Public Utilities Commission
Application for a Site Permit and Two Route Permits for the
Sherco Solar Project

Northern States Power Company

Sherburne County, Minnesota

Docket No. E-002/GS-21-191
Docket No. E-002/ TL-21-190
Docket No. E-002/ TL-21-189

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ACRONYM LIST

AADT	Annual Average Daily Traffic
AC	alternating current
ACSR	aluminum conductor steel-reinforced
AIMP	Agricultural Impact Mitigation Plan
AM	Amplitude Modulation
AMA	Aquatic Management Area
APLIC	Avian Power Line Interaction Committee
Applicant	Northern States Power Company, doing business as Xcel Energy
Application	The Site Permit and two Route Permit Applications provided herein.
AQI	Air Quality Index
ARMER	Allied Radio Matrix for Emergency Response
ASIS	Aggregate Source Information System
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BIPOC	black, indigenous and people of color
BMPs	best management practices
BNSF Railroad	Burlington Northern-Santa Fe Railroad
BWSR	Board of Water and Soil Resources
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
Commission	Minnesota Public Utilities Commission
CON	Certificate of Need
CSAH	County State Aid Highway
CWI	County Well Index
dB	decibels
dBA	A-weighted decibels
DC	direct current
East Application Alignment	The likely alignment within the proposed East Route that minimizes the overall potential impacts based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. Ch. 7850.4100.
East Collector Substation	A 34.5 to 345 kilovolt step-up substation that will collect power from the East Block of the Solar Project.
East HVTL Project	The proposed 1.7-mile 345 kilovolt transmission line that runs from the proposed East Collector Substation to the existing Sherburne County Substation.

East Route	The proposed route width of 860 feet between the East Collector Substation and existing fenceline of the Sherco Generating Plant. Inside this fenceline, the route width varies between 950 - 1,800 feet.
ECS	Ecological Classification System
EMF	electric and magnetic field
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
GPS	Global Positioning System
HVTL	high-voltage transmission line
IAA	impact assessment area
IARC	International Agency for Research on Cancer
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IPaC	Information for Planning and Conservation
ISD	Independent School District
kV	kilovolt
kV/m	kilovolts per meter
L_{10}	ten percent of any hour
L_{50}	fifty percent of any hour
MBTA	Migratory Bird Treaty Act
MBS	Minnesota Biological Survey
MDH	Minnesota Department of Health
mG	milliGauss
MGS	Minnesota Geological Survey
MHz	megahertz
MISO	Midcontinent Independent System Operator
MNBBA	Minnesota Breeding Bird Atlas
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MVA	megavolt amperes

MW	megawatt
NAAQS	National Ambient Air Quality Standards
NESC	National Electric Safety Code
NG Renewables	National Grid Renewables Development, LLC
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NLEB	northern long-eared bat
NO_2	nitrogen dioxide
NPCs	native plant communities
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O_3	ozone
O&M	operations and maintenance
OSA	Office of the State Archaeologist
Pb	lead
PM	particulate matter
PPSA	Minnesota Power Plant Siting Act
Project	As described in this Application, an up to 460-megawatt solar project (Solar Project) and two 345 kilovolt transmission lines (the West and East HVTL Projects) to interconnect the Solar Project to the grid.
Project Footprint	Approximate 3,024-acre area where Xcel Energy proposes to build the Solar Project facilities.
PSA	Purchase and Sale Agreement
PV	photovoltaic
PWI	Public Waters Inventory
RFP	request for proposals
SCADA	Supervisory Control and Data Acquisition
scorecard	Board of Water and Soil Resources Habitat Friendly Solar Site Assessment Form
SDWA	Safe Drinking Water Act
SGCN	Species of Greatest Conservation Need
Sherco Generating Plant	The existing coal-powered Xcel Energy Sherburne County Generating Facility.
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area

SO_2	sulfur dioxide
SOBS	Sites of Biodiversity Significance
Solar Guidance	Minnesota Department of Natural Resources Commercial Solar Siting Guidance, May 2016
Solar Project	Sherco Solar Project
Solar Project Area	Approximately 3,480-acre area of privately-owned land for which Sherco Solar, LLC and Xcel Energy has leases and purchase options to allow siting and construction of the Solar Project.
SPCC	Spill Prevention, Control, and Countermeasures Plan
SSA	sole source aquifer
SSI	Swedish Radiation Protection Authority
SSM	Swedish Radiation Safety Authority
SSURGO	Soil Survey Geographic Database
SWAP	Minnesota's State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
Tetra Tech	Tetra Tech, Inc.
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USG	unhealthy for sensitive groups
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
WEG	Wind Erodibility Group
West Application Alignment	The likely alignment within the proposed West Route that minimizes the overall potential impacts based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. Ch. 7850.4100.
West Collector Substation	A 34.5 to 345 kilovolt step-up substation which will collect power from the West Block of the Solar Project.
West HVTL Project	The proposed 3.2-mile 345 kilovolt transmission line that runs from the proposed West Collector Substation to the existing Sherburne County Substation.
West Route	The proposed route width of 600 feet between the West Collector Substation and existing fenceline of the Sherco Generating Plant. Inside this fenceline, the route width varies between 700 -1,800 feet.
Westwood	Westwood Professional Services
WHO	World Health Organization
WHPA	Wellhead Protection Area

WMA	Wildlife Management Area
WNS	white-nose syndrome
Xcel Energy	Northern States Power Company, doing business as Xcel Energy

1.0 INTRODUCTION

Northern States Power Company, doing business as Xcel Energy (Xcel Energy or Applicant) is proposing to construct an up to 460-megawatt (MW) solar project (Solar Project) and two 345 kilovolt (kV) transmission lines to interconnect the Solar Project to the grid (collectively the Project). The West high voltage transmission line (HVTL) is approximately 3.2 miles long (West HVTL Project) and the East HVTL line is approximately 1.7 miles long (East HVTL Project); both HVTL lines connect the Solar Project to the existing Sherburne County Substation immediately south of the Xcel Energy Sherburne County Generating Facility (Sherco Generating Plant). The Solar Project has an anticipated service life of 35 years.

Xcel Energy respectfully submits this Permit Application (Application) to the Minnesota Public Utilities Commission (Commission) for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850 and two Route Permits pursuant to Minn. Stat. § 216E and Minn. R. Ch. 7850. Pursuant to Minn. R. 7850.1600 Xcel Energy has elected to apply for both a site permit and the two route permits for the West and East HVTL lines needed to interconnect the Solar Project in one application and as part of one proceeding before the Commission. Application Completeness Checklists for the Site Permit and Route Permits are provided in Appendix A.

Xcel Energy proposes to construct the Solar Project, a solar energy conversion facility with an up to 460-MW alternating current (AC) nameplate capacity, in Sherburne County, Minnesota (Figure 1 – Overall Project Location). The Solar Project will partially replace energy production of the nearly 700 MW Sherco Generating Plant Unit 2, currently a coal-powered facility, the retiring of which in 2023 was approved by the Commission in October 2016.[1] The Solar Project is located within agricultural fields between U.S. Highway 10 and the Mississippi River, and on the east and west sides of the existing Sherco Generating Plant. The Solar Project is described in more detail in Section 2.0. The two 345 kV transmission lines, the West HVTL Project and the East HVTL Project, are described in more detail in Sections 3.0 and 4.0, respectively.

The Project represents a joint development between Xcel Energy and National Grid Renewables Development, LLC (NG Renewables). NG Renewables was developing a solar project on the west side of the Sherco Generating Plant while Xcel Energy was developing a solar project on the east side of the Sherco Generating Plant. The companies entered into a Purchase and Sale Agreement (PSA) on January 15, 2021 whereby NG Renewables will act as an authorized representative on behalf of Xcel Energy to secure a site permit and two routes permits for the Solar Project and West and East HVTL Projects, respectively. Xcel Energy, as the applicant and permittee under the site and route permits, will construct, own, and operate the Project. Xcel Energy and NG Renewables have a strong relationship working together in Minnesota. The 200 MW Blazing Star and 200 MW Blazing Star 2 wind farms in Lincoln County were both developed by NG Renewables, formerly Geronimo Energy, and were constructed and are currently owned, and operated by Xcel Energy.

[1] See Commission Order dated January 11, 2017 in the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan in Docket E-002/RP-15-21.

Additionally, Xcel Energy has a Power Purchase Agreement for the 80 MW Elk Creek Solar Project developed by NG Renewables in Rock County, Minnesota.

1.1 Purpose and Need

The Project is proposed due to ceasing operations of Unit 2 of the Sherco Generating Plant which will cease operations by the end of 2023. The Commission previously approved ceasing operations of Unit 2 and upon cessation, existing interconnection capacity must be repowered or retired by Xcel Energy under the Midcontinent Independent System Operator (MISO) generating facility replacement process.[2] The plan to add solar at the Sherco Generating Plant is consistent with the Order approving Xcel Energy's 2016-2030 Resource Plan[3] and its 2020-2034 Upper Midwest Integrated Resource Plan currently before the Commission.[4] The Solar Project will replace a portion of the nearly 700 MW of energy generated by Unit 2 of the Sherco Generating Plant. This plan represents a key milestone step in Xcel Energy's clean energy transition, which targets 100% carbon free electricity by 2050 and 80% less carbon by 2030. The addition of this resource will increase the solar energy produced on Xcel Energy's system by more than 40 percent from currently expected levels and increase the system to a total of approximately 40 percent renewable energy.

On January 4, 2021 Xcel Energy issued a request for proposals (RFP) for solar projects of at least 75 MW that can interconnect to the existing transmission infrastructure at the Sherco Generating Plant.[5] Any project selected from the RFP process would ultimately be owned and operated by Xcel Energy. The RFP indicated selected projects will utilize interconnection service for the Xcel Energy owned Sherco Generating Plant.[6] In order to achieve the level of renewables identified in Xcel Energy's Supplement Preferred Plan[7] while maintaining affordability, it is essential that Xcel Energy make efficient use of its existing interconnection rights. Replacing a portion of the existing coal generation from Unit 2 with new solar capacity that can reutilize the interconnection service at the Sherco Generating Plant is one way to effectively steward that resource, to the benefit of Xcel Energy's customers and the environment.

The addition of solar power near the Sherco Generating Plant is part of Xcel Energy's proposal to jump-start the economy by creating jobs and accelerating the clean energy transition while also keeping bills low for its customers.[8] Xcel Energy decided to accelerate its plans to add solar generation capacity at the Sherco Generating Plant in response to the Commission's Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19

[2] *See* Commission Order dated January 11, 2017 in the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan in Docket E-002/RP-15-21.

[3] *See* Docket No. E002/RP-15-21. Order Approving Plan with Modifications and Establishing Requirements for Future Resource Plan Filings (January 11, 2017) at Order Point 4a.

[4] *See* Docket No. E002/RP-19-368.

[5] *See* Sherco Solar RFP Document (Revised January 5, 2021) available at https://www.xcelenergy.com/working_with_us/renewable_developer_resource_center/sherco_solar_rfp

[6] *See* NSPM 2021 Sherco Solar RFP Addendum 3 Frequently Asked Questions (January 22, 2020) at 8.

[7] *See* Docket No. E002/RP-19-368

[8] *See* Sherco Solar RFP Document (Revised January 5, 2021)

Pandemic.[9] The construction of the Project will provide an estimated $115 million in wages from nearly 900 union construction jobs.

NG Renewables and Xcel Energy were each developing solar generation facilities adjacent to the Sherco Generating Plant prior to issuance of the RFP. NG Renewables was developing a project to the west of the Sherco Generating Plant and had secured purchase options and leases through its subsidiary, Sherco Solar, LLC (Sherco Solar) sufficient to site up to 230 MW of solar generating capacity. Xcel Energy was developing a project to the east of the Sherco Generating Plant and had secured land leases through an affiliate sufficient to site up to 230 MW of solar generating capacity. NG Renewables and Xcel Energy elected to combine the two developments into one project, the Project, with the goal of providing up to 460 of the 500 MW of solar energy capacity being requested by Xcel Energy in the RFP in a timely manner to maximize job creation during the COVID-19 pandemic.

NG Renewables and Xcel Energy entered a Purchase and Sale Agreement on January 15, 2021. Under the agreement, NG Renewables will provide development services to Xcel Energy to secure a site and two route permits on behalf of Xcel Energy. Upon successfully securing site and route permits for the Project and satisfaction of other requirements in the Purchase and Sale Agreement, Xcel Energy will purchase Sherco Solar and its Project-related assets (e.g., land leases, easements, and purchase options) from NG Renewables, Xcel Energy's affiliate will assign land lease rights for the eastern portion of the Project to Xcel Energy, and Xcel Energy will construct, own, and operate the Project. The Project was submitted in response to the RFP by Xcel Energy on February 1, 2021. Xcel Energy's Commission-approved track 2 competitive bid process includes a process for Xcel Energy to submit a self-build bid in addition to third party bids. The Project was selected under the RFP using an independent, third-party evaluator of the Project and all other bids received under the RFP.

As part of the Commission-approved modified track 2 process used by Xcel Energy to evaluate responses to the RFP, Xcel Energy took steps to segregate the teams working on the Project and the RFP process to avoid any potential conflicts of interest. Members of each team were instructed not to discuss or share non-public information related to either the RFP process or the Project with members of the opposite team. Throughout the RFP process, information related to each team's work was kept on separate SharePoint collaboration sites and accessible only to members of the appropriate team. The independent auditor for the RFP process reviewed and approved the team assignments and segregation strategy.

On April 12, 2021, Xcel Energy submitted a petition with the Commission to initiate the process of seeking Commission approval of the Purchase and Sale Agreement with NG Renewables by filing the Purchase and Sale Agreement in a separate docket for Commission approval.[10] The Petition also requested Commission approval of Xcel Energy's self-bid proposal to the RFP (see Docket 20-891) while setting forth the reasons that the Project is exempt from the Certificate of Need (CON) requirement.

[9] See Docket No. E,G999/CI-20-492 COVID-19 Relief & Recovery Report (June 17, 2020), Attachment A at 8.

[10] Xcel Energy, Petition (Initial Filing) *In the Matter of the Petition of Northern States Power Company for Approval of Acquisition of Solar Generation at Xcel Energy's Sherburne County Site*, Docket No. E002/M-20-891 (April 12, 2021).

The proposed Project would install up to 460 MW AC of solar generating capacity in Minnesota that can contribute to satisfying Xcel Energy's and its ratepayers' demands for renewable energy, and potentially help Xcel Energy meet its sustainability goals. By way of example, the Project will produce enough energy to provide electricity for approximately 100,000 homes in the Upper Midwest annually and avoid the emission of approximately 250,000-300,000 metric tons of carbon annually, which is equivalent to approximately 60,000 gas-powered cars removed from the road.[11]

1.1.1 Certificate of Need

For reasons outlined below, the Project is exempt from the CON requirements. Typically, a CON is required for all "large energy facilities," as defined in Minnesota Statutes Section 216B.2421, subd. 2(1), unless the facility falls within a statutory exemption from the CON requirements. Because the Solar Project is a generating plant larger than 50 MW and the West HVTL Project and East HVTL Project are HVTL, each meet the definition of a large energy facility and would require a CON prior to issuance of a Site Permit and Route Permits. However, as outlined in Xcel Energy's Petition, the Project, including the Solar Project, West HVTL and East HVTL Projects[12] are all exempt from CON requirements pursuant to Minn. Stat. § 216B.243, subd. 9 because Xcel Energy will use the power generated by the Solar Project to meet the obligations of Minn. Stat. § 216B.1691, which requires, in part, that Xcel Energy "must generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers in Minnesota" so that "at least" 31.5 percent "of the electric utility's total retail electric sales to retail customers in Minnesota are generated by eligible energy technologies" and that "at least 1.5 percent of the utility's total retail electric sales to retail customers in Minnesota" must be "generated by solar energy". In addition, it is "an energy goal of the State of Minnesota that, by 2030, ten percent of the retail electric sales in Minnesota be generated by solar energy." The Project will be used to meet these obligations and goals, as set forth in Xcel Energy's Petition.

Moreover, the Petition also notes that, because Xcel Energy is following the Commission-approved "Modified Track 2" competitive bidding acquisition process, the Project is exempt from the CON requirements under Minn. Stat. § 216B.2422, subd. 5, which states in relevant part that "if an electric power generating plant, as described in section 216B.2421, subd. 2, clause (1), is selected in a bidding process approved or established by the Commission, a certificate of need proceeding under 216B.243 is not required.[13] Under Minn. Stat. § 216B.2421, subd. 2, electric power generating plants include the transmission lines "that are necessary to interconnect the plant to the transmission system." Therefore, the Solar Project and the West and East HVTL Projects are exempt from the CON requirements of Minn. Stat. 216B.243.

[11] Based on U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator and nearly 1 million MWh annual production PVSYST model.

[12] Under Minn. Stat. § 216B.2421, Subd. 2., a "Large energy facility," for purposes of Minn. Stat. § 216B.243, includes both an "electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more," and "transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system[.]"

[13] *See also Id.*

1.2 Applicant Information

1.2.1 Permittee and Contact Information

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1.3 Project Schedule

The anticipated schedule for each project (Solar Project, West HVTL Project, and East HVTL Project) is provided in Appendix B, Section 1.3, which has been designated as trade secret. The Project is being developed to facilitate an in-service date of all components of the Project by Q4 2024. Xcel Energy reserves the ability to begin commercial operations for portions of the Project via a phased approach beginning in 2023 to accommodate an in-service date for the entire Project by Q4 of 2024.

1.4 Request for Joint Proceeding

Pursuant to Minn. R. 7850.1600 Xcel Energy has elected to apply for both a site permit and the two route permits for the West and East HVTL Projects needed to interconnect the Solar Project in one application and as part of one proceeding before the Commission. Collectively, the Solar Project, West HVTL Project, and East HVTL Project represent Minnesota's largest solar/transmission project to date. As such, Xcel Energy respectfully requests that the Commission order a joint regulatory review process for the Solar Project Site Permit, the West HVTL Project Route Permit, and East HVTL Project Route Permit applications. Holding a joint proceeding is in the public interest because it will make it easier for members of the public to participate in the proceedings, provide a comprehensive record of all benefits, impacts and minimization measures related to the Solar Project, West HVTL Project, and East HVTL Project and improve administrative efficiency.

