water table for the Quaternary aquifer, in which the water for the industrial wells is derived, is greater than 45 feet below ground surface.[81] Additionally, there are no geological hazards such as shallow bedrock, karst features, or mapped faults within the project area. Therefore, no impacts to geologic and groundwater resources from the project are anticipated.

[79] SPA, p. 80
[80] SPA, p. 58
[81] SPA, pg. 80

Roads During construction workers and trucks delivering construction material and equipment will use the existing state, county, and township road system to access the project. 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. Otter Tail will obtain appropriate approvals for any overweight or oversized loads prior to construction.

Solar facilities will not be place within surrounding roadways but impacts or upgrades may occur to support final design and construction as driveways are placed on public roads, roadways are improved electric facilities are placed within roadway rights-of-way, or equipment is moved along public roads throughout construction. Otter Tail will obtain necessary permits from road authorities relating to road access, placement of electric facilities within roadway rights-of-way, and transportation of equipment along roadways. If new driveways are placed along public roads, an access permit will be obtained from Beltrami County prior to construction.[82]

Flatbed trucks, small all-terrain vehicles, rough-terrain forklifts, and skid-steers, as well as pick-up trucks for transporting equipment and workers throughout the project area will occur off roads throughout the project area.

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

Electric Utilities No long-term impacts to utilities will occur because of the project. The project's solar facilities will be designed to avoid the existing ROW of underground utilities. Through the interconnection process there may be limited, temporary impacts to electrical service. These impacts are expected to be short-term. Necessary coordination with local individuals and impacted utilities would take place prior to shutdowns.

Pipelines The project crosses an existing pipeline crossing the site diagonally from northwestern to southeast. Damage to utility pipelines is not expected to occur during ground disturbing actives as the project is designed to avoid existing ROW.

Air Safety There are no FAA-registered airports or airstrips within 3.78 miles of the proposed project. Tall structures that encroach into airspace can pose hazards as aircrafts maneuver near airports. Based on the low overall height of the solar panels and that the project will not impart any solar glint or glace impacts to surrounding aircraft, there are no impacts expected from the solar farm to the private airstrip 300 feet outside the boundary of the project area.

MITIGATION

Water and Wastewater Otter Tail anticipates no impacts to geologic and groundwater resources from the project. A single domestic-sized water well will be required for the O&M facility, and because of this a well construction permit will be required from the Minnesota Department of Health (MDH).

[82] SPA, pg. 61

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

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

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

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

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

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

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

Pipelines The project was designed to avoid existing ROW and damage to the utility pipeline is not expected. Otter Tail will notify Gopher State One-Call of all proposed excavations to ensure that underground utilities will not be impacted throughout construction. If a pipeline or water line must be spanned during construction of the Project, soil preserving BMPs will be used, such as construction matting, over underground utilities when using heavy equipment.[83]

Otter Tail plans to complete a subsurface investigation as recommended in the Phase I Environmental Site Assessment (ESA). Section 5.2 of the DSP (**Appendix C**) requires the permittee to complete a subsurface investigation as recommended in the Phase I ESA prior to the start of construction. The Permittee is then required to comply with the guidance provided from the investigation in order to avoid damages to public utilities, but specifically the gas pipeline bisecting the project site.

4.3.8 Socioeconomics

The ROI for socioeconomics is the region. The impact intensity level is anticipated to be minimal to significant and positive. Effects associated with construction will, overall, be short-term and

[83] SPA, p. 62

minimal. Significant positive effects may occur for individuals. Impacts from operation will be long-term and significant. Adverse impacts are not anticipated.

Beltrami County is a relatively rural county with a lower growth rate then the State of Minnesota as a whole; between 2010 and 2020, the population in Beltrami County increased by 4.01 percent, compared to the increase of 7.6 percent for Minnesota as a whole. The largest population center in Beltrami County is Bemidji, 12.5 miles southeast of the project area. From 2010 to 2020 the population of Bemidji increased 8.5 percent. South of the project area is the town of Solway. From 2010 to 2020 the population of the city of Solway decreased 23.9 percent going from 96 residents to 73 (Table 10).

As of 2020, Beltrami County, Bemidji, and Solway all have a lower median household income compared to the State of Minnesota as a whole. Unemployment rates fluctuate with the economy, but in 2020 unemployment rates in Beltrami County (6.10 percent) and Bemidji (4.90 percent) were both higher in comparisons to Minnesota's (3.80 percent). The city of Solway on the other hand was lower reporting an unemployment rate of 0 percent as of 2020.

In 2020, the sectors with the largest employment in Beltrami County were health care and social assistance. The city of Bemidji's largest employment industries were educational services, health Care, and social assistance. Solway's largest employment industry in 2020 was reported to be manufacturing.[84]

[84] SPA, pp. 66-67

Table 10. Socioeconomic Data for the Project Area[85]

Location	Total Population			Population Characteristics		
	2010 Census	2020 Census	% Change 2010 - 2020	2020 Median Household Income	2020 Unemployment Rate	2020 Largest Employment Industry
State of Minnesota	5,241,914	5,707,390	6.83	$73,382	3.80%	Manufacturing, Health Care, Retail
Beltrami County	4,089	3,935	-3.8	$40,525	6.10%	Health Care and Social Assistance
Bemidji	292	276	-5.5	$36,250	4.90%	Education Services, Health Care, and Social Assistance
Solway	195	209	6.7	$65,625	0%	Manufacturing

POTENTIAL IMPACTS

The impact intensity level is anticipated to be positive. Potential impacts associated with construction will be positive, but minimal and short-term. Significant positive effects might occur for individuals. Impacts from operation will be long-term, positive, and moderate. The project will not disrupt local communities or businesses and does not disproportionately impact low-income or minority populations (see discussion of environmental justice in Section 4.3.9). Adverse impacts are not anticipated.

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

The applicant indicates that procurement of construction resources will give preference to local, union construction craft employees. Construction of the project will last approximately 12 to 14 months and will employ 70 to 80 construction workers at peak and up to two permanent employed personnel to operate and maintain the facility during the operational phase of the project. The applicant will pay prevailing wages for applicable construction jobs in the project area. [86] Local construction crew

[85] SPA, Table 15, p. 67
[86] U.S. Department of Labor, *Prevailing Wage and the Inflation Reduction Act*. (n.d.) https://www.dol.gov/agencies/whd/IRA

expenditures will result in temporary, positive impacts on local economies. Local business may experience increases in revenue due to increased purchase of goods and services during construction.

Long-term benefits of the project include ensuring continued, reliable electric service for communities served by the project and economic benefits through incremental increase in revenues from utility property taxes. Once the project is operational, Otter Tail will pay property tax and production taxes on the land and energy production to local governments. Minnesota has adopted a production tax of $1.20/MWh paid 80 percent to counties and 20 percent to the cities and townships.[87]

The project area includes approximately 188.5 acres of deciduous forest. Forestry is one of the top land uses within the project area; if the project is constructed, approximately 115 acres of trees will be cleared. Beltrami County hosts a forestry-based economy but the applicant states that tree clearing will not negatively impact forestry management as the County is not managing forest in the project area or within two miles of the project area. The project is not located within any active timber sale tracts. Overall impacts on forested areas will be reduced by minimizing tree clearing.[88]

The project area includes approximately 225 acres of active farmland. If the project is constructed, approximately 57.88 acres of cultivated crops will be removed from agricultural production that are currently used to produce soybeans, hay, alfalfa, and corn. The removal of cultivated land is likely to result in an incremental decrease to agricultural-related businesses, such as farm dealerships, seed dealers, and dealers of agricultural inputs such as fertilizer and pesticides, in the area. The extent of any decrease in sales is difficult to determine, but the removal of 57.88 acres of the approximately 173,159 acres of farmland in Beltrami County is unlikely to have a significant impact.[89] Adverse impacts associated with the loss of agricultural land and agricultural production will be mitigated through lease payments to landowners.

MITIGATION

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

4.3.9 Environmental Justice

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

Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and

[87] Minnesota Department of Revenue, Solar Energy Production Tax, (2023), https://www.revenue.state.mn.us/solar-energy-production-tax#:%7E:text=The%20Solar%20Energy%20Production%20Tax%20rate%20is%20%241.20%20per%20megawatt,nameplate%20capacity%20exceeding%201%20megawatt

[88] SPA, p. 69

[89] USDA, Census of Agriculture County Profile, Beltrami County Minnesota (2022), https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27007.pdf

enforcement of environmental laws, regulations, and policies."[90] The intent is to ensure that all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that might affect their environment or health.