1.5 Application Structure

In this Application, Xcel Energy includes a project description for each project in Sections 2.0 (Solar Project), 3.0 (West HVTL Project), and 4.0 (East HVTL Project). In Section 5.0 (Environmental Information), Xcel Energy provides a description of resources for each project as well as distinct sections for impacts and mitigation for each project. Due to the interconnected nature and close geographic proximity of the Solar Project and associated HVTL Projects, Xcel Energy includes all three in this Application, which allows the reader to reference each project description, environmental analyses, agency and public coordination, and associated permits within the same document instead of multiple documents. Xcel Energy believes this approach improves readability for cross-referencing information amongst the three facilities.

2.0 SOLAR PROJECT INFORMATION

Xcel Energy proposes to construct the Solar Project, a solar energy conversion facility with a 460 MW AC nameplate capacity, in Clear Lake and Becker Townships, Sherburne County, Minnesota (Figure 2 – Solar Project Location). As described in Section 1.0, NG Renewables will develop the Project and secure a site and two route permits on behalf of Xcel Energy for the Solar Project and West and East HVTL Projects, respectively, prior to construction and Xcel Energy will construct, own, and operate the Project. NG Renewables and Xcel Energy have a strong relationship working together in Minnesota. The Solar Project will partially replace energy generation of the Sherco Unit 2 coal generating facility, which will cease operations by the end of 2023. Xcel Energy's plan to cease operation of Sherco Unit 2, which was approved by the Commission, and the construction of the Project represents a key milestone step in Xcel Energy's clean energy transition, which targets 100 percent carbon free electricity by 2050 and 80 percent less carbon by 2030. Xcel Energy plans to construct the Project on a schedule that facilitates an in-service date by the end of 2024.

The Solar Project falls within the definition of a Large Electric Power Generating Plant in the Power Plant Siting Act and, thus, requires a Site Permit from the Commission prior to construction.[14] Xcel Energy submitted a request to the Minnesota Department of Commerce for a size determination on February 26, 2021, in accordance with Minnesota Statutes Section 216E.021. On March 22, 2021 Minnesota Department of Commerce determined that the Sherco Solar Project is not associated with any other current or planned solar projects in Minnesota (see Appendix C – Agency Correspondence). Xcel Energy seeks approval of its Application under the alternative review process provided for under Minnesota Statute 216E.04, subd. 2(8) and Minnesota Rules 7850.2800-7850.3900. A notification letter was filed with the Commission on March 22, 2021.

2.1 Overall Solar Project Description

The Solar Project is an up to 460 MW solar photovoltaic (PV) facility located in southwestern Sherburne County, Minnesota. The Project would interconnect into the Sherburne County Substation, which is adjacent to the Solar Project. Xcel Energy and NG Renewables selected this location based on a number of factors, but a key consideration in the selection process was the Project's proximity to existing electrical and transportation infrastructure, including the Sherco Generating Plant, existing transmission lines, and the Sherburne County Substation, which will soon have capacity as a result of ceasing operation of Unit 2 of the Sherco Generating Plant. Additionally, the agricultural areas surrounding the Sherco Generating Plant provide abundant opportunity for solar generation on relatively flat landscapes, with few sensitive resources, that have been previously disturbed by agricultural activities with few sensitive resources. Existing infrastructure in the immediate vicinity of the Project, together with Xcel Energy Owned Property, allows Xcel Energy to minimize the need to construct ancillary facilities on private land not owned by Xcel Energy.

[14] See Minn. Stat. § 216E.01, Subd. 5 and § 216E.03, Subd. 1

2.1.1 Statement of Ownership

Xcel Energy and Sherco Solar have a combination of lease agreements and purchase options with the landowners for the Solar Project. Prior to construction, lease agreements and purchase options will be assigned to Xcel Energy. The Project will be constructed, owned, and operated by Xcel Energy. Appendix D lists the landowners for the Solar Project.

2.1.2 Size and Location

Xcel Energy is proposing to build its Solar Project in Clear Lake Township and Becker Township in Sherburne County, Minnesota (Figure 1 – Overall Project Location). A temporary construction laydown yard for the Solar Project will be located on Xcel Energy Owned Property within the City of Becker. The Solar Project is proposed in two distinct blocks, which collectively create the Solar Project Area. The Solar Project Area covers 3,479.4 acres and is comprised of the West Block (1,653.7 acres), which is located on the west side of the Sherco Generating Plant and the East Block (1,825.7 acres), which is located on the east side of the Sherco Generating Plant. Table 2.1-1 provides the township, range, and section for the Solar Project Area. The total nameplate capacity for the proposed Project facilities is up to 460 MW AC.

Table 2.1-1: Township, Range, and Section of the Solar Project

Facility	Acres	Township Name	Township	Range	Section(s)
West Block	1,653.7	Clear Lake	34 N	29 W	22, 26-28, 34
East Block	1,825.7	Becker	33 N	28 W	5, 7-8, 16-17
		Becker (city)	33 N	28 W	7

Xcel Energy and Sherco Solar have obtained leases and purchase options for 3,479.4 acres of privately-owned land. Xcel Energy has designed the Solar Project to maximize the Solar Project Area to the extent practicable. Based on preliminary design, Project facilities will cover approximately 3,024.2 acres of the Solar Project Area (Project Footprint). There are approximately 466 acres of the Solar Project Area for which Xcel Energy, through either Sherco Solar or Xcel Energy has site control, but are currently not contemplated for occupation by solar facilities (Figures 3a and 3b – Solar Project Area and Solar Project Footprint). In general, most of the unutilized acreage is undevelopable for solar and includes the southern portion of the West Block in the Recreation River District, a state designated wild, scenic and recreational river district, where solar development is prohibited, Public Waters Inventory (PWI) wetlands or delineated wetlands in the East Block, land within the Sherco Generating Plant fence line, and land associated with a residence and business in the East Block. Other areas include narrow strips of land around the periphery of the Project Footprint as a result of setbacks. Xcel Energy anticipates that the narrow strips of land outside the Project Footprint, if determined to be unsuitable for farming, will be revegetated when the balance of the Solar Project is revegetated after construction of the Solar Project. However, Xcel Energy anticipates other areas will continue in their existing land use. Within the Project Footprint, Xcel Energy has also avoided siting infrastructure in low lying areas that may be inundated during rainfall events or would otherwise require significant grading or engineering modifications to be utilized.

The Solar Project is located immediately adjacent to the Sherco Generating Plant. Xcel Energy and NG Renewables selected the specific Solar Project Area based on the need to replace a portion of the energy production being lost by ceasing operation of Unit 2 of the Sherco Generating Plant, significant landowner interest, transmission and interconnection suitability and availability, optimal solar resource, and minimal impact on environmental resources. Xcel Energy is not able to utilize the existing Sherco Generating Plant site for this Project due to its plans to continue coal generation operations at the existing site through 2030. Moreover, additional land in the City of Becker and Becker Township, between the Sherco Generating Plant and the Project, has been reserved by Xcel Energy for commercial and industrial development expansion. Xcel Energy has designated approximately 1,300 acres of land within and surrounding the existing Sherco Generating Plant for future economic development.[15] The available acreage is being actively marketed by both Xcel Energy and the City of Becker and is either located within the City boundary or is under an orderly annexation agreement between the City and Becker Township. An additional approximately 130 acres have already been successfully developed. Successful economic development of this area, with extensive real estate currently available directly adjacent to the U.S. Highway 10 corridor and near the City's core, will help to offset lost tax revenue that the City will experience when the Sherco Generating Plant Coal Units cease to operate.

Xcel Energy has a long history of working in partnership with the City of Becker, in large part because the Sherco Generating Plant and extensive tracts of Xcel Energy Owned Property are within the city limits. This partnership and cooperation by Xcel Energy is best demonstrated by Xcel Energy's actions to aid the City of Becker and partner with the community to expand commercial and industrial properties and initiatives south of U.S. Highway 10:

- Xcel Energy recently donated land to the City of Becker for the newly constructed Energy Drive, which now provides a road connection between Liberty Lane on the eastern side of the Sherco Generating Plant and County State Aid Highway (CSAH) 8 on the northern side of the Sherco Generating Plant. At the intersection of Liberty Lane and Energy Drive, Xcel Energy sold property to a metal recycling company, which began operations in 2019. This Agreement included Xcel Energy granting an easement across owned property to accommodate a railroad spur that can service the metal recycling facility. In addition, Xcel Energy land was successfully marketed and sold to an electric semi company. The area will be used for electric semi storage, charging, and maintenance activities.

- Joint initiatives by Sherburne County, City of Becker, and Xcel Energy have also paved the way for the potential construction a data center on approximately 300 acres of Xcel Energy Owned Property. As a part of this transaction, Sherburne County agreed to provide a property tax break for the construction of the data center[16]. Under the terms of Xcel Energy's energy service agreements for the proposed data center, Xcel Energy has agreed to procure new, incremental renewable energy resources that will be used to match the data center's annual energy usage. The City of Becker, in coordination with Xcel Energy, is

[15] See E.g., Certified Sites for Sale -Becker Industrial Park, https://www.economicdevelopment.xcelenergy.com/available-real-estate/minnesota-real-estate/certified-site-becker-industrial-park# (Accessed March 29, 2021)

[16] *See* $600 million data center project in Becker clears big hurdle (May 15, 2019), Star Tribune, https://www.startribune.com/google-600m-data-center-project-in-becker-clears-big-hurdle/509920222/?refresh=true

planning for expanded water and sewer services to much of the area available for economic development on Xcel Energy owned property. In consultation with the City, Xcel Energy pre-emptively expanded the setback for the proposed solar Project's fenced boundary and infrastructure to accommodate an expanded water and sewer easement south of CSAH 8 and west of County Road 53. Xcel Energy continues to coordinate with the City to minimize conflicts between existing and planned Xcel Energy infrastructure and the proposed utility improvements on lands owned by Xcel Energy.

- Xcel Energy has also worked to enhance research and recreation in addition to economic development in the area. Xcel Energy has developed a license agreement with the city to allow for Mississippi River access and park use via Xcel Energy owned property at Snuffy's Landing. Xcel Energy has also provided a low-cost lease of approximately 400 acres to the University of Minnesota for a research farm facility southeast of the Sherco Generating Plant.

Image 2.1-1 identifies Xcel Energy's various economic development efforts as highlighted above in the area surrounding the Sherco Generating Plant. Xcel Energy will continue to coordinate with the city and community regarding development initiatives in the area.

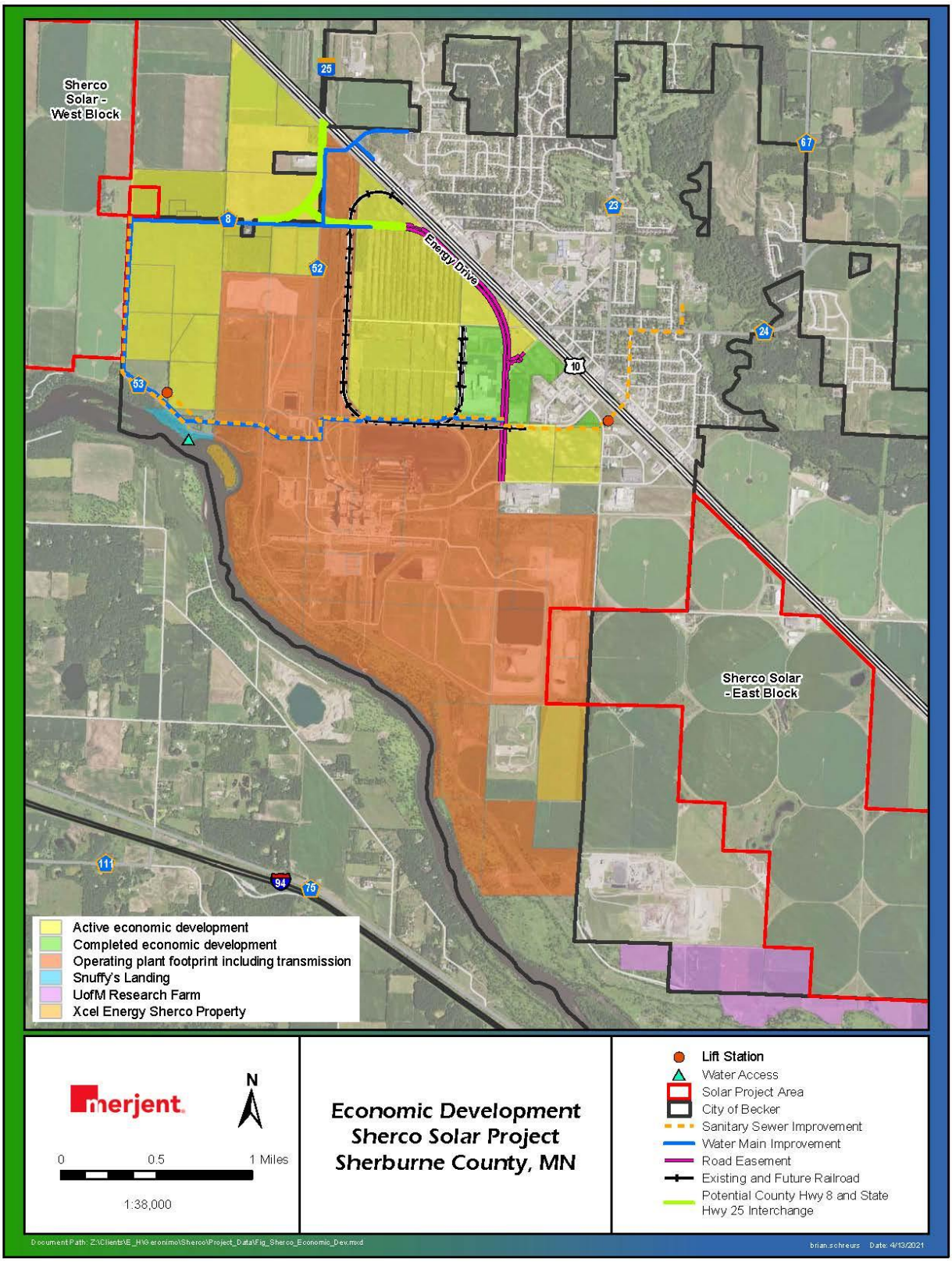
In this Application, Xcel Energy is providing a preliminary Project layout (Figures 4a and 4b – Preliminary Project Layout and 5a-5r – Detailed Preliminary Project Layout; and displayed in more detail in Appendix E – Site Plan). The layout under consideration is within the Project Footprint and subject to final micrositing. The Project's facilities are anticipated to be located within the Project Footprint and include solar panels and racking, inverters, security fencing, two collector substations, on-site below-ground or hybrid electrical collection and communication lines, and up to 12 weather stations (up to 20 feet tall). There are seven laydown areas proposed – five within the fence of the Solar Project and two temporary laydown areas totaling 20.1 acres located on Xcel Energy Owned Land, to be used only during construction. This preliminary Project layout within the Project footprint represents Xcel Energy's effort to maximize the energy production of the Project, follow applicable setbacks, while minimizing impacts to the land, environment, and surrounding community. The final site layout may differ from the preliminary layout and the current boundaries of the Project Footprint set forth in this Application, but will not extend beyond the outer boundaries of the Solar Project Area. While Xcel Energy expects that the final layout will remain considerably similar to the preliminary layout presented in Figures 4a and 4b (Preliminary Project Layout) and Appendix E (Site Plan), changes may occur as a result of ongoing site evaluation, permitting processes, neighboring landowner preferences, and micro-siting activities. Project facilities are described in more detail in Section 2.2.

Sherco Solar and Xcel Energy, through an affiliate, have entered into lease or purchase option agreements with landowners for all of the parcels on which the Project would be constructed. Xcel Energy would exercise its purchase options and hold title to the property it will purchase after the Site Permit is issued and prior to the start of construction[17]. Leased property that will be utilized

[17] Pursuant to Minn. Stat. 216B.50, Xcel Energy will seek Commission approval for the land acquisitions should it exercise its options under the purchase option agreements.

by the Project will move into an operation term of the lease agreement and property currently under lease that is not utilized by the Project and outside of the fenced boundary, may be removed from the lease agreement and the underlying landowner will continue to be allowed to farm the released property.

Image 2.1-1: Xcel Energy's Economic Development at Sherco



2.1.3 Prohibited and Exclusion Sites

Minnesota Rules 7850.4400 subp. 1 prohibits power generating plants from being sited in several prohibited areas, including: national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic and recreational riverways; state wild, scenic, and recreational rivers and their land use districts; state parks; nature conservancy preserves; state Scientific and Natural Areas (SNAs); and state and national wilderness areas. It was determined that the Sherburne County Recreational River Zoning District is a land use district that was created by the Minnesota Wild and Scenic Rivers Act. Following identification of this jurisdiction, Xcel Energy adjusted design plans and will avoid development in the Recreational River District within the Solar Project Area. The area where development will be avoided is located in the southernmost approximately 58 acres of the Solar Project - West Block and can generally be seen on Figure 6.

Additionally, Minnesota Rules 7850.4400 subp. 3 requires that applicants avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include state registered historic sites; state historic districts; state Wildlife Management Areas (WMAs); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The Project facilities are not located within any exclusion areas.

Subject to certain exceptions, Minnesota Rules 7850.4400, subp. 4 prohibits large energy power generating plants from being sited on more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. There is no prime farmland in the Solar Project Area. Regardless, Xcel Energy has voluntarily developed an Agricultural Impact Mitigation Plan (AIMP; Appendix F) detailing methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation that will help to ensure the Project is designed, constructed, operated and ultimately decommissioned and restored in a manner allowing the land to be returned to its original agricultural use in the future. Soils are discussed in further detail in Section 5.5.3.

2.1.4 Alternatives Considered but Rejected

Per Minn. Stat. 216E.04, Subd. 2(8), the Project qualifies for the alternative review process specified in Minn. R. 7850.2800-7850.3900. Accordingly, Xcel Energy is not required to analyze alternative sites pursuant to 7850.3100. Xcel Energy did not consider alternative sites other than the Project site because of the opportunity to replace electric generation of coal with solar energy immediately adjacent to the existing Sherco Generating Plant and Xcel Energy's RFP to interconnect to the existing Sherburne County Substation immediately south of the Sherco Generating Plant. Additionally, the Solar Project is sited on lands under lease or purchase options by willing Project participants in order to harvest an excellent solar resource with minimal environmental impacts expected from Project construction. As described in detail below in Section 2.1.6, the Solar Project considered an additional development area, but that was excluded at this time due to the distance from the Sherco Generating Plant and Xcel Energy's current need for up to 500 MW of solar energy as part of the RFP.

2.1.5 Cost Analysis

Xcel Energy's total estimated costs for the Solar Project are provided in Appendix B, Section 2.1.5, which has been designated as trade secret. The total installed capital costs for the Solar Project will depend on variables including, but not limited to, construction costs, taxes, tariffs, and panel selection, along with associated electrical and communication systems, and access roads.

2.1.6 Future Expansion

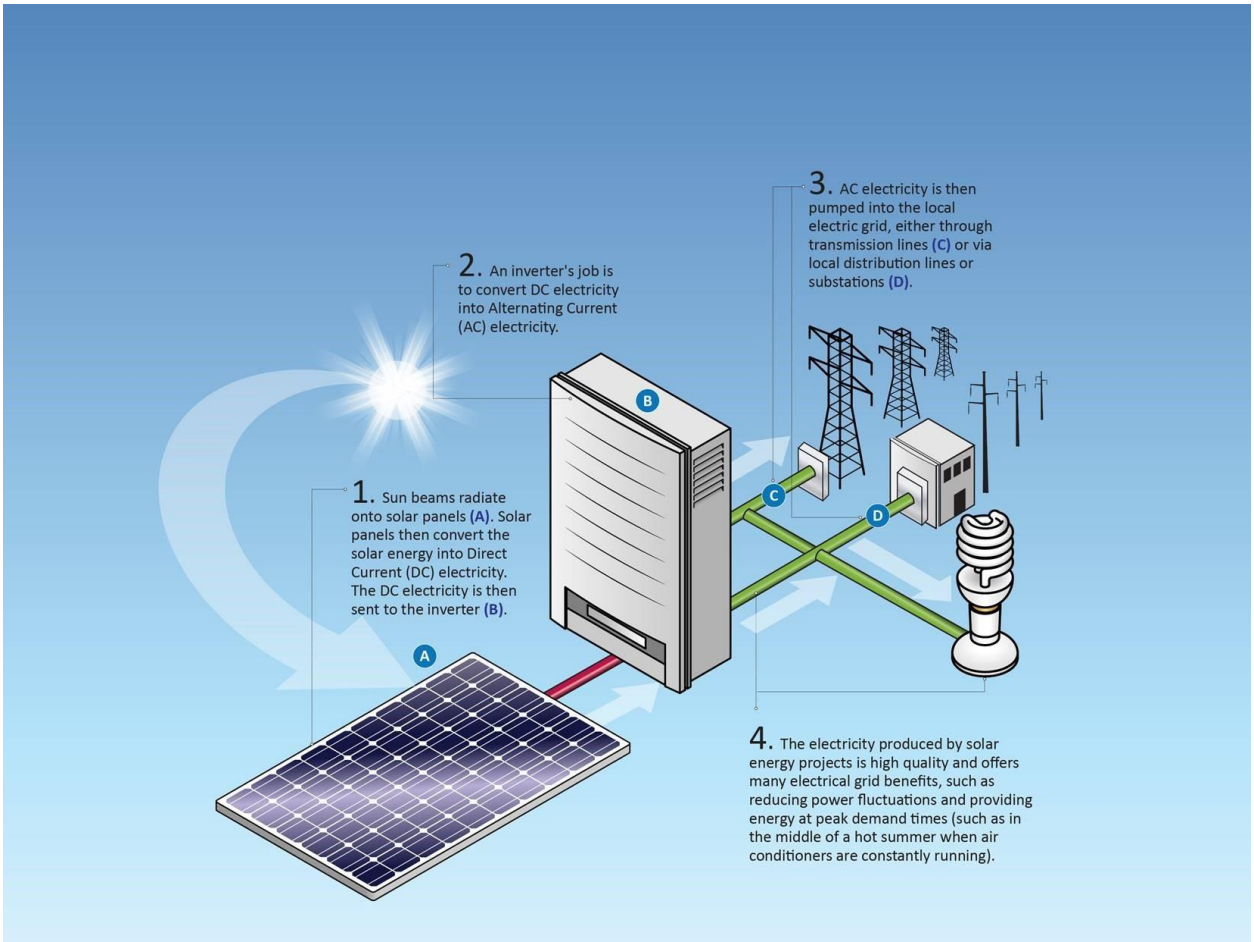
Based on Xcel Energy's clean energy transition, Xcel Energy will cease operations the entire Sherco Generating Plant by 2030. Ceasing operations, coupled with existing interconnecting infrastructure, available transmission capacity, and additional agricultural land adjacent to the Sherco Generating Plant provide opportunity for additional solar development in the Solar Project vicinity. As such, both NG Renewables and Xcel Energy are independently seeking additional development opportunities in this area; however, none of those opportunities are part of the Project or anticipated to be constructed within the same 12-month period as the Project. An example of additional development opportunities is provided in Appendix B, Section 2.1.6, which has been designated as trade secret. Xcel Energy does not anticipate sharing any infrastructure with a future project, except that a future project may elect to build a substation adjacent to one of the two Project substations or construct an additional circuit on all or a portion of the West HVTL Project or the East HVTL Project.[18] Any separate project will be completely independent from the Project proposed in this Application.

2.2 ENGINEERING AND OPERATIONAL DESIGN

Image 2.2-1 below outlines the process of converting solar energy and connecting it to the transmission grid. The process begins with solar panels converting energy from sun into direct current (DC) electrical power. Sets of panels will be electrically connected in series and terminated at an inverter. The inverters will convert the DC power (approximately 1,500 volts) from the panels to AC power (650-950 volts depending on the inverter specifications). Next, a transformer will step up the AC voltage of generated electricity from the inverter output voltage to 34.5 kV. From the transformers, electrical cable will be buried below-ground for routing to the collector substations where the electricity will be stepped up from 34.5 kV to 345 kV to interconnect to the existing transmission infrastructure.

[18] The West HVTL Project and East HVTL Project will be single-circuit HVTLs with towers capable of adding an additional, independent circuit in the future, if necessary. The addition of an additional circuit to the poles would require a route permit for the new circuit prior to construction of the new circuit.

Image 2.2-1: Harvesting Solar Energy



Source: National Grid Renewables Development, LLC

2.2.1 Design

The Project anticipates the use of bifacial solar modules – those that produce solar power from both sides of the panel – for both the West and East Blocks of the Project. Bifacial modules are increasingly becoming the industry standard and some manufacturers estimate a 30 percent increase in production from the additional power generated by the rear side of the panel.[19] While bifacial panels can result in higher panel costs when compared to traditional, backsheeted, monofacial modules, the increased panel output is expected to offset any additional costs and results in a more cost-effective project.

The Project will utilize PV panels with tempered glass varying in size approximately 4 to 6.5 feet long by 2 to 3.5 feet wide, and 1 to 2 inches thick. The panels will be installed on a tracking rack system that utilizes steel and aluminum for the foundations and frame with a motor that allows the racking to rotate from east to west throughout the day. Each tracking rack will contain multiple panels. On the tracking rack system, panels will be a maximum of approximately 20 feet in height

[19] Solar Power World, *What are bifacial solar modules?*, April 2, 2018.

from the ground to the top of the panels when at a 45-degree angle (refer to Images 2.2-2 and 2.2-3 below). Height may vary due to manufacturer, topography and vegetation constraints and could reach a height of approximately 20 feet from the ground. Depending on the technology selected, the PV panels may have an aluminum frame, silicon, and weatherized plastic backing or a side-mount or under-mount aluminum frame, heat strengthened front glass, and laminate material encapsulation for weather protection.

To limit reflection, solar PV panels are constructed of dark, light-absorbing materials. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings. The solar array will occupy most of the Project Footprint for the solar facilities.

2.2.1.1 Linear Axis Tracking Rack System

A linear axis tracking rack system allows the PV panels to track the solar resource throughout the day. The panels and tracking rack system are generally aligned in rows north and south with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the Project to optimize the angle of the panels in relation to the sun throughout the day thereby maximizing production of electricity and the capacity value of the Project.

The tracking rack system is mounted on top of steel piers that are typically driven into the ground, without a need for excavation or concrete to install the piers.

Images 2.2-2 and 2.2-3 below visually show the general racking equipment and dimensions of a linear axis tracking rack system. Image 2.2-4 shows the steel pier foundations for which the tracking rack system is mounted to.

Image 2.2-2: Tracking Rack Systems

Image 2.2-3: Approximate Tracking Rack System Dimensions

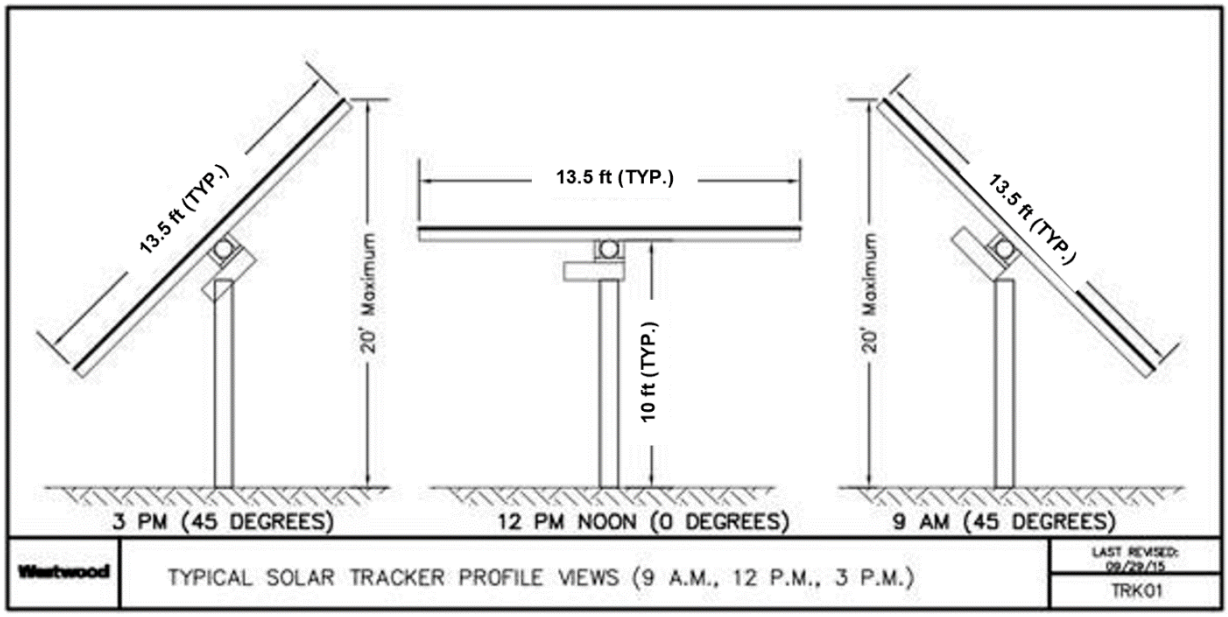


Image 2.2-4: Standard Steel Pier Foundations

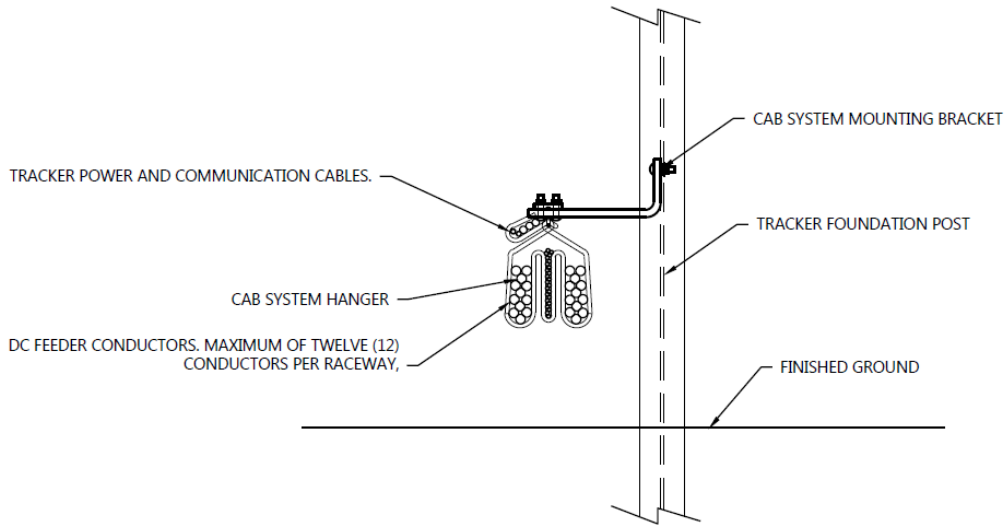
2.2.1.2 Electrical Collection System

Electrical wiring will connect the panels to inverters, which will convert the power from DC to AC. The AC will be stepped up through a transformer from the inverter output voltage to 34.5 kV and brought via the collection cables to one of the two Project collector substations. The electrical collection system is anticipated to be installed via a hybrid above-ground/below-ground system, but could also be installed completely below ground.

The DC collection cables are anticipated to be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets would connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will be routed below-ground at a minimum depth of at least four feet below grade to the inverter/transformer skid where the current is converted to AC and voltage is stepped up to 34.5 kV. A typical drawing of the hanging brackets for the DC cabling is provided below in Image 2.2-5. For a below-ground system, both the DC and AC cabling will be buried. 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 four feet below grade. Below-ground AC collection systems from the inverter skids to the substation will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During all trench excavations the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil.

Electrical collection technology is rapidly evolving and 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.

Image 2.2-5: Typical Above-Ground Collection (DC cable) Hanging Bracket



The Solar Project will utilize inverters to convert the power from DC to AC. Inverters convert approximately 1,500 volts of DC output of the PV panels to between 650-950 volts of AC. Then a step-up transformer converts the inverter AC voltage to an intermediate voltage of 34.5kV. Inverter skids will be utilized at locations throughout the Project Footprint and include a transformer to which the inverters will feed electricity (Image 2.2-6). The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. The Project's preliminary design has proposed 110 central inverter skids (one inverter is required for every 2-3 MW; there are 55 inverters in the West Block and 55 inverters in the East Block). These skids provide the foundation for the inverter, transformer, and Supervisory Control and Data Acquisition (SCADA) system. The skids will be placed atop a concrete slab or pier foundations and typically measure 10 feet wide by 25 feet long, with a structure height of approximately 12 feet above grade (Image 2.2-6). Concrete foundations will be poured onsite or precast and assembled off-site.

The inverters are within the interior of the Project along access roads. Typical drawings of inverters are included in the Site Plan in Appendix E and Image 2.2-6 below shows a central inverter and step-up transformer station.

Image 2.2-6: Typical Inverter and Transformer Station

2.2.1.3 Access Roads

The Project will include approximately 33.8 miles of graveled access roads that lead to the inverters for operation and maintenance. The final length of the access roads will depend on the equipment selected and final engineering. These roads are up to 16 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet). There are 17 access points to the Project from existing county roads. These entrances will have locked gates.

Xcel Energy has included an access road around much of the perimeter of the Project for effective and efficient access for operations and maintenance and for safe ingress and egress of employees, visitors, and emergency responders. Xcel Energy has minimized the amount of access roads within the Project Footprint to the extent practicable.

Some upgrades or other changes to the public roads may be required for construction or operation of the Project. Xcel Energy will work with the governmental entity that owns each affected road to facilitate and pay for required upgrades that meet the required public standards. Upgrades or changes could include, but are not limited to, road improvements, additional aggregate, and driveway changes. Xcel Energy will continue to coordinate with local agencies as the Project develops regarding necessary road upgrades and improvements. Driveway changes will require an entrance permit from the governmental entity that owns the road to which the entrance will be constructed and the permit will be obtained prior to construction of the applicable driveway.

2.2.1.4 Safety Features

Permanent security fencing will be installed along the perimeter of the solar arrays and Project Footprint. Fencing will be secured to posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. The fencing will consist of an agricultural woven wire fence and will extend approximately 8 feet from the ground unless a different course of action is determined acceptable in consultation with Minnesota Department of Natural Resources (MNDNR). At the recommendation of the MNDNR, barbed wire will not be used around the perimeter of the Project.. However, as described in Section 2.2.1.5, the fencing around the collector substations will be a 7-foot chain-link fence, topped with one foot of barbed wire for security and safety purposes (8-foot total height) to comply with the National Electric Safety Code (NESC). This fencing will be designed to prevent the public from gaining access to electrical equipment which could cause injury. Additionally, the fencing will prevent larger wildlife from entering the facility.

The Project will also have security cameras. Xcel Energy will have security lighting at the entrances that will be down-lit. The typical pole height will be ten feet and manually operated by switch as well as motion activated if an intrusion is detected. There will be lights at each inverter that will be down-lit and switch controlled for repair purposes. For more detail about the lighting proposed at the Project site, see Appendix E.

2.2.1.5 Associated Facilities

Collector Substations

The Solar Project will require two collector substations: The West Collector Substation, which will collect power from the West Block of the Solar Project Area and the East Collector Substation, which will collect power from the East Block. The West Collector Substation is located on the eastern edge of the West Block; its location was selected to minimize the length of the associated transmission line (see Section 3.0) and to accommodate potential future development and transmission expansion. The East Collector Substation is located on the western edge of the East Block and was selected to minimize the length of the associated transmission line (see Section 4.0), avoid impacts to residences and agricultural buildings along 137th Street, and to accommodate potential future development and transmission expansion. Regarding siting of substations to accommodate potential future development and transmission expansion, there are no current plans for future development or transmission expansion. The locations were chosen to allow for potential future interconnections into the substations as peripheral substations to the Sherburne County Substation. Allowing future interconnections to the West and East Collector

Substations will limit the transmission infrastructure needed for future development or transmission projects to interconnect to the Sherburne County Substation in an area that is currently significantly developed with existing transmission infrastructure.