Potential Impacts

Utility infrastructure can adversely impact low-income, minority or tribal populations. To identify potential environmental justice concerns in the project area, the DNR's EJ Tool was used to consider the composition of the affected area to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations.[91]

Minnesota Statute defines environmental justice areas as census tracts:[92]

- in which at least 40 percent of the population is nonwhite
- in which at least 35 percent of households have income at or below 200 percent of the federal poverty level
- in which at least 40 percent of the population has limited proficiency in English
- which are located within Indian Country, which is defined as federally recognized reservations and other Indigenous lands

Staff conducted a demographic assessment of the affected community to identify low-income and minority populations using U.S. Census data.[93] Table 11 provides low-income and minority population data with Beltrami County.

Table 11. Low-Income and Minority Population Characteristics

Area	% Below Poverty Level	Median Household Income ($)	% Minority Population‡
Region of Comparison			
Minnesota	9.3	85,086	24
Beltrami County	16.0	67,257	29
Project Census Tract			
Census Tract 4501	9.7	64,254	11

Source: U.S. Census Bureau, 2024 American Community Survey5-year Estimate

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

[90] US EPA *Environmental Justice*, (n.d.), https://www.epa.gov/environmentaljustice .
[91] MPCA, *Environmental Justice,* (n.d.), Environmental justice | Minnesota Pollution Control Agency
[92] Minnesota Statue 116.065
[93] SPA, Appendix L – Environmental Justice Screening Tool

MITIGATION

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

4.4 Public Health and Safety

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

4.4.1 Electric and Magnetic Fields

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

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

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

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

Table 12 provides examples of electric and magnetic fields associated with common household items. "The strongest electric fields that are ordinarily encountered in the environment exist beneath high voltage transmission lines. In contrast, the strongest magnetic fields are normally found very close to motors and other electrical appliances, as well as in specialized equipment such as magnetic resonance scanners used for medical imaging."[94]

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

Table 12. Electric and Magnetic Field Strength of Common Household Objects[95]

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

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

Health Studies In the late-1970s, epidemiological studies indicated a weak association between childhood leukemia and ELF-EMF levels. "Epidemiologists observe and compare groups of people who have had or have not had certain diseases and exposures to see if the risk of disease is different between the exposed and unexposed groups but does not control the exposure and cannot experimentally control all the factors that might affect the risk of disease."[96]

Ever since, researchers have examined possible links between ELF-EMF exposure and health effects through epidemiological, animal, clinical, and cellular studies. To date, "no mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified. Unlike high-energy (ionizing) radiation, EMFs in the non-ionizing part of the electromagnetic spectrum cannot damage DNA or cells directly," that is, the ELF-EMF that is emitted from HVTLs does not have the energy to ionize molecules or to heat them.[97] Nevertheless, they are fields of energy and thus have the potential to produce effects.

> "The few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer."[98]

[95] Id.

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

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

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

> "Overall there is no evidence that exposure to ELF magnetic fields alone causes tumors. The evidence that ELF magnetic field exposure can enhance tumor development in combination with carcinogens is inadequate."[99]

> "A number of scientific panels convened by national and international health agencies and the U.S. Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe."[100]

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

> "Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF…. However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship…, nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.
>
> The Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk cannot be dismissed.[101]"

Regulations and Guidelines Currently, there are no federal regulations regarding allowable ELF-EMF produced by power lines in the United States; however, state governments have developed state-specific regulations. For example, Florida limits electric fields to 2.0 kV/m and magnetic fields to 150 mG at the edge of the ROW for 161 kV transmission lines.[102] Additionally, Table 13 shows the international organizations adopted standards for exposure to electric and magnetic fields.

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

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

[101] Id.

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

Table 13. International Electric and Magnetic Field Guidelines

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

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

POTENTIAL IMPACTS

Potential impacts are anticipated to be negligible and are not expected to negatively affect human health. Impacts will be long-term and localized but can be minimized. The primary sources of EMF from the generating facility will be from the solar arrays, buried electrical collection lines, and the transformers installed at each inverter. The EMF generated by solar arrays is at the level generally experienced near common household appliances. Measured magnetic fields at utility-scale PV projects drop to very low levels of 0.5 mG or less at distances of 150 feet from inverters.[103]

MITIGATION

No health impacts from EMF are anticipated. EMF diminishes with distance from a conductor or inverter. The nearest residence to inverter equipment is about 900 feet and nearest residence to medium voltage (34.5 kV) electrical collection line is also about 900 feet.[104] At this distance both electric and magnetic fields will dissipate to background levels. No additional mitigation is proposed.

4.4.2 Public Safety and Emergency Services

The ROI for public and work safety is the land control area. Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. There is the potential for land has previously been impacted by hazardous substances to be encountered, and hazardous materials must be documented, monitored, and disposed in coordination with MPCA. Potential impacts are anticipated to be minimal. Impacts would be short- and long-term and can be minimized.

Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Construction might disturb existing environmental hazards on-

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

[104] SPA, pp. 52-53

site, for example, contaminated soils. During operation there are occupational risks similar to those associated with construction. Public risks would result from unauthorized entry into the facility.

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

Emergency services in the project area are provided by local law enforcement and emergency response agencies located in nearby communities. Law enforcement in the project area is provided by the Beltrami County Sheriff. Fire service is provided by city and community fire departments. The cities of Solway and Shevlin have volunteer fire department's location 1.55 miles south and 5.56 miles west of the of the project area. Ambulance response is provided by Bemidji Ambulance Service Incorporated in Bemidji. Combined fire and ambulance services are provided by the Solway Fire Department, Shelvin Fire Department, and Bemidji Fire Department. Emergency medical response is also available from the Sanford Bemidji Medical Center in Bemidji. [105]

Potential Impacts

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

The inflow of temporary construction personnel could increase demand for emergency and public health services. On the job injuries of construction workers requiring assistance due to slips, trips or falls, equipment use, or electrocution can create a demand for emergency, public health, or safety services that would not exist if the project were not to be built. Otter Tail will coordinate with local emergency services to ensure that emergency access to areas near construction activities is maintained and will contact utility providers, businesses, or residents near the construction area to notify of potential impacts and prevent damage to public utilities. [106]

In Minnesota, unless solar panels discarded by commercial entities are specifically evaluated as non-hazardous, the panels are assumed to be hazardous waste due to the probable presence of heavy metals. Heavy metals in solar panels can include arsenic, cadmium, lead, and selenium. If hazardous waste, they must be properly disposed of in a special facility or recycled if recyclers are available. [107] Otter Tail will regularly remove waste throughout construction, paper, plastic, petroleum, and other waste products will be gathered and disposed of appropriately at surrounding waste disposal facilities. [108]

Mitigation

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

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[105] SPA, p. 59
[106] SPA, p. 61
[107] MPCA, *2017 Toxics and Pollution Prevention Evaluation Report*, p. 22- 23 https://www.lrl.mn.gov/docs/2018/mandated/180453.pdf
[108] SPA, p. 62

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

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

- Section 4.3.30 in the DSP requires the permittee to take several public safety measures, including landowner educational materials, appropriate signs and gates, etc.
- Section 8.12 in the DSP requires permittees file an *Emergency Response Plan* with the Commission and local first responders prior to operation.
- Section 8.13 in the DSP requires disclosure of extraordinary events, such as fires, etc.
- Section 9.1 in the DSP requires a decommissioning plan prior to construction and updated every five years. Periodic updates of the plan will address the developing information on end-of-life issues related to PV panels.

No additional mitigation is proposed.

4.5 Land-based Economies

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

4.5.1 Agriculture

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

Agricultural practices cover a large portion of the project area with pasture currently making up 36.3 percent (176.97 acres) and cultivated crops (soybean, hay, alfalfa, and corn) currently making up 11.9 percent (57.88 acres). The project area includes 221.8 acres of farmland of statewide importance and prime farmland if drained. Moreover, the project area includes a total of 225 acres of active farmland.

In 2022, there were approximately 173,158 acres of farmland in Beltrami County. There are a total of 608 individual farms located in Beltrami County, with an average farm size of 285 acres. Crop sales account for about 70 percent of agricultural sales compared to 30 percent of livestock sales in the county.[109]

Prime farmland is defined by Federal regulation at 7 C.F.R.657.5(a)(1) as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses.” Approximately 5 percent of the project area is designated as prime farmland (24.5 acres), 2.5 percent of the project area is designated as prime

[109] Census of Agriculture, Beltrami County Profile, (2022), https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27007.pdf

farmland if drained (12.2 acres). Together this totals to 36.7 acres or 7.5 percent of the overall project area. However, only 6.7 acres of prime farmland if drained will be developed within the project footprint, the rest is outside the footprint.[110] With respect to prime farmland, the applicant indicates that no feasible or prudent alternatives to the project exist.