Both the West and East Collector Substations will be 34.5/345 kV step-up substations with metering and switching gear required to connect to the transmission grid at the Sherburne County Substation. It will be designed according to regional utility practices, Midcontinent Independent Transmission System Operator Standards, Midwest Reliability Organization Standards, National Electrical Safety Code, and the Rural Utility Service Code. The area within the substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substations will be fenced with a 7-foot chain-link fence, topped with one foot of barbed wire for security and safety purposes (8-foot total height). The West and East Collector Substation areas will be approximately 300 feet by 850 feet once construction is complete. The substations proposed for this Project are designed not only for the collection needs associated with the solar Project, but the area in which they will be located was sized to accommodate additional substation infrastructure for potential future generation. While there are currently no associated projects under consideration or planned, the substation locations provide suitable area to accommodate future electrical infrastructure improvements associated with long term generation development opportunities for the greater area.

Operation and Maintenance Building

The Solar Project will not have a dedicated operations and maintenance (O&M) building; instead, O&M will be based out of the Sherco Generating Plant, which is central to the Solar Project. There is available parking, storage for extra materials, and office space within the Sherco Generating Plant.

Stormwater Drainage Basins

Xcel Energy has preliminarily designed 11 drainage basins throughout the Project Footprint that range in size from 0.2 to 4.8-acres (see Figures 4a and 4b – Preliminary Project Layout and 5a – 5r - Detailed Preliminary Project Layout). These basins are located in existing low areas that are prone to ponding during rain events. These areas will be vegetated with a wet seed mix that will help stabilize soils after rain events.

Weather Stations

The Project will include up to 12 weather stations up to 20 feet in height (see Image 2.2-7 below). The weather stations will be within the Project Footprint; the final locations will be determined following final engineering.

Image 2.2-7: Weather Station

2.2.1.6 Temporary Facilities

The Project contractors will utilize five temporary laydown areas: four laydown areas covering six acres in the West Block and one laydown area covering one-half acre in the East Block. These five laydown areas will all be located within the fenceline of the Solar Project. Additionally, Xcel Energy includes two additional laydown areas outside the fenceline and on Xcel Energy property to be used during construction. One 10.0-acre laydown area is located on the eastern edge of the West Block in cultivated cropland and the second 10.1-acre laydown area is located on the western edge of the East Block within the Sherco Generating Plant fenceline. These areas are anticipated to be graveled during construction and serve both as a parking area for construction personnel and staging areas for Project components during construction. These laydown areas have been sited to avoid any tree clearing. After construction, the laydown areas within the Solar Project fenceline will be seeded as described in Section 2.2.4.4; the laydown area outside the Solar Project fenceline in agricultural land is anticipated to return to agricultural use and the laydown area at the Sherco Generating Plant will return to its passive use. Laydown areas are displayed on Figures 4a-4b (Preliminary Project Layout) and Figures 5a-5r (Detailed Preliminary Project Layout).

2.2.1.7 Transmission System

The Solar Project will interconnect into the existing Sherburne County Substation via two 345 kV overhead gen-tie transmission lines. The West HVTL Project will connect the West Collector Substation to the Sherburne County Substation via a 3.2-mile transmission line (see Section 3.0). The East HVTL Project will connect the East Collector Substation to the Sherburne County Substation via a 1.7-mile transmission line (see Section 4.0).

2.2.1.8 Pipeline System

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

2.2.2 Project Layout

The Project's final layout will optimize electrical generation and efficiency of the Solar Project while avoiding and minimizing environmental, cultural, and infrastructure impacts. The Project's facilities will be sited to comply with the county and Becker Township setback requirements, where applicable. To the extent applicable, the Project will also comply with all other local, state, and federal regulatory standards.

The Project falls within three different zoning authorities: Sherburne County[20], Becker Township, and the City of Becker (see Figure 6 – Zoning). All three zoning authorities have a solar energy ordinance (see Section 5.2.9 – Land Use and Zoning). The structure setback in each of the three zoning jurisdictions is the same, with minor differences in the side yard or rear yard setback. In this instance, Xcel Energy applied the most conservative setback across the Solar Project, which is 50 feet. Portions of the Project are within the Sherburne County Shoreland Overlay District, which in this case is up to 1,000 feet from the ordinary high water of natural environment lakes listed in the Sherburne County Shoreland Ordinance. Xcel Energy applied the Shoreland Ordinance Structure Setback of 150 feet from the ordinary highwater mark of natural environment lakes subject to the Shoreland Ordinance, which is consistent with other permitted uses in the shoreland overlay district. For example, the permitted uses in the Sherburne County shoreland overlay district include: agricultural uses (such as cultivation, grazing, nurseries, horticulture, truck farming, sod farming and wild crop harvesting), animal feedlots, commercial, industrial, public, and semi-public uses that need access to and use of public waters, extractive uses (sand/gravel mining), and mining of metallic minerals and peat. Lastly, there are approximately 72 acres of the Solar Project within the City of Becker; this area will only include a temporary laydown area during construction that is on Xcel Energy property and within the Sherco Generating Plant boundary. Solar panels will not be sited within the City of Becker. The setback regulations for solar energy systems in Sherburne County and Becker Township are provided in Table 2.2-1. Xcel Energy will meet all setback requirements listed in Table 2.2-1. Setbacks are displayed on the detailed Site Plan in Appendix E.

[20] Sherburne County has zoning authority over Clear Lake Township. Becker Township exercises its own zoning authority.

Table 2.2-1: Solar Project Setback Requirements		
Feature	**Setback Requirement (feet) to solar array**	**Project Design (at closest)**
Neighboring Property Lines (property lines of participating landowners within project boundary are exempt)	50’	52’
Township Road	67’	94’
County Road	50’	89’
County State Aid Highway	70’	102’
Highways 24 or 25	80’	NA
U.S. Highway 10	100’	288’
Side or rear, accessory structures (applied on property lines on the outside edges of the Project boundary)	Up to 50’	52’
County Ditch	50’	NA
Structure Setback in Shoreland Overlay District[1]	150’	153’
Expanded Right-of-Way along County Road 53 [2]	65’	88’

[1] Xcel Energy has applied the structure setback of 150’ in this overlay district.

[2] Based on coordination with the City of Becker, Xcel Energy used a larger setback to accommodate an expanded water and sewer easement.

Sources: Sherburne County, 2018; Becker Township, 2019.

2.2.3 Estimated Project Facility Acreages

Table 2.2-2 describes the estimated acreage for the solar facilities within the 3,024.2-acre Project Footprint based on the preliminary design for the Solar Project.

Table 2.2-2: Estimated Acreages within the Solar Project Footprint	
Project Facilities	**Acres**
Access Roads	66.4
Inverters	0.2
West Collector Substation	5.9
East Collector Substation	5.9
Laydown Areas (within fence)	6.6
Laydown Areas (outside fence – for construction only) [1]	20.1
Solar Panels	2,901.0[2]
Stormwater Basins	18.1
Project Total	**3,024.2**

[1] The laydown areas are temporary impacts to be used only during construction.

[2] The impacts associated with solar panels include the open grass area between every row of panels

2.2.4 Project Construction

A variety of activities must be completed to carry the Project through construction. Below is a preliminary list of activities necessary to develop the Project. Pre-construction, construction, and post-construction activities for the Project include:

- Pre-construction
  - Geotechnical analysis;
  - Design substation and electrical collection system;
  - Design solar array and access roads;
  - Underground utility discovery; and
  - Procure all necessary facility components (solar panels, tracking system, transformers).
- Construction
  - Site preparation, grubbing, and grading;
  - Construct laydown areas and set up temporary job site trailers
  - Construct fencing;
  - Civil construction of access roads;
  - Install PV mounting posts;
  - Install below-ground or above-ground collection system;
  - Install electrical enclosure/inverter;
  - Tracker installation;
  - PV panel installation; and
  - Construct gen-tie line.
- Post-construction
  - Restore disturbed areas not intended for permanent above-ground facilities. Permanent above-ground facilities include the substation, inverter skids and electrical cabinets, and access roads;
  - Test facility; and
  - Begin commercial production.

2.2.4.1 Construction Activities

During construction, equipment and work vehicles will travel to and from the site. Daily construction duration is anticipated to be consistent throughout the construction season when the majority of the access road construction, electrical and substation work is taking place. Typical construction equipment such as scrapers, dozers, dump trucks, watering trucks, motor graders, vibratory compactors and pile drivers, pickup trucks, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

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

Upon completion of construction, heavy equipment will be removed from the site. An overview of construction activities follows.

Geotechnical

Geotechnical and pull testing studies will be performed to determine the topsoil and subsoil types, and the mechanical properties of the soils. These variables will be used to engineer the solar array foundation system. 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 14 feet below grade, depending on soil properties and other factors.

Site Clearing & Vegetation Removal

After the necessary permits are received, construction will begin with the initial site preparation work, including utility locates within the Project boundary. Depending on timing of the start of construction, the Project may require the clearing of residual row-crop debris from the 2021 harvest season. Alternatively, and depending on construction timing, Xcel Energy may plant a cover crop in Spring of 2022 that is compatible with the Project's Vegetation Management Plan (VMP; Appendix G), which will stabilize soils if row crops are not planted that year. Site clearing and preparation will take approximately four months for each the West and East Blocks and will include approaches and site access roads.

Earthwork

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil (depending on the depth of grading cut) in accordance with the Project's AIMP, as discussed in Section 5.2.9.2. Some grading will be required to provide a more level workspace and maintain soil stability in areas with a slope greater than five percent. Topsoil shall have temporary and permanent erosion control and soil stabilization measures established in accordance with the Project's Stormwater Pollution Prevention Plan (SWPPP). The earthwork activities will be completed using typical civil construction equipment – scrapers, bulldozers, front-end loaders, back-hoes, or skid-steers.

Access Road Construction

As a component of earthwork, permanent access roads and permanent turnouts will be developed. This work will start with the stripping and segregating of topsoil materials from the anticipated up to16-foot-wide road width. The subgrade materials will be compacted 16-feet-wide to the specified compaction requirements as laid out by the civil and geotechnical engineer. After compaction is reached and verified, the road will be installed as designed, typically done with or without geo-fabric or via soil cement stabilization methods depending on the soil type, and then, with a surface of 4 to 12 inches of gravel. The gravel will be placed level with the existing grade to facilitate drainage and minimize ponding.

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

Topsoil removed from permanent access roads will be removed and stored in accordance with the AIMP.

Solar Array Construction

Once grading activities are complete, the racking system supports will be constructed using steel piles driven into the ground. The solar facilities will be constructed in blocks, and multiple blocks could be constructed simultaneously. Construction of the blocks will include pre-positioning and driving piles, mounting the tracking rack system to the piles, pre-positioning of panel pallets, mounting panels to the tracking rack system, the completion of electrical connections, terminations and grounding, and installation of cable management systems. In some situations where soils are low strength or consist of loose, non-cohesive sand, helical screw or auger-type foundation posts may be used. The pile is driven using a hydraulic ram that moves along tracks and is operated by two workers. Soil disturbance would be restricted to the hydraulic ram/screw machinery, about the size of a small tractor, temporarily disturbing soil at each pile insertion location and while driving between drilling locations. Pile driving of piers for the rack support will take approximately fifteen months. This includes three months of winter season where it is likely prohibitive to complete any pile driving work.

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

During array and racking assembly, multiple crews and various types of vehicles will be working within the Solar Project Area. To the extent practicable, vehicular traffic will be limited to permanent and temporary access roads to minimize soil disturbance, mixing and compaction; however, some vehicular traffic will occur throughout the Project during construction. These vehicles include flatbed trucks for transporting array components, small all-terrain vehicles, rough-terrain forklifts, and skid-steers, as well as pick-up trucks for transporting equipment and workers throughout the Solar Project Area. Panels will be staged in advance throughout the Solar 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. Installation crews will proceed in serpentine fashion along staked temporary access roads in a pre-established route to minimize off-road traffic.

Electrical Collection System

As described in Section 2.2.1.2, electrical wiring will connect the panels to inverters, which will convert the power from DC to AC. The AC will be stepped up through a transformer from the inverter output voltage to 34.5 kV and brought via the collection cables to the Project substations. The DC cables are anticipated to be installed in an above-ground hybrid system. However, a below-ground system could still be utilized. Above-ground DC collection cables will be strung under the panels on steel arms and a steel cable attached to the piles. The collection cables will hang on the steel cable with cable hangers and will be pole mounted along access roads at the end of rows (see Image 2.2-5).

Below-ground DC and AC collection systems will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During trench excavation the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil. Electrical collection technology is rapidly evolving and 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.

Project Substation Construction

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

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

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

2.2.4.2 Construction Management

Xcel Energy will designate an on-site construction manager. This manager's responsibilities include scheduling and coordinating the activities of engineering, procurement, and construction contractors. The construction manager will be supported by other members of Xcel Energy's team who specialize in engineering, permitting, meteorology, environmental compliance, real estate, and Geographic Information Systems (GIS) mapping.

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

2.2.4.3 Commissioning

During and upon completion of the construction phase, the Project will undergo inspection testing and commissioning. Inspection and testing will occur for each component of the solar array, as well as the associated communication, meteorological, collection, and SCADA systems.

2.2.4.4 Restoration

Following construction, areas that will not contain permanent facilities (area under the arrays, the laydown yards, and stormwater basins) will be stabilized with sediment stabilization and erosion control measures such as silt fence and biologs and re-vegetated according to the VMP. The site will be seeded with site specific seed mixes and include three native seed mixes: a low growing mix for upland areas throughout the site, a wet mix for areas with hydric soils and/or susceptible to holding water based on field reviews and hydraulic modeling of the site, and a wet mix specific to wet areas such as stormwater basins.

The Solar Project will implement pollinator-friendly seed mixes that meet or exceed the Minnesota Board of Water and Soil Resources (BWSR) Habitat Friendly Solar Site Assessment Form (scorecard) and will allow the site to claim the site provides beneficial habitat as set forth in Minn. Stat. 216B.1642 (BWSR, 2020). The BWSR habitat friendly solar program promotes the planting and management of wildlife habitat with an emphasis on pollinator, songbird, and gamebird benefits on solar projects. Implementing this habitat friendly program requires that seed mixes be native and diverse, with species blooming in multiple seasons. Xcel Energy will strive to meet the highest standard, the "gold standard," established by the scorecard. As of March 2021, the largest solar facility to achieve BWSR's Habitat Friendly Solar status is a 120-acre site and the average site size was approximately 27 acres. Achieving Habit Friendly Solar status at the Sherco Solar Project would make it 25 times larger than the largest solar site to achieve this standard as of March 2021, and would provide a significant block of native habitat adjacent to the Mississippi River in an area that has traditionally consisted of heavy agricultural use and ongoing urbanization (BWSR, 2021). The VMP also reflects Xcel Energy's goal to reach the scorecard threshold to achieve solar pollinator re-certification at year 3 of operations.

The VMP provides a guide and recommendations to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The VMP is a living document that will continue to be updated and refined as Project planning progresses leading up to construction. The VMP outlines vegetation management tasks during the establishment and perpetual maintenance phases including monitoring and treatment of any invasive species, mowing, and re-seeding. Additionally, short-term and long-term goals are defined for the VMP.

2.2.5 Project Operation and Maintenance

Following commissioning and commercial operation, the care, custody, and control of the facility transfers from the construction team to the operations staff. The construction manager works with the operations staff, the equipment suppliers, and other construction and maintenance personnel to ensure a smooth transition from the start of construction to the commercial operation date of the Project. The operations staff will have full responsibility for the facility to ensure operations and

maintenance are conducted in compliance with approved permits, prudent industry practice and the equipment manufacturer's recommendations.

The Project will be professionally maintained and operated by Xcel Energy, an affiliate of Xcel Energy, or a contractor. Primary tasks will include scheduled monthly and quarterly inspection(s) of electrical equipment, vegetation management as well as snow removal on access drives.

The expected service life of the Project is 35 years, and Xcel Energy estimates that the Project will result in up to 24 full-time permanent positions to operate and maintain the Project facilities. A maintenance plan will be created for the Project to ensure the performance of the solar facilities, including a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. Derating/degradation refers to the known process of components losing some efficiency or otherwise degrading over the course of the Project's life cycle; like all technology and physical components, a certain amount of this is unavoidable, and Xcel Energy will plan for it and maintain the facility as needed. Once construction is complete, the solar facility will see two trucks on site daily, and at intervals associated with the maintenance schedule in Section 2.2.5.5 during normal operations. The main scheduled activities are described in more detail below in Sections 2.2.5.2 through 2.2.5.5.

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. As an example, if a panel needs repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The panel can then be replaced, and the combiner box circuit closed. Additionally, the power production circuits are separated from the tracking circuits. This allows the PV panels to operate during an unscheduled outage of the tracker system. On occasion, it may be desirable to perform maintenance when the sun is down. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residences are present.

There will be an area for the storage of the spare parts and the tools as described in Section 2.2.1.5. The generating facility will be operated through a real-time control system for most operations functions.

2.2.5.1 Supervisory Control and Data Acquisition System

The solar arrays will communicate directly with the SCADA system for remote performance monitoring, energy reporting and troubleshooting. The SCADA system provides data on solar generation and production, availability, meteorology, and communications. The SCADA system allows monitoring of, and communications with, the Project and relays alarms and communication errors. All the monitored data will be managed by Xcel Energy on-site in addition remote monitoring of the site 24 hours a day, 7 days a week through Xcel Energy's remote monitoring and diagnostic center.

2.2.5.2 Equipment Inspection

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

- PV panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.;
- Inverters, transformer, and electrical panels: visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
- Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds; and
- Cabling and wiring: visual check of the buried and aerial electrical line and connection box to verify their status.

2.2.5.3 Performance Monitoring

Performance monitoring of the Project facilities will consist of a weekly or monthly download of the data acquired by the onsite meteorological stations (energy produced, alarms, faults, etc.).

2.2.5.4 Facility Maintenance

Housekeeping of the Project facilities will include road maintenance, vegetation maintenance via occasional mowing (after first few years of vegetation establishment, anticipated approximately once per year in the fall, but dependent on conditions), fence and gate inspection, lighting system checks, and PV panel washing (if required; minimal to no washing is anticipated to be needed at Project facilities due to the naturally occurring and frequent precipitation).

2.2.5.5 Maintenance Schedule

Table 2.2-3 provides more information on the anticipated frequency of the operations and maintenance tasks associated with the Project. The table represents the anticipated preliminary frequency of these tasks; the frequency of inspection may be varied based on facility demands and experience with performance of certain components and Project features.

Table 2.2-3: Operations and Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
Photovoltaic (PV) Field	PV Panels visual check	Once Yearly
	Wirings and junction boxes visual check	Once Yearly
	PV strings measurement of the insulation	Once Yearly
	PV strings and string boxes faults	Once Yearly
	PV panels washing	No regular washing planned (only as site-specific conditions warrant)
	Vegetation Management (if necessary at site)	Up to three times a year depending on site conditions

Table 2.2-3: Operations and Maintenance Tasks and Frequency		
Plant Device	**Task**	**Preliminary Frequency**
Electric Boards	Case visual check	Once Yearly
	Fuses check	Once Yearly
	Surge arresters check	Once Yearly
	Torque check	Once Yearly
	DC voltage and current check	Once Yearly
	Grounding check	Once Yearly
Inverter	Case visual inspection	Once Yearly
	Air intake and filters inspections	Once Yearly
	Conversion stop for lack of voltage	Once yearly
	AC voltage and current check	Once yearly
	Conversion efficiency inspection	Once yearly
	Datalogger memory download	Once yearly
	Fuses check	Once yearly
	Grounding check	Once yearly
	Torque check	Once yearly
Support Structures	Visual check	Once yearly
	PV panels toque check on random sample	Once yearly

2.2.6 Decommissioning and Repowering

At the end of the Project's useful life, anticipated to be 35 years, Xcel Energy will either take necessary steps to continue operation of the Project (such as re-permitting and retrofitting) or will decommission the Project and remove facilities. A preliminary decommissioning plan has been developed for the Project, and is included as Appendix H. The decommissioning plan will be revised prior to construction and every five years thereafter during operation of the Project. Decommissioning activities will generally include:

- Removing the solar array equipment, transformers, electrical collection system, fencing, lighting, and substations;
- Removal of below-ground electrical cables to a depth of four feet (cables buried below four feet will be left in place with landowner approval);
- Removal of buildings and ancillary equipment to a depth of four feet;
- Removal of surface road material and restoration of the roads to substantially the same physical condition that existed immediately before construction. If the Solar Project is decommissioned and the land sold to a new owner, Xcel Energy would retain any access roads the new landowner requested be retained;
- Grading, adding or re-spreading topsoil, and reseeding according to the Natural Resources Conservation Service (NRCS) technical guide recommendations and other agency recommendations, areas disturbed by the construction of the facility or decommissioning activities, grading and soil disturbance activities will be kept to the minimum necessary to

restore areas where topsoil was stripped in construction, topsoil in decommissioned roads and compaction only in areas that were compacted during decommissioning activities so that the benefits to the soil that were achieved over the life of the Project are not counteracted by decommissioning; and

- Standard decommissioning practices would be utilized, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, and restoration.

2.2.6.1 Timeline

Decommissioning is estimated to take 24 months to complete and the decommissioning crew will ensure that all equipment is recycled or disposed of properly.

2.2.6.2 Removal and Disposal of Project Components

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

- Panels: Panels inspected for physical damage, tested for functionality, and removed from racking. Functioning panels packed and stored for reuse (functioning panels may produce power for another 25 years or more). Non-functioning panels packaged and sent to the manufacturer or a third party for recycling or another appropriate disposal method.
- Racking: Racking uninstalled, sorted, and sent to metal recycling facility.
- Steel Pier Foundations: Steel piles removed and sent to a recycling facility.
- Wire: belowground wire abandoned in place at depths greater than four feet. Wire above four feet removed and packaged for recycling or disposal.
- Conduit: Above-ground conduit disassembled onsite and sent to recycling facility.
- Junction boxes, combiner boxes, external disconnect boxes, etc.: Sent to electronics recycler.
- Inverter/Transformer: Evaluate remaining operation life and resell or send to manufacturer and/or electronics recycler.
- Concrete pad(s): Sent to concrete recycler.
- Fence: Fence will be sent to metal recycling facility and wooden posts for the agricultural fence will be properly disposed.
- Computers, monitors, hard drives, and other components: Sent to electronics recycler. Functioning parts can be reused.

2.2.6.3 Restoration/Reclamation of Facility Site

After all equipment is removed, the facility would be restored to an agricultural use, in accordance with the AIMP, or to another use if the economic conditions and landowner intentions at that time indicate another use is appropriate for the site. Holes created by steel pier foundations and fence poles, concrete pads, re-claimed access road corridors and other equipment will be filled in with soil to existing conditions and seeded. Grading and other soil disturbance activities during decommissioning will be kept to the minimum necessary to effectively decommission the site to maintain the soil benefits realized during the long-term operation of the Project, such benefits include building topsoil through plant matter decay, carbon capture, and beneficial, soil bacteria that are often absent from soil subject to row crop agriculture.

Xcel Energy reserves the right to extend operations instead of decommissioning at the end of the site permit term. In this case, a decision may be made on whether to continue operation with existing equipment or to retrofit the facilities with upgrades based on newer technologies. If the decision is made to continue operations, the Project will be re-permitted.

2.2.6.4 Financial Resource Plan

Beginning in year fifteen of the Project's operational life, Xcel Energy will either create a reserve fund, enter into a surety bond agreement, create an escrow account, or provide another form of security that will ultimately fund decommissioning and site restoration costs after Project operations cease, to the extent that the salvage value does not cover decommissioning costs. The exact amount to be allocated for decommissioning will be determined by a third-party study in year fourteen that will assess the difference between estimated decommissioning costs and the salvage value. The preliminary decommissioning plan (Appendix H) identifies anticipated costs less salvage value, which are currently anticipated to be a net positive value of $13,100,000. This estimate is on par with current pricing for scrap metal, industry trends, and decommissioning practices, which may change over the life of the Project but will be accounted for as part of the regular review of the Decommissioning Plan.

3.0 WEST HVTL PROJECT INFORMATION

3.1 Alternative Permitting Process for Route Permit

The Minnesota Power Plant Siting Act (PPSA) provides that no person may construct an HVTL without a Route Permit from the Commission. Minn. Stat. § 216E.03, subd. 2. Under the PPSA, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length. Minn. Stat. § 216E.01, subd. 4. The proposed 345 kV West HVTL Project is an HVTL greater than 1,500 feet in length and, therefore, a Route Permit is required from the Commission prior to construction.

The West HVTL Project qualifies for review under the Alternative Permitting Process authorized by Minn. Stat. § 216E.04, subd. 2(4) and Minn. R. 7850.2800, subp. 1(D), because the length of the 345 kV line is less than five miles. Accordingly, Xcel Energy is following the provisions of the Alternative Permitting Process outlined in Minn. R. 7850.2800 to 7850.3900 for this Project.

3.1.1 Notice to the Commission

Xcel Energy notified the Commission on March 22, 2021 by letter that it plans to file a Route Permit application for the West HVTL Project and that it intends to use the Alternative Permitting Process of Minn. R. 7850.2800 - .3900. This letter complies with the requirement of Minn. R. 7850.2800, subp. 2, to notify the Commission of this election at least 10 days prior to submitting an application for a Route Permit.

3.2 West HVTL Project Proposal

Xcel Energy is currently developing an up-to-460 MW Solar Project adjacent to the Sherco Generating Plant in Sherburne County, Minnesota. Xcel Energy is proposing to build a new 3.2-mile single circuit 345 kV transmission line to connect the Solar Project to the existing Sherburne County Substation on the south side of the Sherco Generating Plant (See Figure 1 – Overall Project Location). For the Application, and as described further in Section 3.2.1, Xcel Energy has developed a West Route for the proposed West HVTL Project that is located in sections 26, 27, and 35 of Clear Lake Township and Sections 25 and 36 (T34N R29W) and Sections 1 and 2 (T33N 29W), all four of which are within the City of Becker. The West HVTL Project will be built double-circuit-capable, meaning the structure sizes and conductor configuration will be designed to be able to accommodate a double circuit configuration at a later date allowing for potential future generation connection. It is most efficient to develop the double circuit capable structures at the time of construction for the single circuit. Any future double circuit line would be subject to a separate filing with the Commission (See 3.2.5 for details).

The West Route will begin at a new Solar Project collector substation (West Collector Substation) to be constructed on the east side of the West Block of the Solar Project along 115th Avenue SE (County Road 53) and approximately one-quarter mile north of River Road SE (CSAH 8). The West Route will then generally travel south and east for approximately three miles to the existing Sherburne County Substation. Details regarding the West Collector Substation are provided in Section 2.2.1.5. The collector substations will be permitted with the Solar Project because they are essential components of the Solar Project; that is, the Solar Project cannot operate without the

collector substations. There are no substation improvements at the Sherburne County Substation planned outside the existing footprint; this point of interconnection has capacity for the necessary equipment within its existing footprint.

The West Route was developed based on the routing criteria and voluntary landowner participation. Within the Solar Project, Sherco Solar and Xcel Energy have land leased for the transmission line; outside the Solar Project, the West Route is routed on Xcel Energy property (see Figures 1 – Overall Project Location and Figure 7 – West Route Map). The West Route traverses predominately cultivated crop lands utilizing roads and parcel lines and accounting for landowner preferences for the anticipated alignment.

Refer to Section 3.3 for more detailed description of the proposed West Route.

3.2.1 Statement of Ownership

The West HVTL project will be constructed, owned, and operated by Xcel Energy. Appendix D lists the landowners within and adjacent to the West Route.

3.2.2 Route Width

The PPSA, Minn. Stat. § 216E, directs the routing of transmission lines in a way that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion." The PPSA further authorizes the Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. A "route" may have "a variable width of up to 1.25 miles," within which the right-of-way for the transmission facilities can be located.

A route should be wide enough to provide flexibility for the permittee to work with landowners to address concerns and to address engineering issues that may arise after a Route Permit is issued. Once a route is established by the Commission, the permittee then does more detailed engineering and survey work and obtains input from landowners to establish a final alignment and pole placement.

Xcel Energy proposes a route width of approximately 1,200 feet around the West Collector Substation to allow for flexibility in routing around this facility. Xcel Energy proposes a route width of approximately 600 feet between the West Collector Substation and the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52), where the West Route enters the existing fenceline of the Sherco Generating Plant. Inside this fenceline, Xcel Energy proposes a varying route width of approximately 700-1,800 feet to provide flexibility in routing around and near existing transmission lines and the Sherco Generating Plant and associated facilities. The widest route width, approximately 1,800 feet, is proposed around the Sherburne County Substation (see Figure 7 – West Route Map).

Once the permittee establishes a final alignment and structure placement, proposed construction drawings are provided to the Commission in the form of a "Plan and Profile" compliance filing so the Commission can confirm that the permittee's plans are consistent with the Route Permit.

Given the Commission's practice to identify an "anticipated alignment" in its Route Permit decisions, Xcel Energy has developed what it currently believes to be the likely alignment within the West Route that minimize the overall potential impacts based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. Ch. 7850.4100. This alignment is referred to as the "Application Alignment." This Application Alignment may require modifications after a Route Permit is issued due to limitations inherent in identifying an alignment absent detailed survey and engineering work, site review, and design. The Application Alignment that was developed for purposes of evaluating the potential impacts of the West HVTL Project (the West Application Alignment) is shown on the detailed maps in Figure 7 – West Route Map. Xcel Energy completed a preliminary design for the West Application Alignment based on the information known at the time of the filing of this Application.

After the Commission issues a Route Permit decision with an "anticipated alignment," a final alignment will be developed by reviewing that "anticipated alignment" with individual landowners and agencies with permitting responsibilities and performing detailed survey and engineering work, site review, and design. The final alignment will be provided to the Commission through the Plan and Profile submission and review process discussed above. As part of that submission, Xcel Energy will inform the Commission as to where deviations in the final alignment from the "anticipated alignment" occur. Any right-of-way modifications within the Route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100.

3.2.3 Transmission Structure and Conductor Design

The new 345 kV transmission line would be constructed of custom steel single-pole (monopole) structures. Xcel Energy will implement three types of monopole structures: tangent, angle, and dead end. These structures are typically used in the following situations:

- Tangent – structures that support straight or nearly straight runs of conductor
- Angle – structures that turn the conductor approximately 2 to 60 degrees
- Dead End – structures that turn the conductor approximately 60 to 90 degrees or take the full tension of the line in one direction

The proposed structures will range in height from approximately 135 feet to 165 feet tall. The typical spans between structures will be between 900 and 1,100 feet. Because the structures will be built to support an additional circuit in the future, all three structure types will have concrete foundations between 12 and 58 feet deep, depending on soil conditions, geotechnical analysis, and the structures' function (i.e., angle and dead-end structures typically require deeper foundations). Table 3.2-1 summarizes the three typical monopole structure designs for the line.

Table 3.2-1: West HVTL Project Typical Structure Design Summary						
Structure Type	**Structure Material**	**Typical Right-of-way Width (feet)**	**Structure Height (feet)**	**Structure Base Diameter (inches)**	**Foundation Diameter (feet)**	**Average Span Between Structures (feet)**
Tangent	Steel	150	135 to 145	66 to 78	7.5 to 8.5	900 to 1,100
Angle	Steel	150	135 to 145	72 to 84	8 to 9	900 to 1,100
Dead End	Steel	150	150 to 165	102 to 120	10.5 to 12	900 to 1,100

Image 3.2-1 provides a photo of typical single-circuit monopole structures that Xcel Energy proposes to use for this West HVTL Project. All three proposed structure types are monopole structures that differ in the conductor angles. Technical diagrams of these three proposed structure types are included in Appendix I – Typical Transmission Structures.

Image 3.2-1 Photo of Typical Single-Circuit Monopole 345 kV Structure

The conductors for the 345-kV transmission line will consist of 2-bundle Dover T-2 aluminum conductor steel-reinforced (ACSR) conductor in a vertical configuration with 18” spacing. The conductors will have a capacity of 370 megavolt amperes (MVA) loading.

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the NESC standards. Applicable standards will be met for construction and installation,

and applicable safety procedures will be followed during design, construction, and after installation.

3.2.4 Transmission Line Right-of-Way

Xcel Energy anticipates constructing the new single-circuit 345-kV transmission line and structures using a design and span lengths that require a 150-foot-wide right-of-way. When paralleling existing road rights-of-way, Xcel Energy proposes to place poles on adjacent private property, within approximately 10 feet of the existing road right-of-way. These pole placements allow the transmission line right-of-way to share existing road rights-of-way to the greatest extent feasible and will reduce the overall size of the easement required from the private landowner along roads.

3.2.5 Project Costs

The total estimated cost of the West HVTL Project along the proposed West Route is approximately $6.9 million. This estimate is an engineering estimate and expected to reflect actual Project costs within 20 percent. Final Project costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor.

As stated above, if the MPUC grants the necessary approvals, Xcel Energy will construct, operate, and maintain the proposed 345 kV West HVTL Project, as well as the Solar Project. Operating and maintenance costs after construction of the transmission line will be nominal for several years because the line will be new and minimal initial vegetation management is required. The anticipated annual operating and maintenance costs for the 345 kV West HVTL Project is approximately $500 per mile. The principal operating and maintenance costs include inspections, which are typically ground-based but occasionally are done aerially. Inspections are generally performed on a yearly basis.

3.2.6 Design Options to Accommodate Future Expansion

The Solar Project is proposed to be up to 460 MW, half of which will be generated in the West Block and carried by the West HVTL Project. The West HVTL structures will be designed to be double circuit capable, and the transmission outlet provided by the West HVTL Project allows for potential future expansion of generation in the area without requiring additional new transmission lines across the Sherco Generating Plant. This allowance appropriately capitalizes on the construction of the West HVTL Project and minimizes environmental impacts both now and in the future. The future addition of the second circuit to the route, or other transmission upgrades would be subject to future filings with the Commission.

3.3 West HVTL Project – Facility Design and Route Selection Process

In this Application, Xcel Energy includes the proposed West Route, which has been sited to minimize adverse human and environmental impacts and utilizes signed voluntary easements within the Solar Project and is located on Xcel Energy owned land where located outside the Solar Project. The route selection process is described in detail below.

3.3.1 Route Selection Process

When submitting an application under the Alternative Permitting Process, the applicant must submit one proposed route. Minn. Stat. § 216E.04, subd. 3. The Applicant must also "identify in the application any other sites or routes that were rejected by the applicant." Id. This section describes Xcel Energy's development of the proposed West Route; alternate route segments that were considered and rejected are described in Section 3.3.3.

In developing the proposed West Route, Xcel Energy first reviewed the statutory and rule criteria set forth in the PPSA, Minn. Stat. Ch. 216E, and Minn. R. 7850.4100. Xcel Energy also considered the State's policy of non-proliferation of new infrastructure routes.

The proposed West Route was developed with the following primary objectives:

- Satisfy Minnesota routing requirements;
- Parallel existing roads, survey boundaries, field lines, natural division lines, and transmission lines on land leased by Sherco Solar;
- Minimize impacts to residences and farmsteads;
- Minimize creation of new infrastructure corridors by locating proposed transmission facilities near existing transmission and transportation alignments; and
- Minimize impacts to environmental and other sensitive resources.

Xcel Energy performed analysis of environmental resources in the Solar Project Area using regulatory and other natural resource information, GIS data, computer mapping, aerial photographs, and topographic maps. Environmental resources, human settlement, economic, cultural resources, natural environment, and rare and unique natural resources identified along the proposed West Route are discussed in Sections 5.1 to 5.6 of this Application. The proposed West Route is designed to avoid or minimize Project impacts.