Potential Impacts

The impact intensity level will range from minimal to moderate. The intensity of the impact is likely to be subjective. For example, conversion of farmland to solar energy production can be viewed as a conversion from one type of industrial use to another. Conversely, the conversion of farmland to solar energy production can be viewed as a negative impact to agricultural production. Restoring the site with native grasses and forbs will reduce soil erosion, provide pollinator and wildlife benefits, and improve soil health. This EA acknowledges that the perceived impacts to agriculture are subjective and may be difficult to assess given the trade-offs associated with utility scale solar projects.

Rural areas, with large parcels of relatively flat, open land, are ideal for solar development, which require six to eight acres of land to generate one MW of electricity. The project will result in up to 225 acres of farmland being removed from agricultural production for the life of the project. This change in land use would take productive farmland out of production for the life of the project, representing approximately 0.001 percent of existing agricultural land in Beltrami County. The applicant indicates that the land could be returned to agricultural uses after the project is decommissioned and the site is restored.

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

Mitigation

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

- Section 4.3.9 in the DSP requires protection and segregation of topsoil.
- Section 4.3.10 in the DSP requires measures to minimize soil compaction.
- Section 4.3.11 in the DSP requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls to ensure that stormwater does not become a problem on or off-site.
- Section 4.3.16 in the DSP requires that "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".
- 4.3.17 in the DSP requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates and timing of revegetation will stabilize soils and improve overall soil health. Otter Tail Solar has included a draft VMP as Appendix I of its site permit application.
- Section 4.3.18 in the DSP requires the permittee to develop an AIMP with MDA. Otter Tail's draft AIMP (Appendix H of its site permit application) details methods to minimize soil

[110] SPA p. 82

compaction, preserve topsoil, control noxious weeds and invasive species, maintain the existing drainage conditions through appropriate maintenance and repair of existing drain tile, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use.

- Section 4.3.20 in the DSP requires the permittee to develop an Invasive Species Management Plan to prevent introduction and spread of invasive species during construction of the project.
- Section 4.3.21 in the DSP requires the permittee to take reasonable precautions against the spread of noxious weeds.
- Section 4.3.29 in the DSP requires the permittee to fairly restore or compensate landowners for damages to crops, fences, drain tile, etc. during construction.

Otter Tail indicates that BMP's would be implemented during construction in order to minimize and mitigate long-term impacts to agricultural lands, including project design that minimizes infrastructure to the degree practicable, preventing soil profile mixing, halting construction during wet weather conditions, ensuring proper site drainage and erosion control, and limiting the spread of noxious weeds and invasive species by cleaning construction equipment. Following construction, Otter Tail indicates that disturbed areas would be repaired and restored to pre-construction contours and characteristics to the extent possible.[111]

4.5.2 Forestry

The ROI for forestry is the land control area. Impact intensity is expected to be minimal to moderate – a negligible loss of forest in Beltrami County would occur for the life of the project. Tree clearing will be offset by the Beltrami County's larger forestry-based economy. Potential impacts are localized and unavoidable but can be reduce by minimizing tree clearing.

The project is located in Beltrami County Forest District 1, which hosts the townships of Buzzle, Lammers, and Jones. Beltrami County hosts a forestry-based economy colecting $466,118 in revenue for all timber sold year-to-date as of April 2024.[112] Forestry is one of the top land uses within the project area and includes approximately 188.5 acres of deciduous forest. According to Beltrami County Forest Management Plan, the county is not managing forest within the project area or within two miles. Thus, if the project is construct, approximately 115 acres of trees will be cleared to accommodate the solar facilities.

POTENTIAL IMPACTS

Potential impacts to forestry management are not anticipated as the county is not managing forest in the project area or within two miles of the project area.[113] A negligible loss of forest in Beltrami County would occur for the life of the project. To construct the project tall vegetation must be cleared to support the placement of the solar facilities, resulting in the clearing of 115 acres of deciduous forest

[111] SPA, pp. 68-69
[112] Beltrami County, Natural Resource Management, *Timber Auction Results – April 2 & 4,* (2024), https://www.co.beltrami.mn.us/media/lb2a2poq/april-auction-results.pdf
[113] Id.

within the land control area. The applicant states that all timber cleared during construction would be moved and disposed of properly prior to operation of the project.[114]

Potential impacts related to forestry economics and timber sales revenue are not anticipated as no known commercial forestry operations are within the vicinity of the project and the project is not located within any active timber sale tracts. [115] The tree clearing necessary for the project will be offset by Beltrami's larger forest-based economy.

Overall, potential impacts are localized and unavoidable but can be minimized.

MITIGATION

Beltrami County has one comprehensive plan, the Beltrami County Forest management Plan, that concerns land use and land improvements in the county. This plan does not indicate that Beltrami County is planning improvements or managing forest in the project or within two miles of the project area.[116]

The project is not anticipated to negatively impact forestry management within Beltrami County, and therefore there should be no land use conflicts in the project area. Overall impacts on forested areas will be reduce by minimizing tree clearing.[117]

4.5.3 Tourism

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

Tourism in the local area includes outdoor recreational activities, such as hiking, hunting, fishing, boating, snowmobiling, birdwatching, golfing, and archery; local community festivals, such as the Beltrami County fair; and leisure and hospitality industries, such as local restaurants and resorts.

POTENTIAL IMPACTS

All project facilities will be located on privately-owned land, therefore impacts to tourism and recreation are anticipated to be minimal. Short-term impacts to outdoor recreational activities could occur during construction due to noise and traffic increase, however these impacts will be temporary and short-term in duration.

MITIGATION

Because significant impacts are not anticipated, no additional mitigation measures are proposed.

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[114] Id.
[115] SPA, p. 69
[116] Beltrami County, Forest Management Plan, (2018), https://www.co.beltrami.mn.us/media/1pcenblj/forest-management-plan.pdf
[117] SPA, p.69

4.6 Archeological, Cultural, and Historic Resources

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

Archeological resources are locations where objects or other evidence of archaeological interest exist, and can include aboriginal mounds and earthworks, ancient burial grounds, prehistoric ruins, or historical remains.[118] Historic resources are sites, buildings, structures, or other antiquities of state or national significance.[119]

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

Potential Impacts

Otter Tail reports contacting the eleven federally recognized Tribal Nations in Minnesota, including Minnesota Tribal Nations' Tribal Historic Preservation Officers (THPO) and the Minnesota Indian Affairs Council for additional information or comment on the project.[120] Otter Tail received responses from four of the federally recognized Tribal Nations that expressed interest in ongoing project updates, including the Leech Lake Band of Ojibwe, the Lower Sioux Indian Community, the Shakopee Mdewakanton Sioux Community, and the Upper Sioux Community.[121]

Otter Tail conducted a Phase Ia Cultural Resources Literature Review and Assessment using the Minnesota Statewide historic Inventory Portal records. This literature review showed no previously recorded archaeological sites, previously inventoried historical cemeteries or architectural properties, or National Historic Landmarks, or Locally Designated historic properties identified within the study area.[122]

Based on elevation and prehistoric hydrology data reviewed during the archaeological assessment, there is potential to encounter yet unrecorded Pre-Contact Archaeological Sites. A Phase I Archaeological Survey is planned to be completed in October of 2024 for the areas identified as possessing high archaeological potential.[123]

Mitigation

Prudent siting to avoid impacts to archaeological and historic resources is the preferred mitigation. Section 4.3.23 of the DSP (**Appendix C**) address archeological resources and require the permittee to avoid impacts to archaeological and historic resources where possible and to mitigate impacts where avoidance is not possible. If previously unidentified archaeological sites are found during construction, the permit requires the permittee to stop construction and contact SHPO to determine how best to

[118] Minnesota Statutes, Section. 138.31, subd. 14.
[119] Minnesota. Statutes, Section 138.51.
[120] SPA, pp. 95-96
[121] SPA, p. 96
[122] SPA, p. 71
[123] Id.

proceed. Ground disturbing activity will stop, and local law enforcement will be notified should human remains be discovered.

Additionally, Section 5.3 of the DSP (**Appendix C**) requires preparation of a Phase I Archaeological Survey for the areas within the project identified as possessing high archaeological potential. The permittee there after shall correspond SHPO and comply with the guidance provided by the survey's results to avoid archaeological and historic resources.