To evaluate the route options, Xcel Energy considered the following land use/right-of-way, residential, and environmental criteria:

- **Existing Land Use and Transmission Line, Roads, Survey Lines, Natural Division Lines, and Agricultural Field Boundaries and Other Rights-of-way**: Xcel Energy identified and mapped the locations of existing electric transmission lines, roadways, survey lines, natural division lines, and agricultural field boundaries. Xcel Energy then assessed whether the proposed West Route could be co-located with or parallel to these features. Land use and infrastructure is discussed in Sections 5.1, 5.2.9, and 5.3.1.
- **Residences and Farmsteads**: Xcel Energy designed the West Route to avoid farmsteads and residences, which are limited to first quarter mile of the proposed route along 115th Avenue SE (County Road 53). The West Route is sited on the opposite side of the road from two residences along this road.
- **Wetlands**: Wetlands along the proposed West Route were identified and mapped using existing desktop data followed by a field survey. Wetlands are discussed in Section 5.5.5.

- **Streams and Drainages**: Streams and drainages along the proposed West Route were identified using desktop resources and mapped followed by a field survey. Water resources are discussed in Section 5.5.4.
- **Flora, Fauna, and Rare & Unique Natural Resources**: Xcel Energy reviewed publicly available rare and natural resource data and information, and consulted with applicable resource agencies, to identify and map the locations of such features near the proposed West Route. This information is being used to avoid and minimize potential Project impacts and is further discussed in Sections 5.5.6, 5.5.7, and 5.6.
- **Cultural Resources**: A Phase Ia literature review was conducted on a one-mile buffer of the proposed West Route and a Phase 1 survey was completed within the proposed West Route to identify previously unrecorded cultural resources. Cultural resources are discussed in Section 5.4.

The analyses of this data are presented in Section 5.0 for the proposed West Route.

3.3.2 Proposed Route Description

Xcel Energy routed the West HVTL Project to provide a direct and efficient route between the proposed West Collector Substation and the Sherburne County Substation that maximizes corridor sharing with roads and minimizes impacts to residences, landowners, and land uses while considering potential future commercial and industrial development and transmission planning around the Sherco Generating Plant. From the West Collector Substation, the West Route runs south on the west side of 115th Avenue SE (County Road 53) within the Solar Project for three-quarters of a mile before crossing to the east side of 115th Avenue SE (County Road 53) to avoid a residence, continuing south to the intersection of 115th Avenue SE (County Road 53) and River Road SE (CSAH 8). The West Route then turns east on the north side of River Road SE (CSAH 8) for one mile before turning south on the west side of 125th Avenue SE (County Road 52). At the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52), the West Route enters the fenced area of the Sherco Generating Plant. The West Route follows the east side of 125th Avenue SE (County Road 52) for one mile to avoid the existing ash storage associated with the coal plant on the west side of 125th Avenue SE (County Road 52). The West Route then routes around the west side of the Sherco Generating Plant by turning west for 0.2 mile then south for 0.5 mile and then east for 0.3 mile into the Sherburne County Substation (see Figure 7 - West Route Map). Existing road corridors were paralleled as closely as practicable to limit impacts to agricultural operations and to minimize potential impacts to future economic development initiatives being considered in the area.

3.3.3 Alternative Route Segments Considered but Rejected

Xcel Energy evaluated siting the West Collector Substation approximately 0.6-mile north along 115th Avenue SE (County Road 53) within the Solar Project Area. This substation was shifted south to the location proposed in this Application to potentially allow a future road to be constructed through the northeastern most part of the West Block of the Solar Project and allow commercial and industrial development on land that is north of the West Block and not part of the Solar Project. Shifting the West Collector Substation also minimizes transmission line length and allowed for Xcel Energy to route nearly the entire length of the West HVTL Project on Xcel

Owned Property, thereby reducing the overall impacts from the West HVTL Project. Xcel Energy also evaluated a route segment from the former West Collector Substation location east to U.S. Highway 10 and paralleling the south side U.S. Highway 10 southeast to 125th Avenue SE (County Road 52) before turning south. However, the City of Becker and Sherburne County have informed Xcel Energy of potential future road improvements to this segment of the highway between 115th and 125th Avenues SE (County Roads 53 and 52, respectively). Priority was also given to willing landowner participants for the route selected, and one landowner necessary to complete the segment indicated that a greenfield route for the line could impact their center pivot irrigation infrastructure and agricultural operations. Therefore, to avoid potential relocation later, and to avoid a greenfield crossing of an agricultural field that would disrupt center-pivot irrigation, Xcel Energy rejected this segment from consideration. Instead, the West Route follows 115th Avenue SE (County Road 53) south out of the West Collector Substation before turning east on River Road SE (CSAH 8) to 125th Avenue SE (County Road 52).

3.4 West HVTL Project - Right-of-Way Acquisition, Construction, Restoration, and Maintenance

3.4.1 Right-of-Way Acquisition

All necessary easements for the West HVTL Project have been secured from willing landowners. Xcel Energy prioritized siting of the Solar Project to be as close to the Sherco Generating Plant as practicable to minimize the length of the transmission line and affected landowners. The West Route initiates at the West Collector Substation within the Solar Project Area, the leases for which allow for transmission lines associated with the Project. The remaining 3.2 miles of the West Route are on Xcel Energy-owned land and/or within the Sherco Generating Plant. As such, there are no landowners along the West Route that required standalone transmission easement agreements. This is a unique circumstance for a transmission line project but one that was intentional by Xcel Energy to minimize impacts to landowners to the maximum degree practicable.

After the Route Permit is issued, the next step is a physical evaluation of each parcel included in the West Route. For this work, Xcel Energy will schedule survey crews to conduct preliminary survey work. A geotechnical company will take soil borings to assess the soil characteristics and determine appropriate foundation design specifications. The soil analysis will be performed by an experienced geotechnical testing laboratory. Xcel Energy may schedule and perform other surveys that will help to minimize potential impacts of the West HVTL Project. The surveys identify right-of-way corridors, natural features, man-made features, and associated ground elevations that will be considered and included for the detailed engineering of the West Route.

3.4.2 Construction Process

Construction will begin after applicable federal, state, and local approvals have been obtained, property and rights-of-way are acquired, soil conditions are established, and final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, weather, and available workforce and materials.

Xcel Energy will work with an experienced contractor to construct and maintain the transmission line in conjunction with the construction and operation of the Solar Project. Construction will follow industry best practices. These best practices address transmission specifics such as right-of-way clearing, staging, and erecting transmission line structures and stringing transmission lines. They also address general construction best practices, including but not limited to safety and stormwater pollution prevention planning. Xcel Energy will consider the proposed schedule for activities, permit requirements, safety measures, prohibitions, maintenance guidelines, inspection procedures, and terrain characteristics throughout the West Route's development, construction, and operations. In some cases, these activities, such as schedules, are modified to minimize impacts to sensitive animals or environments or to enhance safety.

Surveyors will stake the construction corridor within the approved right-of-way and the pole locations of the approved alignment in preparation for the construction crew arriving on site. Once the construction crew arrives, they will begin by clearing and grubbing out the right-of-way to ensure that vegetation meets the NESC standards and that the construction crew will have easy access to the construction site. The crew will use chain saws, lifts, tractors, and bulldozers only where needed to clear vegetation. The crew will install temporary culverts and field approaches where needed to access the Route and to maintain adequate access and drainage throughout construction.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. Sites with more than 10 percent slope will have working areas graded level or fill brought in for working pads. Xcel Energy anticipates that only minimal grading will be needed because the proposed West Route has minimal elevation change.

Typical construction equipment used on a project consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers.

Staging areas are generally established while constructing a transmission project. Staging involves delivering the equipment and materials to construct the new transmission line facilities. Structures are delivered to staging areas, sorted, and loaded onto structure trailers for delivery to the staked location. The materials are stored until they are needed for construction of the West Route. In some cases, additional space (temporary laydown areas) may be required. These areas will be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. Insulators and other hardware are attached to the structure while it is on the ground adjacent to the location where the structure is to be placed.

When it is time to install the poles, structures are moved from the staging areas, delivered to the staked location, and placed within the right-of-way until the structure is set. Typically, access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Permission from the property owner is obtained prior to accessing the transmission line corridor outside of public rights-of-way. Where necessary to accommodate the

heavy equipment used in construction (including cranes, concrete cement trucks, and hole-drilling equipment), existing access roads may be upgraded or new roads may be constructed. Once construction is complete, the temporary field approaches and access roads installed for construction will be removed and revegetated. Previously removed woody vegetation will be allowed to regrow so long as it does not encroach on NESC-prescribed clearances.

At this time, Xcel Energy anticipates the predominant foundation type for the West Route to be concrete drilled pier foundations for all three structure types. For concrete foundations, the excavation process will utilize temporary steel casing and rebar, concrete and anchor bolts will be placed in the hole. The standard projection of a concrete foundation is one foot above grade.

3.4.3 Restoration and Clean-up

The ground will be disturbed during the normal course of work (as is typical of most construction projects), which can take several weeks in any one location. Xcel Energy will take the steps necessary to lessen the impact of construction on the surrounding environment by restoring areas disturbed by construction in accordance with best management practices (BMPs). This will begin with a pre-construction survey that will identify areas requiring special restoration procedures. During construction, crews will also attempt to limit ground disturbance wherever possible. As construction on each parcel of land is completed, disturbed areas will be restored to their original condition to the maximum extent practicable.

In some cases, Xcel Energy may engage an outside contractor to restore the disturbed areas to their original condition to the extent practicable. Portions of permanent vegetation that are disturbed or removed during construction of transmission line will be reestablished to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish naturally with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the approved route will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences
- Hay bales
- Hydro seeding
- Planting individual seeds or seedlings of non-invasive native species

3.4.4 Maintenance Practices

Transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed West HVTL Project is approximately 35 years. However, high voltage transmission lines are seldom completely retired.

Transmission infrastructure is reliable because it includes very few mechanical elements. It is built to withstand weather extremes, with the exception of severe weather such as tornadoes and heavy ice storms. Transmission lines are automatically taken out of service by the operation of protective

relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly either by truck or by air. Inspections will be conducted to ensure that the transmission line is fully functional and that no vegetation has encroached so as to violate NESC-prescribed clearances. Annual operating and maintenance costs for 345 kV transmission lines in Minnesota and the surrounding states are expected to be approximately $500 per mile per year. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

4.0 EAST HVTL PROJECT INFORMATION

4.1 Alternative Permitting Process for Route Permit

The Minnesota PPSA provides that no person may construct an HVTL without a Route Permit from the Commission. Minn. Stat. § 216E.03, subd. 2. Under the PPSA, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length. Minn. Stat. § 216E.01, subd. 4. The proposed 345 kV transmission line is an HVTL greater than 1,500 feet in length and, therefore, a Route Permit is required from the Commission prior to construction.

The East HVTL Project qualifies for review under the Alternative Permitting Process authorized by Minn. Stat. § 216E.04, subd. 2(3) and Minn. R. 7850.2800, subp. 1(C), because the length of the 345 kV line is less than five miles. Accordingly, Xcel Energy is following the provisions of the Alternative Permitting Process outlined in Minn. R. 7850.2800 to 7850.3900 for this East HVTL Project.

4.1.1 Notice to the Commission

Xcel Energy notified the Commission on March 22, 2021 by letter that it plans to file a Route Permit application for the East HVTL Project and that it intends to use the Alternative Permitting Process of Minn. R. 7850.2800 - .3900. This letter complies with the requirement of Minn. R. 7850.2800, subp. 2, to notify the Commission of this election at least 10 days prior to submitting an application for a Route Permit.

4.2 East HVTL Project Proposal

Xcel Energy is currently developing an up-to-460-MW Solar Project adjacent to the Sherco Generating Plant in Becker, Minnesota. Xcel Energy is proposing to build a new 1.7-mile single circuit 345 kV transmission line to connect the Solar Project to the existing Sherburne County Substation on the south side of the Sherco Generating Plant. For the Application, and as described further in Section 4.2.1, Xcel Energy has developed an East Route for the proposed East HVTL Project that is located in sections 1, 6, and 7 of the City of Becker and Becker Township. The East HVTL Project will be built double circuit-capable, meaning the structure sizes and conductor configuration will be designed to be able to accommodate a double circuit configuration at a later date allowing for potential future generation connection. It is most efficient to develop the double circuit capable structures at the time of construction for the single circuit. Any future double circuit line would be subject to a separate filing with the Commission (See 4.2.5 for details).

The East Route will begin at a new Solar Project collector substation (East Collector Substation) to be constructed in the northwest corner of the East Block of the Solar Project just southeast of the intersection of 140th Avenue SE (Sherburne Avenue) and 137th Street and approximately 0.8 mile southwest of U.S. Highway 10. The East Route will then generally travel west and north for approximately 1.5 miles to the existing Sherburne County Substation. Details regarding the East Collector Substation are provided in Section 2.2.1.5. The collector substations will be permitted with the Solar Project because they are essential components to the solar facility; that is, the solar facility cannot operate without the collector substations. There are no substation improvements at

the Sherburne County Substation planned outside the existing footprint; this point of interconnection has capacity for the necessary equipment within its existing footprint.

The East Route was developed based on the routing criteria and prioritized a direct route that utilized land within the Sherco Generating Plant. The East Route exits the west side of the East Collector Substation and immediately crosses Sherburne Avenue before entering the Sherco Generating Plant (Figure 1 – Overall Project Location Map and Figure 8 – East Route Map). As such there are no private landowners along the East Route.

Refer to Section 4.3 for more detailed description of the proposed East Route.

4.2.1 Statement of Ownership

The East HVTL project will be constructed, owned, and operated by Xcel Energy. Appendix D lists the landowners within and adjacent to the East Route.

4.2.2 Route Width

The PPSA, Minn. Stat. § 216E, directs the routing of transmission lines in a way that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion." The PPSA further authorizes the Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. A "route" may have "a variable width of up to 1.25 miles," within which the right-of-way for the transmission facilities can be located.

A route should be wide enough to provide flexibility for the permittee to work with landowners to address concerns and to address engineering issues that may arise after a Route Permit is issued. Once a route is established by the Commission, the permittee then does more detailed engineering and survey work and obtains input from landowners to establish a final alignment and pole placement.

Xcel Energy proposes a route width of approximately 860 feet between the East Collector Substation and the intersection of 140th Avenue SE (Sherburne Avenue) and 137th Street, where the East Route enters the existing fenceline of the Sherco Generating Plant. Inside this fenceline, Xcel Energy proposes a varying route width of approximately 950 - 1,800 feet to provide flexibility in routing around and near existing transmission lines and the Sherco Generating Plant and associated facilities. The widest route width, approximately 1,800 feet, is proposed around the Sherburne County Substation

Once the permittee establishes a final alignment and structure placement, proposed construction drawings are provided to the Commission in the form of a "Plan and Profile" compliance filing so the Commission can confirm that the permittee's plans are consistent with the Route Permit.

Given the Commission's practice to identify an "anticipated alignment" in its Route Permit decisions, Xcel Energy has developed what it currently believes to be the likely alignment within the route that minimize the overall potential impacts based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. Ch. 7850.4100. This alignment is referred to as

the "Application Alignment." This Application Alignment may require modifications after a Route Permit is issued due to limitations inherent in identifying an alignment absent detailed survey and engineering work, site review, and design. The Application Alignment that was developed for purposes of evaluating the potential impacts of the East HVTL Project (the East Application Alignment) is shown on the detailed maps in Figure 8 – East Route Map. Xcel Energy completed a preliminary design for the East Application Alignment based on the information known at the time of the filing of this Application.

After the Commission issues a Route Permit decision with an "anticipated alignment," a final alignment will be developed by reviewing that "anticipated alignment" with individual landowners and agencies with permitting responsibilities and performing detailed survey and engineering work, site review, and design. The final alignment will be provided to the Commission through the Plan and Profile submission and review process discussed above. As part of that submission, Xcel Energy will inform the Commission as to where deviations in the final alignment from the "anticipated alignment" occur. Any right-of-way modifications within the Route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100. (see Figure 8 – East Route Map).

4.2.3 Transmission Structure and Conductor Design

The new 345 kV transmission line would be constructed of custom steel single-pole (monopole) structures. Xcel Energy will implement three types of monopole structures: tangent, angle, and dead end. These structures are typically used in the following situations:

- Tangent – structures that support straight or nearly straight runs of conductor
- Angle – structures that turn the conductor approximately 2 to 60 degrees
- Dead End – structures that turn the conductor approximately 60 to 90 degrees or take the full tension of the line in one direction

The proposed structures will range in height from approximately 135 feet to 165 feet tall. The typical spans between structures will be between 900 and 1,100 feet. Because the structures will be built to support an additional circuit in the future, all three structure types will have concrete foundations between 12 and 58 feet deep, depending on soil conditions, geotechnical analysis, and the structures' function (i.e., angle and dead-end structures typically require deeper foundations). Table 4.2-1 summarizes the three typical monopole structure designs for the line. These are the same structures proposed for the West HVTL Project.

Table 4.2-1: East HVTL Project Typical Structure Design Summary

Structure Type	Structure Material	Typical Right-of-way Width (feet)	Structure Height (feet)	Structure Base Diameter (inches)	Foundation Diameter (feet)	Average Span Between Structures (feet)
Tangent	Steel	150	135 to 145	66 to 78	7.5 to 8.5	900 to 1,100
Angle	Steel	150	135 to 145	72 to 84	8 to 9	900 to 1,100
Dead End	Steel	150	150 to 165	102 to 120	10.5 to 12	900 to 1,100

Image 4.2-1 provides a photo of typical single-circuit monopole structures that Xcel Energy proposes to use for this East HVTL Project. All three proposed structure types are monopole structures that differ in the conductor angles. Technical diagrams of these three proposed structure types are included in Appendix I – Typical Transmission Structures.

Image 4.2-1 Photo of Typical Single-Circuit Monopole 345 kV Structure

The conductors for the 345-kV transmission line will consist of 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18” spacing. The conductors will have a capacity of 370 MVA loading.

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the NESC standards. Applicable standards will be met for construction and installation, and applicable safety procedures will be followed during design, construction, and after installation.

4.2.4 Transmission Line Right-of-Way

Xcel Energy anticipates constructing the new single-circuit 345-kV transmission line and structures using a design and span lengths that require a 150-foot-wide right-of-way. The East Route does not parallel any existing public roads.

4.2.5 Project Costs

The total estimated cost of the East HVTL Project along the proposed East Route is approximately $3.7 million. This estimate is an engineering estimate and expected to reflect actual Project costs within 20 percent. Final Project costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor.

As stated above, if the MPUC grants the necessary approvals, Xcel Energy will construct, operate, and maintain the proposed 345 kV East HVTL Project, as well as the Solar Project. Operating and maintenance costs after construction of the transmission line will be nominal for several years because the line will be new and minimal initial vegetation management is required. The anticipated annual operating and maintenance costs for the 345 kV East HVTL Project is approximately $500 per mile. The principal operating and maintenance costs include inspections, which are typically ground-based but occasionally are done aerially. Inspections are generally performed on a yearly basis.

4.2.6 Design Options to Accommodate Future Expansion

The Solar Project is proposed to be up to 460 MW, approximately 230 MW of which will be generated in the East Block and carried by the East HVTL Project. The East HVTL structures will be designed to be double-circuit-capable, and the transmission outlet provided by the East HVTL Project allows for potential future expansion of generation in the area without requiring additional new transmission lines across the Sherco Generating Plant. This allowance appropriately capitalizes on the construction of the East HVTL Project and minimizes environmental impacts both now and in the future. The future addition of the second circuit to the route, or other transmission upgrades would be subject to future filings with the Commission.

4.3 East HVTL Project – Facility Design and Route Selection Process

The East Route has been sited to minimize adverse human and environmental impacts. The East Route utilizes signed voluntary easements within the Solar Project and is located on Xcel Energy-owned land where located outside the Solar Project. The route selection process is described in detail below.

4.3.1 Route Selection Process

When submitting an application under the Alternative Permitting Process, the applicant must submit one proposed route. Minn. Stat. § 216E.01, subd. 4(3). The Applicant must also "identify in the application any other sites or routes that were rejected by the applicant." Id. This section describes Xcel Energy's development of the proposed East Route; alternate route segments that were considered and rejected are described in Section 4.3.3.

In developing the proposed East Route, Xcel Energy first reviewed the statutory and rule criteria set forth in the PPSA, Minn. Stat. Ch. 216E, and Minn. R. 7850.4100. Xcel Energy also considered the State's policy of non-proliferation of new infrastructure routes.

The proposed East Route was developed with the following primary objectives:

- Satisfy Minnesota routing requirements;
- Parallel existing roads, survey boundaries, field lines, natural division lines, and transmission lines on land leased by Xcel Energy;
- Minimize impacts to residences and farmsteads;
- Minimize creation of new infrastructure corridors by locating proposed transmission facilities near existing transmission and transportation alignments; and
- Minimize impacts to environmental and other sensitive resources.

Xcel Energy performed analysis of environmental resources in the Solar Project Area using regulatory and other natural resource information, GIS data, computer mapping, aerial photographs, and topographic maps. Environmental resources, human settlement, economic, cultural resources, natural environment, and rare and unique natural resources identified along the proposed East Route are discussed in Sections 5.1 to 5.6 of this Application. The proposed East Route is designed to avoid or minimize Project impacts.

To evaluate the route options, Xcel Energy considered the following land use/right-of-way, residential, and environmental criteria:

- **Existing Land Use and Transmission Line, Roads, Survey Lines, Natural Division Lines, and Agricultural Field Boundaries and Other Rights-of-way**: Xcel Energy identified and mapped the locations of existing electric transmission lines, roadways, survey lines, natural division lines, and agricultural field boundaries. Xcel Energy then assessed whether the proposed East Route could be co-located with or parallel to these features. Land use and infrastructure is discussed in Sections 5.1, 5.2.9, and 5.3.1.
- **Residences and Farmsteads**: Xcel Energy designed the East Route to avoid farmsteads and residences, none of which are present within the proposed East Route.
- **Wetlands**: Xcel Energy used existing desktop data and a field survey to identify wetlands along the proposed East Route; no wetlands were identified as a result of this review. Wetlands are discussed further in Section 5.5.5.
- **Streams and Drainages**: Streams and drainages along the proposed East Route were identified using desktop resources and mapped followed by a field survey. Water resources are discussed in Section 5.5.4.
- **Flora, Fauna, and Rare & Unique Natural Resources**: Xcel Energy reviewed publicly available rare and natural resource data and information, and consulted with applicable resource agencies, to identify and map the locations of such features near the proposed East Route. This information is being used to avoid and minimize potential project impacts and is further discussed in Sections 5.5.6, 5.5.7, and 5.6.
- **Cultural Resources**: A Phase Ia literature review was conducted on a one-mile buffer of the proposed East Route and a Phase 1 survey was completed within the proposed East Route to identify previously unrecorded cultural resources. Cultural resources are discussed in Section 5.4.

The analyses of this data are presented in Section 5.0 for the proposed East Route.

4.3.2 Proposed Route Description

The East Route was sited to provide a direct and efficient route between the proposed East Collector Substation and the existing Sherburne County Substation that maximizes corridor sharing with roads and avoids impacts to residences and private landowners while considering potential future commercial and industrial development and transmission planning around the Sherco Generating Plant. From the East Collector Substation, the East Route crosses 140th Avenue SE (Sherburne Avenue), and the fenceline of the existing Sherco Generating Plant, then turns north and travels along the west side of 140th Avenue SE for about one-quarter mile before turning west for a little more than one mile and eventually connecting into the Sherburne County Substation (see Figure 8 - East Route Map).

4.3.3 Alternative Route Segments Considered but Rejected

Because the East Route was intentionally designed to be the most direct route, avoid private landowners, avoid the existing 345 kV transmission lines, and is less than two miles, no alternative route segments were evaluated. Xcel Energy designed the East Route with potential future commercial and industrial development within the Sherco Generating Plant in mind.

4.4 East HVTL Project - Right-of-Way Acquisition, Construction, Restoration, and Maintenance

4.4.1 Right-of-Way Acquisition

As discussed above in Section 4.2, Xcel Energy intentionally sited the East Collector Substation on the west side of the East Block to facilitate a direct transmission route to the Sherburne County Substation. The East Route exits the west side of the East Collector Substation within the Solar Project Area, crosses Sherburne Avenue, and then into the Sherco Generating Plant. As such, there are no private landowners along the East HVTL Project, and therefore, no standalone transmission easement agreements. Similar to the West Route, this is a unique circumstance for a transmission line project, but one that was intentional by Xcel Energy to minimize impacts to landowners.

After the Route Permit is issued, the next step is a physical evaluation of each parcel included in the East Route. For this work, Xcel Energy will schedule survey crews to conduct preliminary survey work. A geotechnical company will take soil borings to assess the soil characteristics and determine appropriate foundation design specifications. The soil analysis will be performed by an experienced geotechnical testing laboratory. Xcel Energy may schedule and perform other surveys that will help to minimize potential impacts of the East HVTL Project. The surveys identify right-of-way corridors, natural features, man-made features, and associated ground elevations that will be considered and included for the detailed engineering of the East Route.

4.4.2 Construction Process

Construction will begin after applicable federal, state, and local approvals have been obtained, property and rights-of-way are acquired, soil conditions are established, and final design is

completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, weather, and available workforce and materials.

Xcel Energy will work with an experienced contractor to construct and maintain the transmission line in conjunction with the construction and operation of the Solar Project. Construction will follow industry best practices. These best practices address transmission specifics such as right-of-way clearing, staging, and erecting transmission line structures and stringing transmission lines. They also address general construction best practices, including but not limited to safety and stormwater pollution prevention planning. Xcel Energy will consider the proposed schedule for activities, permit requirements, safety measures, prohibitions, maintenance guidelines, inspection procedures, and terrain characteristics throughout the East Route's development, construction, and operations. In some cases, these activities, such as schedules, are modified to minimize impacts to sensitive animals or environments or to enhance safety.

Surveyors will stake the construction corridor within the approved right-of-way and the pole locations of the approved alignment in preparation for the construction crew arriving on site. Once the construction crew arrives, they will begin by clearing and grubbing out the right-of-way to ensure that vegetation meets the NESC standards and that the construction crew will have easy access to the construction site. Because a majority of the East Route is in developed land, this clearing will be minimal. The crew will use chain saws, lifts, tractors, and bulldozers only where needed to clear vegetation. The crew will install temporary culverts and field approaches where needed to access the East Route and to maintain adequate access and drainage throughout construction.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. Sites with more than 10 percent slope will have working areas graded level or fill brought in for working pads. Xcel Energy anticipates that only minimal grading will be needed because the East Route has very little elevation change.

Typical construction equipment used on a transmission line project consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers.

Staging areas are generally established while constructing a transmission project. Staging involves delivering the equipment and materials to construct the new transmission line facilities. Structures are delivered to staging areas, sorted, and loaded onto structure trailers for delivery to the staked location. The materials are stored until they are needed for the East HVTL Project. In some cases, additional space (temporary laydown areas) may be required. These areas will be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. Insulators and other hardware are attached to the structure while it is on the ground adjacent to the location where the structure is to be placed.

When it is time to install the poles, structures are moved from the staging areas, delivered to the staked location, and placed within the right-of-way until the structure is set. Typically, access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Permission from the property owner is obtained prior to accessing the transmission line corridor outside of public rights-of-way. Where necessary to accommodate the heavy equipment used in construction (including cranes, concrete cement trucks, and hole-drilling equipment), existing access roads may be upgraded or new roads may be constructed. Once construction is complete, the temporary field approaches and access roads installed for the East HVTL Project will be removed and revegetated. Previously removed woody vegetation will be allowed to regrow so long as it does not encroach on NESC-prescribed clearances.

At this time, Xcel Energy anticipates the predominant foundation type for all three structure types on the East Route to be concrete drilled pier foundations. For concrete foundations, the excavation process will utilize temporary steel casing and rebar, concrete and anchor bolts will be placed in the hole. The standard projection of a concrete foundation is one foot above grade.

4.4.3 Restoration and Clean-up

The ground will be disturbed during the normal course of work (as is typical of most construction projects), which can take several weeks in any one location. Xcel Energy will take the steps necessary to lessen the impact of construction on the surrounding environment by restoring areas disturbed in accordance with BMPs and permit conditions. This will begin with a pre-construction survey that will identify areas requiring special restoration procedures. During construction, crews will also attempt to limit ground disturbance wherever possible. As construction on each parcel of land is completed, disturbed areas will be restored to their original condition to the maximum extent practicable.

In some cases, Xcel Energy may engage an outside contractor to restore the disturbed areas to their original condition to the extent practicable. Portions of permanent vegetation that are disturbed or removed during construction of transmission line will be reestablished to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish naturally with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the approved route will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences
- Hay bales
- Hydro seeding
- Planting individual seeds or seedlings of non-invasive native species

4.4.4 Maintenance Practices

Transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed East HVTL Project is approximately 35 years. However, high voltage transmission lines are seldom completely retired.

Transmission infrastructure is reliable because it includes very few mechanical elements. It is built to withstand weather extremes, with the exception of severe weather such as tornadoes and heavy ice storms. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly either by truck or by air. Inspections will be conducted to ensure that the transmission line is fully functional and that no vegetation has encroached so as to violate NESC-prescribed clearances. Annual operating and maintenance costs for 345 kV transmission lines in Minnesota and the surrounding states are expected to be approximately $500 per mile per year. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

5.0 ENVIRONMENTAL INFORMATION

This section provides a general description of the environmental and human setting of the Solar Project, West Route, and East Route. Topics discussed in the following subsections include environmental setting, human settlement, land-based economies, archaeological and historic resources, hydrologic features, vegetation and wildlife, and rare and unique natural resources that are known to occur or may potentially occur within the Solar Project Area and/or West and East Routes. Xcel Energy has defined impacts by their duration, size, intensity, and location. This context is used to determine an overall resource-level impact. Impact levels are described using qualitative descriptors that are not intended as value judgement, but rather as a measure to ensure a common understanding among readers for each of the three facilities.

- **Minimal** – Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts may, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short term.

- **Moderate** – Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area, making them difficult to observe, but they can be estimated by modeling or other means. Moderate impacts may be long term or permanent to common resources, but are generally short to long term for rare and unique resources.

- **Significant** – Significant impacts alter an existing resource or its condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may 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 may affect common or rare and unique resources.

In addition to identifying existing resources and the potential effects on those resources, Xcel Energy identified measures that can be used to avoid, minimize, or mitigate effects. These actions are collectively referred to as mitigation.

- **Avoid** – Avoiding an impact means that the impact is eliminated altogether by moving or not undertaking parts or all of a project.

- **Minimize** – Minimizing an impact means to limit its intensity by reducing the project size or moving a portion of the project from a given location.

- **Mitigate** – Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute somewhere else.

Xcel Energy analyzed potential impacts to human and environmental resources based on specific impact assessment areas (IAAs). The IAA for each resource is the geographic area within which a project may exert some influence. These IAAs vary with the resource being analyzed as well as the potential impact and are summarized in Table 5.0-1.

The following IAAs will be used:

- **Solar Project Footprint (Solar Project).** The Solar Project Footprint encompasses all areas proposed for solar development, as demonstrated in Table 2.2-2. With the exception of two temporary laydown areas on Xcel Energy property totaling 20.1 acres, the rest of the Solar Project Footprint represents the facilities within the perimeter fence line that will be converted to a solar use for the life of the Solar Project.

- **Right-of-Way (West Route and East Route)**. The HVTL projects have a right-of-way of 150 feet (75 feet on either side of the Application Alignments). This distance is used as the IAA for analyzing potential displacement impacts and impacts to land-based economies (agriculture, forestry, and mining) and natural resources.

- **One thousand feet (Solar Project, West Route, and East Route)**. A distance of 1,000 feet from the Solar Project Area and on each side of the Application Alignments is used as the IAA for analyzing aesthetic and electronic interference impacts. Impacts may extend outside of this 1,000-foot distance, but are anticipated to diminish relatively quickly with distance from the line such that potential impacts outside this distance would be minimal.

- **One mile (Solar Project, West Route, and East Route)**. A distance of one mile from the Solar Project Area and proposed West and East Routes is used as the IAA for analyzing potential impacts to archaeological and historic resources, rare and unique species, and airports and airstrips.

- **Project Study Area (Solar Project, West Route, and East Route)**. The Project Study Area, defined generally as the townships and/or county within which the Projects are located (Clear Lake Township, Becker Township, and Sherburne County), is used as the IAA for analyzing potential impacts to cultural values, socioeconomics, public services, zoning and land use, emergency services and public health and safety, transportation, air quality, tourism, and recreation. These are resources for which impacts may extend throughout communities in the Project Study Area.

Where specific, quantified impacts are discussed, Xcel Energy quantified these based on the Solar Project Footprint and the Application Alignments. Both the Solar Project Footprint and the Application Alignments were identified based on the best data available at the time of this Application. Xcel Energy anticipates that the Solar Project Footprint or portions of the Application Alignments may need to be modified either before the Site Permit and Route Permits are issued or before construction begins to address design, engineering, or stakeholder concerns, including those of agencies and landowners.

Table 5.0-1: Impact Assessment Areas

Type of Resource	Specific Resource/Potential Impact to Resource	Impact Assessment Area	
		Solar Project	West and East Routes
Human Settlement	Displacement, Electric and Magnetic Fields, Noise	Residences within and adjacent to the Solar Footprint	Right-of-Way[1]
	Aesthetics and Electronic Interference	1,000 feet	1,000 feet[2]
	Public Health and Safety, Socioeconomics, Cultural Values, Recreation, Public Services, Zoning and Land Use Compatibility, Transportation, Air Quality	Project Study Area	Project Study Area
Land-Based Economies	Agriculture, Forestry, Mining	Solar Project Footprint	Right-of-Way[1]
	Tourism	Project Study Area	Project Study Area
Archaeological and Historic Resources	-	One Mile	One Mile
Natural Environment	Geology and Groundwater Resources, Soils, Water Resources, Flora, Fauna	Solar Project Footprint	Right-of-Way[1]
Rare and Unique Species	-	One Mile	One Mile

[1] The right-of-way is 150 feet wide, centered on the Application Alignments.

[2] On each side of the anticipated alignment, for a total 2,000-foot area of analysis.

Throughout Section 5.0, Environmental Information, Xcel Energy presents the description of resources first for the Solar Project Area, West Route, and last the East Route. A discussion of impacts and mitigation is also broken out by Project to clearly identify environmental resources and impacts specific to each of the three Project facilities.

5.1 Environmental Setting

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, Undated). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Solar Project and associated HVTL Projects are located within the Minnesota and NE Iowa Morainal Section of the Eastern Broadleaf Forest (222M). The Solar Project and associated HVTL Projects are located in the Anoka Sand Plain ecological subsection.

The Anoka Sand Plain subsection a flat, sandy lake plain with terraces along the Mississippi River. Topography is level to gently rolling with small dunes and kettle lakes. The depth to bedrock in this subsection is typically less than 200 feet. Soils are derived primarily from the fine sands of the sandy plain. Annual precipitation in the Anoka Sand Plain subsection ranges from 27 inches in the west to 29 inches in the east and the average growing season lasts approximately 136 to 156 days in length. Prior to Euro-American settlement, vegetation in this subsection was predominantly oak barrens and openings with brushland in large areas and upland prairie along a narrow band along the Mississippi River. Currently, land used in this subsection is for sod and vegetable crops on drained peat and muck areas with urban expansion rapidly expanding in this subsection. (MNDNR, 2021a).