4.7 Natural Resources

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

4.7.1 Air Quality

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

Air quality is a measure of how pollution-free the ambient air is and how healthy it is for humans, other animals, and plants. Emissions of air pollutants will occur during construction and operation of new infrastructure for the project. Overall air quality in Minnesota has improved over the last 20 years, but current levels of air pollution still contribute to health impacts. As illustrated in Figure 10**,** today, most of our air pollution comes from smaller, widespread sources. The rest comes from a wide variety of things we use in our daily lives: our vehicles, local businesses, heating and cooling, and yard and recreational equipment.[124]

The nearest air quality monitor to the project is in Red Lake, Minnesota approximately 32 miles north of the project. [125] Air quality in the area has been considered "good" between 298 and 348 days of the year from 2018-2022. During the same time period, the number of days classified as moderate occurred varied between 11 and 33. Air quality was considered unhealthy for sensitive groups on one day in both 2018 and 2019 and five days in 2021. Air quality was classified as unhealthy on one day in 2019 and three days in 2021, and very unhealthy on one day in 2021. The increase in the number of days of moderate or worse air quality in 2021 was statewide and largely attributable to drought conditions and wildfire smoke in the upper Midwest. [126]

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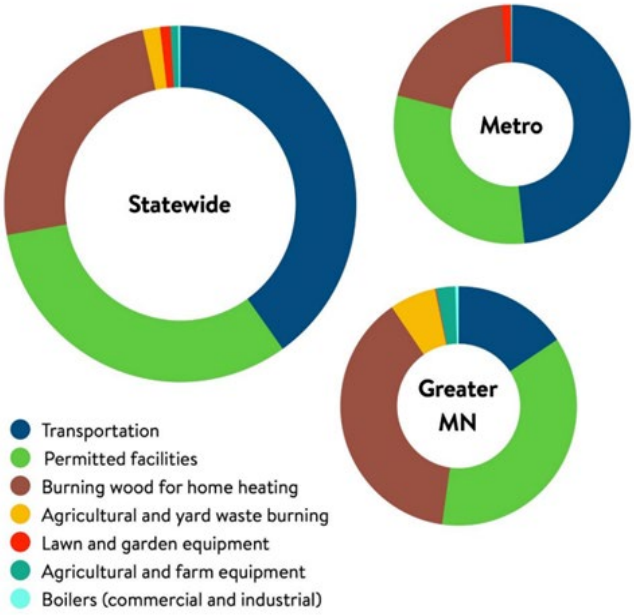
[124] MPCA *The State of Minnesota's Air Quality, January 2023 Report to the Legislature*, https://www.lrl.mn.gov/docs/2022/mandated/221697.pdf

[125] MPCA, Minnesota's air monitoring site locations, (n.d.), https://data.pca.state.mn.us/views/Airmonitoring-Activestatewidemonitoringsites/Minnesotasairmonitoringsitelocations?%3Aembed=y&%3AisGuestRedirectFromVizportal=y

[126] MPCA. The Air We Breathe: The State of Minnesota's Air Quality in 2021, 2023, https://www.lrl.mn.gov/docs/2022/mandated/221697.pdf

Figure 10. Air Pollution Sources by Type



Potential Impacts

Minimal intermittent air emissions are expected during construction of the project. Air emissions associated with construction are highly dependent upon weather conditions and the specific activity occurring. For example, traveling to a construction site on a dry gravel road will result in more fugitive dust than traveling the same road when wet. Once operational, neither the generating facility nor the transmission line will generate criteria pollutants.

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

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

Emissions associated with maintenance are dependent upon weather conditions and the specific activity occurring. Vehicle exhaust will be emitted during maintenance visits to the generating facility. The applicant indicates that, over the life of the project, fugitive dust emissions will be reduced by the elimination of farming and establishment of perennial native plantings and other permanent vegetative cover. The applicant also indicates that the project will have a positive effect on air quality by replacing electrical generation produced by burning fossil fuels, reducing associated greenhouse gas emissions.

MITIGATION

Exhaust emissions can be minimized by keeping vehicles and equipment in good working order, and not running equipment unless necessary. Otter Tail indicates that best management practices will be used during construction and operation of the project to minimize dust and emissions.

As a component of the construction stormwater permit that will be obtained for the project, a National Pollutant Discharge Elimination System/State Disposal System construction stormwater permit and an associated Stormwater Pollution Prevention Plan (SWPPP) will be developed and implemented prior to construction in order to minimize the potential for fugitive dust emissions.

Watering exposed surfaces, covering disturbed areas, and reducing speed limits on-site are all standard construction practices.

The AIMP identifies construction BMPs related to soils and vegetation that will help to mitigate against fugitive dust emissions. Several sections of the draft plan indirectly mitigate impacts to air quality, including sections related to construction and vegetation removal, soils, erosion and sediment control, and restoration of the site to pre-construction conditions.[127]

4.7.2 Geology and Groundwater

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

Groundwater in Minnesota is largely a function of local geologic conditions that determine the type and properties of aquifers. Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. Geologically, the project site is within the Wawa Subprovince of Superior Province. The underlying bedrock is an Archean age granitic intrusion known as Bemidji Batholith. The bedrock is overlain by Quaternary glacial deposits. Within the project area, the deposits are cut by a collapsed meltwater channel that is oriented northeast-southwest across the site.[128]

The project area sits within Minnesota groundwater Province 4, the Central Province, and is characterized by thick glacial sediment. Within Province 4, sand gravel aquifers are common, and the deeper fractured crystalline bedrock has poor aquifer properties and limited use as an aquifer. [129]

Within the project area, groundwater is mainly derived from the thick sand and gravel layers within the Quaternary deposits. Nearby data suggest that the water table is greater than 45 feet below ground surface. There are two industrial wells mapped within the project area that derive their water from the Quaternary buried artesian aquifer.[130]

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[127] SPA, Appendix H - AIMP.
[128] SPA, p. 79
[129] DNR, Minnesota Groundwater Provinces (2021) https://www.dnr.state.mn.us/waters/groundwater_section/mapping/provinces.html
[130] SPA, p. 80

Pollution sensitivity of near surface materials in the project area is in the "low" category.[131] The sensitivity to pollution of near-surface materials is an estimate of the time it takes for water to travel through the unsaturated zone to reach the water table, which for the purposes of the model was assumed to be 10 feet below the land surface.[132] This means that the project area is generally expected to have "low" groundwater pollution sensitivity where contaminants from the land surface would not reach groundwater for month to a year.[133] Low sensitivity does not guarantee protection. Leakage from an unsealed well for example, may bypass the natural protection, allowing contamination to directly enter an aquifer.

Depth to water table in the preliminary development area ranges from just below the surface to more than 45 inches depending on the soil type. Depth to water table is shallower in the mapped hydric soils and areas delineated as wetland, and deeper in the non-hydric soil units.[134]

The land control area was reviewed for wells listed on the Minnesota Well Index (MWI) and MDH Wellhead Protection Areas (WHPAs).[135] The MDH maintains the Minnesota Well Index (MWI), which provides basic information (e.g., location, depth, geology, construction, and static water level) for wells and borings drilled in Minnesota. The MWI identified two documented industrial wells near the facility building on site and four additional wells with 0.5 miles of the project area[136]

Under the Safe Drinking Water Act, each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well. Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection program. WHPAs for public and community water-supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by MDH (2023b). A search for WHPAs in the MDH database indicated that the land control area is located entirely outside of any WHPA for a drinking water well where contaminants could ender and pollute the well.

Potential Impacts

Potential impacts to geology and groundwater can occur directly or indirectly. Impacts to geological resources are likely to be minimal, due to the absence of shallow bedrock, karst features, and map faults within the project area.

Groundwater onsite is derived from a buried Quaternary aquifer. Wells completed nearby to the north in the unconfined Quaternary aquifer report depths to water between 46 to 60 feet below ground

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[131] Minnesota Natural Resource Atlas, (n.d.), https://mnatlas.org/gis-tool/
[132] Adams, R. Pollution Sensitivity of Near-Surface Materials, (2016), https://www.leg.mn.gov/docs/2017/other/170839.pdf
[133] DNR, Methods to Estimate Near-Surface Pollution Sensitivity, (2016), https://files.dnr.state.mn.us/waters/groundwater_section/mapping/gw/gw03_ps-ns.pdf .
[134] SPA, p. 80
[135] SPA, p. 77
[136] MDH, *Minnesota Well Index,* (n.d.), https://www.health.state.mn.us/communities/environment/water/mwi/index.html .

surface (bgs). The groundwater flow direction in the unconfined aquifer is estimated to the east towards Grant Creek and other nearby water bodies.[137]

Direct impacts to groundwater are generally associated with construction, for example, structure foundations that could penetrate shallow water tables or groundwater usage. Indirect impacts could occur through spills or leaks of petroleum fluids or other contaminants that contaminate surface waters which could ultimately contaminate groundwater. The disturbance of soil and vegetative cover could affect water quality in groundwater resources. Impacts to groundwater resources, including aquifers and the Grant Creek, are not anticipated as water supply needs will be limited and the unconfined aquifer is greater than 45 feet bgs.

Construction of the project is not likely to require subsurface blasting, and newly fractured bedrock causing groundwater flow is not anticipated. A domestic well is likely to be installed as a component of the O&M building. Otter Tail acknowledges that the construction of a solar project will create an increase in impervious and semi-impervious surfaces within the area of land control. This could lead to an increase of stormwater runoff, and in turn reduce groundwater recharge.

The project is not anticipated to require the use or storage of large quantities of hazardous materials that might otherwise have the potential to spill or leak into area groundwater. A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be required for the main power transformer located in the project substation, as well as for oil-filled operation equipment (inverter/transformer) or oil storage at the O&M building. The transformers will be properly contained per USEPA requirements. The SPCC, because of its specificity, will be completed prior to construction. An additional SPCC plan will also likely be needed for the operational phase of the project.[138]

The variables from the applicant's geotechnical study will be used to engineer the solar array foundation system. Typically, the foundation is a steel pile, which is driven into the ground with a hydraulically powered high-frequency hammer mounted on a tracked carrier. The piles are installed at pre-defined locations throughout the array area to an embedment depth of approximately 8 feet to 20 feet below ground surface, depending on soil properties and other factors.[139]

The electrical collection system, DC and AC collection systems, is anticipated to be installed below-ground. The panels deliver DC power to the inverters through below-ground DC cabling that will be installed in trenches at a depth of at least three feet below grade.

MITIGATION

Stormwater management is important to ensure that structure foundations maintain their integrity and that rainwater and surface runoff drain away from the project structures and roads in a way that does not adversely affect existing drainage systems, roads, or nearby properties. Appropriate permanent stormwater management measures, including minimizing the area of impervious surfaces at the site to reduce the volume and velocity of the stormwater runoff and the establishment of multiple stormwater ponds, will address drainage from the newly established impervious areas. Otter

[137] SPA, p. 80
[138] SPA. P. 51
[139] SPA, p. 28

Tail indicates that solar panels will be mounted above the ground with a low-maintenance perennial seed mix underneath, allowing water to filter into vegetation and soil prior to discharging.

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

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

A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will also be acquired by Otter Tail from the MPCA. BMPs 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.[140]

Any dewatering required during construction will be discharged to the surrounding upland vegetation, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering of more than 10,000 gallons per day or 1,000,000 gallons per year, a Water Appropriations Permit from DNR is required. Otter Tail will obtain a Water Appropriation Permit if dewatering is required.[141]

4.7.3 Soils

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

The project area is within the Chippewa Plains Ecological Subsection. This subsection is characterized by gently rolling lake plains and till plains. Soils in the project area are derived predominantly from till and soils range from sandy to clayey. The soils deposited in the area (Table 14) are made up majority well drained, sandy loam soils. The drainage network throughout the Chippewa subsection is poorly

[140] SPA, p .8
[141] Id.

developed due to age and the generally flat characteristics of the landforms. However, only a small portion (23.4 acres) of the soils are considered hydric (Northwood muck and Willosippi loam soil types). Approximately 89.4 percent of the soils are considered well-drained. Approximately 93 percent (451.3 acres) of the project area is within soil units that are not classified as prime farmland or prime farmland if drained.

Table 14. Soil Types in Solar Facility Project Site[142]

Soil type	Farmland Classification	Drainage	Acres
Sol cobbly sandy loam, 1-6% slow	Not prime farmland	Well drained	221.8
Nary cobbly fine sandy loam	Farmland of Statewide Importance	Moderately well drained	165.9
Lengby sandy loam	Prime farmland	Well drained	24.5
Cutaway fine sandy loam	Farmland of Statewide Importance	Well drained	23.3
Bemidji sandy loam	Farmland of Statewide Importance	Well drained	20.4
Northwood muck	Not prime farmland	Very poorly drained	19.9
Stuntz loam	Prime farmland if drained	Somewhat poorly drained	8.7
Willosipi loam	Prime farmland if drained	Poorly drained	3.5
Solar Facility Subtotal			**488**

Potential Impacts

The proposed project footprint will cover and impact 6.7 acres of Stuntz loam which is prime farmland if drained. This area of impact is below the 33 acres allowed for a 66 MW electric power generating plant site under the prime farmland rule.[143]

Construction within the project area will disturb approximately 267 acres of land used for the solar facility project site. These include Sol cobbly sandy loam (140.5 acres), Nary cobbly fine sandy loam (119.5 acres), and Stunz loam (6.7 acres). Of these soils, the Stunz loam is considered "prime if drained."[144] As with any ground disturbance, there is potential for soil compaction and erosion. Heavy rainfall events during construction or prior to establishment of permanent vegetation, increase the risk that significant sedimentation and erosion could occur.

The impact intensity level is expected to be low to moderate. Primary impacts to soils include compaction from construction equipment, soil profile mixing during grading and pole auguring, rutting from tire traffic, and soil erosion. Impacts to soils are likely to be greatest with the below-ground electrical collection system. Potentials impacts will be positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur. Because the soil at the solar facility would be covered with native perennial vegetation for the operating life of the project, soil health would likely improve over the operating life of the project.

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[142] SPA, Appendix H- AMIP; SPA Appendix I - VMP; USDA National Cooperative Soil Survey Soil Series; Minnesota Natural Resource Atlas, https://mnatlas.org/gis-tool/
[143] SPA, Appendix P - Farmland Classification
[144] SPA, p. 81

The soils within the site are made up majority well drained, sandy loam soils. As a result, the soils offer a good balance of drainage, water retention, and nutrient availability. This soil type is considered easy to work with and will aid in growth the various vegetative seed mixes the applicant plans to employ via the VMP. There is a small portion of the project area that contains soil with a hydric texture. Given the gentle rolling topography mitigative drainage measures are not necessary but drain tiles may be used to ensure proper drainage in areas with excessive water retention.

Soil cover and management at the solar facility will change from cultivated cropland to a mixture of and pervious areas with native groundcover plantings and semi-impervious surfaces. Once permanent vegetation is properly established, stormwater management, as well as general soil health, might improve due to use of native plants. The location and amount of stored topsoil will be documented to facilitate re-spreading of topsoil after decommissioning. These benefits could extend beyond the life of the project if they are preserved through decommissioning practices, and if the site is returned to agricultural use.

MITIGATION

Several sections of the DSP (**Appendix C**) address soil-related impacts

- Section 4.3.9 in the DSP requires protection and segregation of topsoil.
- Section 4.3.11 in the DSP requires the permittee to obtain a MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control.
- Section 4.3.16 in the DSP requires that “site restoration and management” practices enhance “soil water retention and reduces storm water runoff and erosion”.
- Section 4.3.17 in the DSP requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates and timing of revegetation will stabilize soils and improve overall soil health. Otter Tail has included a draft VMP as Appendix I of its site permit application.
- Section 4.3.18 in the DSP requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Otter Tail has included a draft AIMP as Appendix H of its site permit application.

4.7.4 Surface Water and Floodplains

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

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

The project is in the Mississippi River – Headwaters watershed of Upper Mississippi River Basin.[145] The watershed characteristically is a largely forested area rich in surface water resources providing habitat for a variety of wildlife species. Groundwater springs are present throughout much of the river channel throughout this watershed. The applicant states that an initial desktop review used for identifying surface water showed several steams in the project area; however, a subsequent field review demonstrated there are no rivers, streams or lakes present within the project area.[146] There are no drainage ditches or impaired waters within the project area. Further, the project area is not within a Federal Emergency Management Agency-mapped floodplain.

Under Section 303(d) of the Clean Water Act, states are required to assess all waters of the state to determine if they meet water quality standards, list waters that do not meet standards and update the list biannually and conduct total maximum daily load studies to set pollutant-reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses. The list, known as the 303(d) list, is based on violations of water quality standards. The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota. There are no waters listed by the MPCA as impaired waters within the project site. Moose lake, is approximately 5.5 miles southwest of the projected is listed as an impaired lake.[147] The Clearwater River, within approximately 3.8 miles north and northwest of the project, is listed as an impaired water, with aquatic consumption/aquatic life as the affected designated use and mercury in fish tissue/turbidity as the pollutant/stressor.[148]

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

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

According to FEMA, Beltrami County is amongst eight counties in Minnesota that remained unmapped, meaning FEMA has not performed a flood study on that county. Development on surrounding lakes is managed by local ordinances following Minnesota Shoreland Management regulations. The project sits at an elevation of 1430 feet and is not within a FEMA-mapped floodplain, therefore, the applicant states that impacts are not anticipated. Due to Minnesota's warmer and

[145] DNR, Minnesota's watershed basins. (n.d.), https://www.dnr.state.mn.us/watersheds/map.html
[146] SPA, p. 82
[147] MPCA, Impaired Waters Viewer, (2014), https://gisdata.mn.gov/dataset/impaired-waters-viewer.
[148] MPCA, Impaired Waters Viewer, (n.d.), https://gisdata.mn.gov/dataset/impaired-waters-viewer

wetter climate, there is increased risk for damaging rain events and more frequent flooding. These events could impact the project (Section 4.7.9).

Potential Impacts

The Mississippi River - Headwaters Watershed can be impacted by issues such as increased sedimentation, nutrient, and contaminant loading from stormwater runoff from increased development and forest management practices along shorelines.[149]

The project is designed to avoid direct impacts to surface waters by avoiding placement of project components such as access roads, solar arrays, inverters, or transmission structures in surface waters.

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

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

Mitigation

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

Best management practices to minimize the impact on surface waters will be utilized as a part of the SWPPP, including but not limited to sediment control, revegetation plans, and management of exposed soils to prevent sediment from entering waterbodies.[150]

Otter Tail plans to maintain drainage system integrity during construction, including rerouting, reinforcement, or other methods outlined in the AIMP filed with the SPA.[151]

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

- Section 4.3.11 in the DSP requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls. This section also requires implementation of erosion and sediment control measures, contours graded to provide for proper drainage, and all disturbed areas be returned to pre-construction conditions. Otter Tail will also develop a Stormwater Pollution Prevention Plan (SWPPP) that complies with MPCA rules and guidelines. The SWPPP describes construction activity, temporary and permanent erosion and sediment controls, BMPs, permanent stormwater management that will be implemented during construction and through the life of the

[149] MPCA, Mississippi River – Headwaters, https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters
[150] SPA, p. 77
[151] SPA, Appendix G - AIMP.

project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

- Section 4.3.16 in the DSP requires that "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".

4.7.5 Wetlands

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

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated during much of the growing season). Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.[152]

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

The applicant assessed the potential for wetlands within the solar farm footprint through a formal wetland delineation in August 2024. Additional wetland analysis, including wetland mapping and identification, was conducted for this EA using desktop reviews of available resource (i.e., National Wetlands Inventory (NWI) data, MNDNR Public Waters Inventory, etc.).

The wetland mapping identified forty-eight wetlands, totaling to approximately 13.8 acres of wetlands within the project site. Wetlands were further identified to determine type and acreage using NWI data. Wetland types include wet meadow, and upland grassland.

This EA uses the National Wetland Inventory for Minnesota (NWI-MN) to allow for comparison of wetland type between the Solar Facility Units (Table 15). This comparison includes portions of wetlands that have been delineated for this project. The NWI-MN is a publicly available GIS database that provides information on the location and characteristics of wetlands in Minnesota.

[152] USEPA, *What is a Wetland,* (2022), https://www.epa.gov/wetlands/what-wetland

Table 15. NWI-MN Wetlands in Project Footprint[153]

Wetland type	Acres
Freshwater Emergent Wetland	3.27
Freshwater Shrub Wetland	6.59

Otter Tail contracted with HDR and completed a wetland delineation in August 2024 across the entire land control area (487 acres) including an additional boundary around the site totaling to a 500-acre inspection area. Preliminary results of the field investigation identified approximately 48 wetlands totaling to 13.8 acres within the project area. Eleven acres of PEM Type 2 wetland were delineated within the project area. These systems are associated with saturated meadows with dominant herbaceous vegetation of grass and sedge varieties. Of these eleven acres of PEM wetland, 1.39 acres are likely artificial wetlands associated with a constructed water detention pond and drainage from the adjacent facility. PUB Type 3 wetland (0.14 acres) was delineated within the project area. This area was an open water pond with an unconsolidated bottom with dominant vegetation of lake sedge, water plantain, and reed canary grass.[154]

Table 16 summarizes delineated wetlands within areas of land control, which were identified using the Wetland Delineation Report of the SPA (Appendix J).

Table 16. Delineated Wetlands

Wetland type	Acres delineated in land control area
PEM Type 2 Wetland	10.99
PEM Type 2 Wetland (artificial)	1.39
PUB Type 3 Wetland	0.14
PFO Type 7 Wetland	1.28
Total	13.80

Potential Impacts

Ottertail's Wetland delineation identified 48 wetlands within the project area. The NWI-MN mapping identified 3.27 acres of freshwater emergent wetland and 6.59 acres of freshwater shrub wetland, totaling to 9.86 acres of wetland within the project area. The majority of delineated wetlands were associated with saturated meadows and primarily include small, ephemeral palustrine forested wetlands and up to two small wetland complexes comprising palustrine emergent, forested and scrub-shrub type.[155]

[153] DNR, National Wetland Inventory of Minnesota, (2015), https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/water_nat_wetlands_inv_2009_2014/metadata/metadata.html#Distribution_Information
[154] SPA, Appendix J - Wetland delineation report
[155] SPA, p. 82

Although wetlands have been identified within the project area, the preliminary site layout for the solar facility avoids locating solar arrays and associated facilities in wetlands. The wetlands still within the project area are along the border of the project area along roadways. There may be potential for temporary, short-term impacts to wetlands that occur during installation of the electrical collection lines and temporary access roads.

MITIGATION

The project site layout has been designed to avoid all wetlands delineated to date. If wetland impacts are required for the final layout, coordination with the appropriate agency, such as the USACE under Section 404 and 401 of the Federal Clean Water Act (CWA) and the Beltrami County SWCD under the Minnesota Wetland Conservation Act (WCA), would occur prior to construction. If unavoidable wetland impacts take place, impacts will be replaced in accordance with Section 404 of the Federal CWA and the Minnesota CWA.[156]

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

4.7.6 Vegetation

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

The solar facility is located in the Laurentian Mixed Forest Province, Northern Minnesota Drift and Lake Plains Section, and Chippewa Plains Subsection (212Na). The Chippewas Plains Subsection is characterized by gently rolling lake plains and till plains. Pre-settlement vegetation was a mixture of deciduous and coniferous forests dominated by white pine, red pine, and hardwoods on moraines, and jack pine on lake and outwash plains. Wetland areas were dominated by sedge meadow communities. Fire was the most important natural disturbance within the white pine-red pine forests and jack pine forests/wetlands. Present day, this subsection is forested, aspen being the most common tree species amongst birch, maple, oak, white spruce, jack pine, and red pine. Within the project area, the current land use is predominately agricultural and deciduous forest.[157]

POTENTIAL IMPACTS

Construction of the solar facility will eliminate vegetative cover and create impermeable surfaces at access roads and inverter skids. Removal of vegetative cover exposes soils and could result in soil erosion. Temporary or permanent removal of vegetation also has the potential to affect wildlife habitat. Most notably, permanent impacts to forested site vegetation will occur. Approximately 115 acres of trees will be cleared to support construction and operation of the project. Agricultural land

[156] SPA, p. 77
[157] DNR, *Ecological Classification System: Ecological Land Classification Hierarchy*, (n.d.), https://www.dnr.state.mn.us/ecs/index.html

within the solar facility would be converted to perennial, low growing vegetative cover, resulting in a net increase in vegetative cover for the life of the project. Inside the security fence making up majority of the project footprint, markedly under the arrays, a two-foot-tall array mix comprised of native grass and forbs species that grow to a height which will not interfere with the safe and reliable operation of the solar array. [158]

A mix comprised of grasses and forbs but with twice the diversity as the array mix will be used to cover approximately 17 acres outside the fenced area. Areas outside the security fence do not present operational concerns, therefore, there is no height restrictions place on this perimeter mix. In wetland and stormwater management units, native seed mixes that contain plants well suited for soils frequently becoming saturated will be used; this mix is expected to cover less than 5 acres.[159] Once established, vegetation would be maintained using BMPs through periodic mowing and herbicide application.[160]

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

MITIGATION

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

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

[158] SPA, Appendix I - VMP
[159] Id.
[160] Id.

  - A site plan showing how the site will be revegetated and that identifies the corresponding seed mixes. Best management practices should be followed concerning seed mixes, seeding rates, and cover crops.

- Section 4.3.18 in the DSP requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated, and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Otter Tail has included a draft AIMP as Appendix H of its application.
- Section 4.3.15 in the DSP requires the permittee to minimize the number of trees removed and to leave existing low growing species in the ROW undisturbed to the extent possible, or to replant to blend in with adjacent areas following construction.

4.7.7 Wildlife and Habitat

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

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

The project landscape is dominated by agriculture and forest. Landscape types and vegetation communities vary throughout the local vicinity. Wildlife that associated with rangeland, deciduous forest patches, shallow wetlands, and habitat transition zone are common in the project area. Homesteads, farmsteads, pastures, and forested areas may provide ideal habitat for a variety of wildlife species well-adapted to broken forest patches and areas dominated by agriculture.[161]

Wildlife utilizing the land control area are common species associated with disturbed habitats and are accustomed to human activities (e.g., agricultural activities and road traffic) occurring in the area. Mammals, reptiles, amphibians, and insects are present. Mammals found in the project area include deer mouse, white-tailed deer, gray squirrel, coyote, red fox, easter cottontail, striped skink, northern raccoon, and American black bear. Reptiles and amphibians found in the project area include American toad, tiger salamander, northern leopard frog, and common garter snake.[162]

Avian species common to the site include the wild turkey, American robin, blue jay, brown-headed cowbird, ring-necked pheasant, common crow, common yellowthroat, red-winged blackbird, and common raven. There are no waterfowl production Areas (WPAs) within the project area or within

[161] SPA, p. 84
[162] SPA, pp. 85-86

two miles of the project area. There are no Important Bird Areas (IBA) designated by the National Audubon Society within the project area or within two miles of the project area. [163]

POTENTIAL IMPACTS

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

Non-Avian Wildlife Individuals will be displaced to adjacent habitats during construction. Because the project area does not provide critical habitat, this should not impact life cycle functions, for example, nesting. Direct significant impacts to individuals might occur, that is, small species might be crushed or otherwise killed during construction. Population level impacts are not anticipated.

The largest impact to wildlife associated with solar facilities is fencing. Project fencing will be 8 ft-high chain link fences topped with three strands of high-tensile wire. Although deer can jump many fences, they can become tangled in both smooth and barbed-wire fences, especially if the wires are loose or installed too closely together.[164] Predators can use fences to corner and kill prey species.[165]

Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact wildlife populations. Wildlife entanglement and death from plastic netting and other plastic materials has been documented in birds, fish, mammals, and reptiles.[166]

Reduced pesticide use, as compared to agricultural production, has the potential to benefit insects, including pollinators, and smaller wildlife such as rodents, birds, insects, and reptiles.

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

Risks to birds have been identified near PV solar facilities. Preliminary findings in one report, based on limited data, suspect the danger is this appearance of water causing migrating birds to attempt to land, consequently incurring trauma and related predation.[167]

Habitat There are no DNR WMAs or migratory waterfowl feeding and resting, or USFWS Waterfowl Production areas within two miles of the site.

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[163] SPA, p. 87

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

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

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

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

Wildlife habitat in the area is currently highly fragmented. The row crop habitat at the solar facility being converted is not crucial to wildlife populations, although the land control area may be used as a travel corridor or, occasionally, as a food source (for example, standing corn). Once restored, the developed area within the solar facility will provide herbaceous cover and native habitat for the life of the project. This change might be attractive to some species, and not others. Fencing will restrict ingress and egress of larger wildlife, and habitat benefits will be limited to small mammals, grassland birds, reptiles, insects, etc. accustomed to human disturbance. Overall, the project does not contribute to significant habitat loss or degradation or create new habitat edge effects.

4.7.7.1 MITIGATION

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

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

Other potential mitigation measures include:

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

4.7.8 Rare and Unique Resources

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

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

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

The Division of Ecological and Water Resources within DNR manages the Natural Heritage Information System (NHIS). The NHIS "provides information on Minnesota's rare plants, animals, native plant communities, and other rare features. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and conservation of these features."[168] NHIS data includes federally endangered, threatened, or candidate plant species, and endangered or threatened animal species. The system also includes state endangered, threatened, or special concern species. The NHIS database a source of information, but not the sole source for identifying these resources, as some areas surveys have not been conducted extensively or recently making.

The USFWS provides information for use in National Environmental Policy Act (NEPA) documents, and reviews and provides comments on these documents. Through this process, the USFWS seeks to ensure that impacts to plant and animal resources are adequately described, and necessary mitigation is provided. One such resource is the distribution lists of federally listed threatened, endangered, and candidate species by county.

The EA does not map federal- or state-listed species found in the NHIS database, because DNR requires that public display of NHIS data either mask the identity or location of rare features due to the vulnerability of some species to exploitation. Moreover, the NHIS database masks the occurrence of rare species of by randomly incorporating their location into a larger map polygon.

POTENTIAL IMPACTS

Natural Communities

Minnesota Biological Survey (MBS) systematically collects, interprets, and provides baseline data on the distribution and ecology of rare plants, rare animals and native plant communities.[169] The MBS uses four classifications denoting the level of biological diversity to rank sites:[170]

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

[168] DNR, *Natural Heritage Information System*, (n.d.), http://www.dnr.state.mn.us/nhnrp/nhis.html
[169] DNR, *Minnesota County Biological Surveys*, (n.d.), http://www.dnr.state.mn.us/eco/mcbs/index.html
[170] DNR, *Minnesota Biological Survey*, MBS Site Biodiversity Significance Ranks, (n.d.), https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.

outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.

There are no MBS sites of moderate, high, or outstanding biodiversity significance within the project area.[171] The Bemidji Slough WMA is 9.1 miles northeast of the project area. This WMA is a wetland and upland grassland complex surround by agricultural lands and commercial development.[172]

Rare Species

Northern Long Eared Bat *(Myotis septentrionalis)*

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

The Natural Heritage Review indicated the federally endangered northern long-eared bat may occur in forested areas throughout Minnesota, which includes habitat observed in the Project Area; however, according to the official IPaC queried on August 30, 2024, impacts to this species should not occur within one mile of the Project Area.[173]

Gray Wolf *(Canis lupus)*

As of February 10th, 2022, Minnesota's gray wolf once again became a federal protected threatened species. Human persecution, habitation deterioration, and the reduction of prey populations led to the decline of wolves. The DNR is committed to ensuring the long-term survival of the wolf in Minnesota and minimizing and resolving conflicts between wolves and humans, establishing a management plan.[174] The IPaC states that the applicant but notify the Service if there is observed gray wolf activity during project implement that could indicate a den or rendezvous site in close proximity (e.g., multiple wolves observed).[175]

The IPaC review determined that Gray Wolves are potentially present within one mile of the project. The Gray Wolf has a federally listed threatened status. The project is not likely to adversely affect the gray wolf.[176]

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[171] SPA, p. 91
[172] DNR, Minnesota Wildlife management areas, *Bemidji Slough WMA,* (n.d.), https://www.dnr.state.mn.us/wmas/detail_report.html?id=wma0166900
[173] SPA, p. 90
[174] DNR, Wolf Management, (n.d.), https://www.dnr.state.mn.us/wolves/index.html
[175] SPA, Appendix Q - NHIS-IPAC Data (MNDNR Biological Survey Map Clip)
[176] SPA, p. 89

Monarch Butterfly *(Danaus plexippus)*

The monarch butterfly is a federal candidate species. The species is common throughout Minnesota during summer months and is most frequently found in habitats where milkweed and native plants are common, including roadside ditches, open areas, wet areas, and urban gardens.[177]

The IPaC review determined that the Monarch Butterfly is potentially present within one mile of the project are occurring within disturbed grassland habitat. However, the species has no federally protected status. The effect determination for the monarch butterfly found that the project will have no effect on this species.[178]

Bald Eagles and Golden Eagles (*Haliaeetus leucocephalus, Aquila chrysaetos)*

In Minnesota, the bald eagle nesting season is generally January through early July. Bald eagles are primarily found near rivers, lakes, and other waterbodies in remote and, more recently, within metropolitan areas.[179]

Bald eagles are afforded additional protections under the Bald and Golden Eagle Protection Act, which is administered by the USFWS. Bald eagle incidental take permits and nest removal permits are considered to be voluntary permits, meaning a project proposer must make the determination to pursue a permit based on the respective risk of their project's potential to take a bald eagle.

Bald eagles typically nest in mature trees near large lakes or streams. Nesting habitat suitable for bald eagles is not present within the project site. The USFWS will coordinate appropriate mitigation measures for bald eagles for the project. Mitigation measure may include setbacks from nests, timing restriction for construction activities, and possibly seeking a USFWS permit for removal of a nest.

Birds of Conservation Concern in the Project Area

Of note, the USFWS IPaC Trust Resource reported five migratory birds of conservation concern that are expected to occur within the project area.

- Bobolink (*Dolichonyx oryzivorus)*
- Chimney swift *(Chaetura pelagica)*
- Evening grosbeak *(Caccothraustes vespertinus)*
- Veery *(Catharus fuscescens fuscescens)*
- Wood thrush *(Hylocichla mustelina)*

MITIGATION

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

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[177] DNR, *Monarch Butterfly,* (n.d.), https://www.dnr.state.mn.us/insects/monarchbutterfly.html
[178] SPA, P. 89
[179] DNR, *Bald Eagles in Summer*, (n.d.), https://www.dnr.state.mn.us/birds/eagles/summer.html

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

- Section 5.4 in the DSP requires the permittee to comply with the USFWS guidance and requirements in effect regarding NLEB, including tree clearing restrictions if applicable.
- Section 5.5 in the DSP requires the permittee to notify USFWS is there is observable wolf activity within the project area and, if so, to comply with their guidance.
- Section 5.6 in the DSP requires the permittee to file documentation authorizing any Bald Eagle nest removal prior to construction.

4.7.9 Climate Change

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

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

In 2020, the electricity sector was the third largest source of Minnesota GHG emissions at 26,179,328 tons of 137,238,222 tons, or 19.1%.[180] GHG from electricity generation have decreased by 54% in Minnesota since 2005 due to a shift in generation to lower- and non-emitting sources and an increase in end-use energy efficiency.[181]

POTENTIAL IMPACTS

General

The MNDNR Minnesota Climate Trends Tool was used to determine current climate conditions for Beltrami County.[182] Annual average temperature trends show a temperature increase of 0.54 °F per

[180] MPCA, Greenhouse gas emissions data, (2024), https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/GHGsummarystory?%3Aembed=y&%3AisGuestRedirectFromVizportal=y

[181] Id.

[182] Minnesota Climate Trends Map, (n.d.), https://arcgis.dnr.state.mn.us/ewr/climatetrends/

decade from 1895 to the present, and 1.88 °F per decade from 1970 to present. Precipitation for Beltrami has had no meaningful change from 1985 to the present.[183]

The MNDNR Minnesota Climate Explorer tool was also used to project climate conditions for Beltrami County. Temperature models were created to project climate data for two scenarios, Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. RCP is a measure adopted by the Intergovernmental Panel on Climate Change to represent various GHG concentration pathways. The numbers (i.e., 4.5 and 8.5) represent the amount of net radiative forcing the earth receives in watts per meter squared, where a higher RCP signifies a more intense GHG effect resulting in a higher level of warming. RCP 4.5 represents an intermediate scenario where emissions begin to decrease around 2040 and RCP 8.5 represents a scenario with no emissions reductions through 2100.[184]

The climate models predict that under RCP 4.5, the average temperature for Beltrami County is projected to increase by approximately 3.49 °F by Mid-Century (2040 to 2059) compared to current conditions (1980 to 1999). Late-Century (2080-2099) air temperature is projected to increase by approximately 5.5 °F for RCP 4.5, and approximately 9.52 °F for RCP 8.5. Mid-Century annual precipitation is projected to increase by approximately 0.9 inches for RCP 4.5. Late-Century annual precipitation is projected to increase by approximately 3.62 inches for RCP 4.5, and 5.35 inches for RCP 8.5.

Greenhouse gases

Construction activities will result in short-term increases in GHG emissions from the combustion of fossil fuels in construction equipment and vehicles. The project's construction emissions are an insignificant amount relative to Minnesota's overall emissions of approximately 137 million tons in 2020.[185] Potential impacts due to construction GHG emissions are anticipated to be negligible.

Other GHG emissions will be created by land use change from the loss of existing natural carbon sinks in the area. Once operational, the project will generate minimal GHG emissions. Emissions that do occur would result from vehicle usage to and from the solar array and substation for maintenance and operation of the substation and switchyard. GHG emissions for project construction is estimated to be 5,176 metric tons of CO_2 e. The majority of land-use emissions will occur during construction due to the change from cropland and wetlands to settlement, however the establishment of perennial vegetation reduce this impact.

If electrical energy from the project displaces energy that would otherwise be generated by carbon-fueled power plants (e.g., coal, natural gas), the project could reduce GHG by approximately 70,988 metric tons of CO_2 equivalent annually. Thus, compared to non-renewable energy generation, the project would be beneficial with respect to GHG emissions. Total GHG emissions resulting from

[183] SPA, p. 86

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

[185] MPCA, *Greenhouse gas emissions data.* (n.d.), https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory

construction and operation of the project are anticipated to be minimal when compared to the long-term reduction in GHG emissions facilitated by the project.

Climate and weather

Tree and vegetation loss from construction could eliminate related climate resilience benefits, leading to more intense runoff during storms or flooding (thus increasing erosion and reducing water retention), increased heat extremes, and potential reductions in air quality. Removal of or impacts to wetlands due to construction eliminates the ability for the land to retain and absorb stormwater, leading to more intense stormwater runoff and nutrient loading. Revegetation is expected to offset effects, therefore impacts should be temporary and minimal.

A warming climate is expected to cause increased flooding, storms, and heat wave events. These events, especially an increased number and intensity of storms, could increase risks to the project. More extreme storms also mean more frequent heavy rainfall events, which can cause localized soil erosion or flooding. Flooding could damage the project's electrical collection system including inverters and collection wiring. Climate and weather impacts are considered in the design of the facility and include impacts from extreme storms such as stormwater runoff, strong winds and hail. Based on local hydrology and topography, there is potential for soils to become rutted due to increased rain events. Rainfall infiltration is calculated to increase once the project is completed. However, native perennial vegetation will replace seasonal row crops across most of the site, creating deep root systems that are able to improve water infiltration and mitigate stormwater runoff.

The FEMA National Risk Index[186] rates Beltrami County as having "relatively low" risk for hail.
The solar panel modules selected for the project are designed to withstand wind and hail events.
The tracking systems are also designed to automatically stow the panels in the safest position based on the weather conditions (wind, hail, flooding, deep snow, etc.). For example, panels are stowed in a nearly vertical position during hail events by re-orienting the trackers, which limits direct impacts between hailstones and the panels.

MITIGATION

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

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

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

[186] FEMA National Risk Index, (n.d.), https://hazards.fema.gov/nri/

Otter Tail states that erosion during construction activities will be minimized through the implementation of the SWPPP. This will assist in mitigating the additional erosion impacts due to the anticipated increase in 100-year storm intensity.

4.8 Unavoidable Impacts

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

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

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

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

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

- Visual impacts of the project.
- Cultural impacts due to a change in the sense of place for local residents.
- Loss of land for agricultural purposes.
- Injury or death of birds that collide with PV panels.
- Injury or death of birds and mammals from fencing.

4.9 Irretrievable or Irreversible Impacts

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

Irreversible and irretrievable resource commitments are primarily related to project construction, including the use of water, aggregate, hydrocarbons, steel, concrete, wood, and other consumable resources. Some, like fossil fuel use, are irretrievable. Others, like water use, are irreversible. Still others might be recyclable in part, for example, the raw materials used to construct PV panels would be an irretrievable commitment of resources, excluding those materials that may be recycled at the end of the panels' useful life. The commitment of labor and fiscal resources to develop, construct, and operate the project is considered irretrievable.

4.10 Resource Topics Receiving Abbreviated Analysis

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

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

4.10.1 Displacement

Displacement can occur when residences or other buildings are located within a proposed site or right-of-way. If the buildings would potentially interfere with the safe operation of a project, they are typically removed from the site or ROW and relocated. Displacements from large energy facilities are rare and are more likely to occur in heavily populated areas where avoiding all residences and businesses is not always feasible than in rural areas where there is more room to adjust site boundaries or ROWs to accommodate the proposed energy facility.

There are no residences, business, or structures such as barns or sheds located within the area of land control, and none will be displaced by the project. No mitigation is proposed.

4.10.2 Communications

Electronic interference from the proposed project is not anticipated. Allied Radio Matrix for Emergency Response (ARMER) towers are a network of radio towers and radio transmission equipment used for emergency response services throughout the state of Minnesota. The city of Bemidji has two active ARMER towers (Bemidji West, Bemidji Fire Tower) within 15 miles of the project area.[187] There are no cell phone towers located within the boundary of the solar facility. There are 18 registered cellular phone towers within 10 miles of the project area. Cellular phone service in the service area is provided by national operators, and base stations are used for wireless devices as a central point for communication.

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

[187] SPA, p. 60

Additionally, the Gen-Tie line that is proposed will not exceed the height of the transmission lines already existing in the area.

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

4.10.3 Implantable Medical Devices

Electromagnetic fields (EMF) might interfere with implantable electromechanical medical devices, such as pacemakers, defibrillators, neurostimulators, and insulin pumps. Impacts to implantable medical devices and persons using these devices are not expected to occur, but, if they did occur, moving away from the project would return the pacemaker to normal operation. Section 4.3.30 of the DSP requires the permittee to provide educational materials about the project to adjacent landowners. Additional mitigation is not proposed.

4.10.4 Mining

There are no gravel pits within the area of land control. There are no known mining operations in the vicinity of the project. According to a review of Mine Safety and Health Administration (MSHA) Mine Data Retrieval System found that there are 37 surface mines in Beltrami County. None of these mines are located two miles within the project site.[188]

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

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

4.11 Cumulative Potential Effects

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

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

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

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

[188] SPA, p. 70

4.11.1 Analysis Background

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

Cumulative potential effects are impacts to the environment that results from "the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."[189]

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

The Beltrami County website and MnDOT Region 2 website projects were reviewed, but they did not reveal any projects proposed within the area and time of the proposed project. No other projects within the area have been identified.[190]

Accordingly, cumulative potential effects are solely those associated with the project. These effects are discussed in this chapter, above.

[189] Minn. R. 4410.0200, subp. 11a
[190] SPA p. 94

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