The Solar Project, West Route and East Route are located immediately adjacent to the Sherco Generating Plant, southwest of U.S. Highway 10, northeast of the Mississippi River near the City of Becker. Residences are scattered throughout the rural area and increase in density around the cities of Clear Lake and Becker. The predominant land use of the Solar Project is center-pivot irrigation agriculture. The West Route is characterized by agriculture for the first 1.25 miles of the route followed by industrial/developed land within the existing footprint of the Sherco Generating Plant. Similarly, the East Route is characterized by industrial/developed land within the Sherco Generating Plant. The Solar Project is bordered by 95th Avenue on the west, U.S. Highway 10 to the northeast, with several county and township roads within and adjacent to the Solar Project Area. The West Route follows county and township roads; the East Route crosses one township road before entering the Sherco Generating Plant footprint. There are numerous transmission lines south of the East Block of the Solar Project and the East Route that connect to the Sherburne County Substation. There are additional transmission lines that connect to the Sherburne County Substation from the north and along the West Route. The Solar Project is located on relatively flat fields conducive to solar development; the West and East Routes follow existing roads and parcel lines.

5.2 Human Settlement

Solar facilities and transmission lines have the potential to impact human settlements during construction and operation of a project, which can be avoided, minimized, or mitigated with proper planning and siting practices. Potential public and health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Potential health concerns related to operation of a solar facility including health impacts from electric and magnetic fields (EMF), stray voltage, induced voltage, impaired air quality, and electrocution. Solar facilities, transmission lines, and conductors also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the region in which the project would occur, be incompatible with local land use and zoning, interfere with electronic communications, and impact public services (e.g., transportation).

The following subsections present an overview of the resources related to human settlement in the Project Study Area and discuss how the Solar Project and West and East Routes may affect these resources and what measures Xcel Energy will implement to mitigate Project effects.

5.2.1 Emergency Services, Public Health, and Safety

Solar facility and transmission line projects have the potential to impact the availability of emergency and public health services and safety of the local populace during construction. The influx of temporary construction personnel could increase demand for emergency and public health services. If construction personnel are injured or require assistance due to falls, equipment use, or electrocution this creates a demand for emergency, public health, or safety services that would not exist if the Project did not exist. If road closures are required during construction, such closures could impede police, fire, and other rescue vehicles access to the site of an emergency. Furthermore, use clear and appropriate signage during construction of a solar facility or transmission line is required to ensure public safety.

Operating solar facilities or transmission line are required to meet certain safety qualifications and standards such as fencing of solar facilities or energized equipment to prevent public access. In addition, construction of towers or transmission lines must consider potential effects on existing emergency communication systems to avoid line-of-sight disturbances.

5.2.1.1 Description of Resources

Solar Project

If emergency personnel were needed at the Solar Project, multiple agencies would likely respond, depending on the situation and the location in the Project where the emergency occurred. In the Solar Project Study Area, local law enforcement and emergency response agencies are available in Sherburne County and nearby communities. These include the Sherburne County Sheriff, Becker City Police Department, Big Lake Police Department, and Elk River Police Department. Fire departments near the Solar Project include the Becker City Fire Station, Clear Lake Fire Department, Clearwater Fire Department, Monticello Fire Department, Big Lake Fire Station, and Elk River Fire Department. Ambulance service is available from CentraCare Health EMS in Big Lake, Monticello Ambulance Service in Monticello, Elk River Ambulance Service in Elk River,

North Ambulance Service in Princeton, and Mayo Clinic Ambulance and Central Minnesota EMS Region in St. Cloud. All of these law enforcement and emergency response agencies are within 20 miles or less of the Project.

Hospitals and clinics within the Solar Project Study Area are predominantly located in St. Cloud and include the St. Cloud Hospital, which has numerous locations throughout the city; the St. Cloud VA Medical Center; and Sweet Health Care, LLC and various eye clinics, dental offices, and chiropractors. Other hospitals and clinics near the Solar Project include CentraCare Health Monticello Care Center and Emergency Room in Monticello, Mercy Hospital Surgery Center and Metropolitan Heart and Vascular Institute in Elk River, and Fairview hospital in Princeton. All of the hospitals and clinics are within 20 miles or less of the Solar Project.

There are four towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Sherburne County (Minnesota Department of Public Safety, 2018). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. In order for the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Solar Project; the nearest ARMER tower is about 3.5 miles north/northeast of the Solar Project (Minnesota Department of Public Safety, 2018).

West Route

The West Route is directly adjacent to the Solar Project, and both facilities have the same Project Study Area. As such, the emergency services, public health, and safety services described for the Solar Project are representative of the emergency services, public health, and safety services available for the West Route.

There are four ARMER towers in Sherburne County. However, there are no ARMER towers within one mile of the West Application Alignment; the nearest ARMER tower is about 3.6 miles northeast of the West Application Alignment (Minnesota Department of Public Safety, 2018).

East Route

The East Route is directly adjacent to the Solar Project, and both facilities have the same Project Study Area. As such, the emergency services, public health, and safety services described for the Solar Project are representative of the emergency services, public health, and safety services available in the East Route.

There are four ARMER towers in Sherburne County. However, there are no ARMER towers within one mile of the East Application Alignment; the nearest ARMER tower is about 4.1 miles north/northeast of the East Application Alignment (Minnesota Department of Public Safety, 2018).

5.2.1.2 Impacts and Mitigation

Solar Project

Construction and operation of the Solar Project will have minimal impacts on the security and safety of the local populace. Any temporary road closures required during construction would be coordinated with local jurisdictions to provide safe access of police, fire, and other rescue vehicles. Local law enforcement resources may be utilized for traffic control and law enforcement during construction activities. In the event that emergency services are needed for local residents during the estimated 32 months of construction, construction in the vicinity of the emergency site will stop, and any impeding equipment will be relocated so that emergency vehicles may access the emergency site.

Xcel Energy is gathering information to coordinate with all emergency and non-emergency response teams for the Solar Project, including law enforcement agencies, local fire departments, ambulance services, and 911 services. Any accidents that might occur during construction of the Solar Project would be handled through local emergency services. The influx of approximately 475 workers to construct the Solar Project would not be expected to influence emergency or public health services. Once construction is complete, the Solar Project will not impede emergency services. As such, construction and operation of the Solar Project will have minimal impacts on the availability of emergency services.

The type and number of responding agencies will depend on the incident requiring emergency services. Xcel Energy will develop an Operations and Emergency Action Plan for the Solar Project that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior. Additionally, construction will comply with local, state, and federal regulations regarding installation of the Solar Project facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Solar Project; these include clear signage during all construction activities, and fencing of all Solar Project facilities to prevent public access. In addition, the West and East Collector Substations will be fenced and accessible only by authorized personnel.

While there are ARMER towers in the vicinity of the Solar Project (i.e., within three to four miles), the Solar Project will not impact this communication system as the proposed facilities are well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Xcel Energy anticipates the tallest solar facilities to be up to 50 feet tall at the West and East Collector Substations. As such, no mitigation is proposed.

West Route

No impacts on emergency services or the security and safety of the local populace are anticipated as a result of the West HVTL Project. Any temporary road closures required during construction would be coordinated with local jurisdictions to provide safe access for police, fire, and other rescue vehicles. Local law enforcement resources may be utilized for traffic control and law enforcement during construction activities. In the event emergency services are needed for local

residents during the estimated four months of construction, construction will stop, and any impeding equipment will be relocated so that emergency vehicles may access the emergency site.

Any accidents that might occur during construction of the West Route would be handled through local emergency services. The influx of approximately 40 workers for construction would not be expected to influence emergency or public health services. Once construction is complete, the West Route will not impede emergency services. As such, construction and operation of the West Route will have minimal impacts on the availability of emergency services.

The West Route will be designed to meet local, state, and NESC safety standards. The proposed transmission line will be equipped with protective devices to prevent damage from transmission line or pole falls or other potential accidents. The West Route will be equipped with protective devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur. Signage around the transmission line will warn the public of the safety risks associated with the energized equipment. The construction of the West Route is not expected to have a negative impact on public health or safety. Construction crews will comply with Occupational Safety and Health Administration measures to ensure their own safety.

While there are ARMER towers in the vicinity of the West Route (i.e., within 3.6 miles of the West Application Alignment), most structures associated with the West Route will be tangent or angle structures, which are less than the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Xcel Energy anticipates the tangent and angle structures to be up to 145 feet tall; dead end structures at the West Collector Substation and Sherburne County Substation will be 150 to 165 feet tall. While the dead end structures may slightly exceed the height of the ARMER tower, they are proposed adjacent to existing structures that are similar in height (i.e., the Sherburne County Substation and existing 345 kV transmission lines which are 115 to 125 feet tall). As such, no mitigation is proposed.

East Route

No impacts to emergency services or the security and safety of the local populace are anticipated from the East Route. Xcel Energy does not anticipate and public road closures. Additionally, because nearly all the East Route is located within the Sherco Generating Plant, in the event of an emergency, Xcel Energy would follow the existing Generating Plant emergency response procedures.

Any accidents that might occur during construction of the East Route would be handled through local emergency services. The influx of approximately 40 workers for construction would not be expected to influence emergency or public health services. Once construction is complete, the East Route will not impede emergency services. As such, construction and operation of the East Route will have minimal impacts on the availability of emergency services.

The East Route will be designed to meet local, state, and NESC safety standards. The proposed transmission line will be equipped with protective devices to prevent damage from transmission line or pole falls or other potential accidents. The East Route will be equipped with protective

devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur. Signage around the transmission line will warn the public of the safety risks associated with the energized equipment. The construction of the East Route is not expected to have a negative impact on public health or safety. Construction crews will comply with Occupational Safety and Health Administration measures to ensure their own safety.

While there are ARMER towers in the vicinity of the East Route (i.e., within 4.1 miles of the East Application Alignment), the transmission line will not impact this communication system as the proposed facilities are well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Xcel Energy anticipates the tangent and angle structures to be up to 145 feet tall; dead end structures at the East Collector Substation and Sherburne County Substation will be 150 to 165 feet tall. While the dead end structures may slightly exceed the height of the ARMER tower, they are proposed adjacent to existing structures that are taller (i.e., the Sherburne County Substation, Becker Substation, and existing 345 kV transmission lines). As such, no mitigation is proposed.

5.2.2 Electric and Magnetic Fields

Electric and magnetic fields, or EMF, are present around any electrical device. Electric fields arise from the voltage or electrical charges while magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. Electric and magnetic fields are invisible just like radio, television, and cellular phone signals, all of which are part of the electromagnetic spectrum. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. The scientific consensus is that electric fields pose no health risk to humans (National Radiation Laboratory, Ministry of Health, New Zealand, 2008).

5.2.2.1 Description of Resources

Solar Project

Electric and Magnetic Fields

The sources of EMF related to the Solar Project include electrical collection lines and from the transformers installed at each inverter and collector substations. EMF from electrical collection lines and transformers dissipates rapidly with distance from the source (NIEHS, 2002). Generally speaking, higher voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. There is no federal standard for electric fields. The Commission, however, has imposed a maximum electric field limit of eight kV/m measured at one meter (3.28 feet) above the ground[21]. There are presently no Minnesota regulations pertaining to magnetic field

[21] *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (*adopting* Administrative Law Judge Findings of Fact, Conclusions and Recommendation at Finding 194 [April 22, 2010 and amended April 30, 2010]) (September 14, 2010).

exposure; however, the internationally accepted guideline for the general public exposed to magnetic fields is 833 milliGauss (mG; NEIHS, 2002).

Research on the potential influence of EMFs on organisms and human health has been conducted over many decades to understand basic interactions of EMFs with biological organisms and cells, and to investigate potential therapeutic applications. In the 1970s, questions arose about potential adverse health effects from EMFs and health conditions, including cancer. Over the past 40 years, considerable additional research has been conducted to address uncertainties in those studies and to determine if there was any consistent pattern of results from human, animal, and cell studies that would support such an association[22,23,24,25.] The quantity and complexity of the research has led scientific and government health agencies to assemble multidisciplinary panels of scientists to conduct weight-of-evidence reviews and arrive at conclusions about the possible effects associated with EMFs.

Overall, the published conclusions of these scientific review panels have been consistent. None of the panels concluded that either electric fields or magnetic fields are a known or likely cause of any adverse health effect at the long-term, low exposure levels found in the environment. As a result, no standards or guidelines have been recommended to prevent this type of exposure; however, from all the research that has been conducted, it was confirmed that short-term exposure to higher intensities of EMF (above exposure levels of electrical and industrial workers) could produce adverse stimulation of nerves and muscles (WHO, 2018). Although electric and magnetic fields induce voltages and currents in the body, the induced currents directly beneath high-voltage transmission lines are very small compared to thresholds for producing shock and other harmful electrical effects (WHO, 2018).

The Commission has repeatedly found that there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects. In the Huntley-Wilmarth 345 kV Transmission Line Project, for example, the Commission concluded that "No adverse health impacts from electronic and magnetic fields are anticipated for persons living or working near the Project."[26] Similarly, the Commission has reached similar conclusions for a

[22] The National Institute of Environmental Health Sciences (NIEHS) assembled a 30-person Working Group to review the cumulative body of epidemiologic and experimental data and provide conclusions and recommendations to the U.S. government (NIEHS, 1999).

[23] The International Agency for Research on Cancer (IARC) completed a full carcinogenic evaluation of EMF in 2002 (IARC, 2002).

[24] The International Commission on Non-Ionizing Radiation Protection (ICNIRP), the formally recognized organization for providing guidance on standards for non-ionizing radiation exposure for the World Health Organization, published a review of the cumulative body of epidemiologic and experimental data on EMF in 2003. The ICNIRP released exposure guidelines in 2010 that updated their 1998 exposure guidelines. For both guidelines, they relied heavily on previous reviews of the literature related to long-term exposure, but provided some relevant conclusions as part of their update process (ICNIRP, 2010).

[25] The Swedish Radiation Protection Authority (SSI), which became the Swedish Radiation Safety Authority (SSM) in 2009, evaluated current studies in several reports, using other major scientific reviews as a starting point (SSI, 2007 and 2008; SSM, 2009, 2010, 2013, 2014, 2015, 2018).

[26] *In the Matter of the Application of Xcel Energy and ITC Midwest for a Certificate of Need for the Huntley-Wilmarth 345-kV Transmission Line Project; In the Matter of the Application of Xcel Energy and ITC Midwest for a Route Permit for the Huntley-Wilmarth 345-kV Transmission Line Project,* Order Finding Environmental Impact Statement Adequate, Granting Certificate of Need, Issuing Route Permit, and Requiring Additional Analysis (Aug. 5, 2019) at ALJ Report, Route Permit

utility-scale solar project by concluding that, "[b]ased on the most current research on electromagnetic fields, and the distance between the [Elk Creek] Project and houses, the [Elk Creek] Project will have no impact to public health and safety due to EMF or magnetic fields."[27].

Implantable Medical Devices

EMF may interfere with implantable electromechanical medical devices, such as pacemakers, defibrillators, neurostimulators, and insulin pumps. Most of the research on electromagnetic interference and medical devices relates to pacemakers. Laboratory tests indicate that interference from magnetic fields in pacemakers is not observed until 2,000 mG—a field strength significantly greater than predicted for this type of development, thus no impact is expected from magnetic fields. Electric fields may interfere with a pacemaker's ability to sense normal electrical activity in the heart. However, modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and other implantable medical devices, have indicated that electric fields below 7 kV/m are unlikely to cause interactions affecting operation of most of their devices.

Stray Voltage

Stray voltage can be a concern in agricultural areas, particularly for dairy farms. Stray voltage is an unintended transfer of electricity between two grounded objects, and is typically caused by improperly grounded electrical equipment in farm buildings or by a faulty utility connection. Stray voltage can occur with electrical distribution lines to residences and high voltage transmission lines that parallel them. Stray voltage flows through the ground between electrical systems that, by code, must be grounded (i.e., connected to the earth) to ensure safety. This voltage may be felt by animals standing on the ground.

Farming Operations, Vehicle Use, and Metal Buildings

Construction and operation of a solar facility does not introduce the same potential for induced voltage as transmission lines. Unlike transmission lines, in which vehicles and farm equipment can travel beneath and metal buildings may be located nearby, a solar facility is enclosed (fenced). Furthermore, the voltages associated with a solar facility are much less than HVTLs. As such, there are no known concerns about farming operations, vehicle use, and metal buildings associated with a solar facility.

Finding No. 346. *See also In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and GRE for the Tower Transmission Line Project and Associated Facilities at p. 23 (Aug. 1, 2007) ("Currently, there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects.")

[27] *In the Matter of the Application of Elk Creek Solar, LLC for a Certificate of Need for the up to 80-Megawatt Elk Creek Solar Project in Rock County, Minnesota; In the Matter of the Application of Elk Creek Solar, LLC for a Site Permit for the up to 80-Megawatt Elk Creek Solar Project in Rock County, Minnesota,* Order Adopting Findings of fact, Conclusions of Law, and Recommendations, Granting Certificate of Need, and Issuing Site Permit at p. 26,Finding of Fact No. 102. (December 31, 2020).

West Route

Electric and Magnetic Fields

As described above, electric and magnetic fields occur around all electrical devices, including transmission lines. The frequency of transmission line EMF in the United States is 60 hertz and falls in the extremely low frequency range of the electromagnetic spectrum (any frequency below 300 hertz). For the lower frequencies associated with power lines, the electric and magnetic fields are typically evaluated separately.

Electric fields on a transmission line are solely dependent upon the voltage of the line, not the current. Electric-field strength is measured in kilovolts per meter (kV/m), and the strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees or buildings. As described above, there is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8.0 kV/m measured at one meter (3.28 feet) above the ground.

Magnetic fields are created by the electrical current (measures in amps) moving through a transmission line. The strength of a magnetic field is proportional to the electrical current and is typically measured in mG. As with electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. Unlike electric fields, however, magnetic fields are not shielded or weakened by objects or materials. There are presently no Minnesota regulations pertaining to magnetic field exposure.

Implantable Medical Devices

The description of implantable medical devices described for the for the West Route is the same as described for the Solar Project.

Stray Voltage

The description of stray voltage for the for the West Route is the same as described for the Solar Project.

Farming Operations, Vehicle Use, and Metal Buildings

The West HVTL Project will be designed to meet or exceed minimum clearance requirements with respect to electric fencing as specified by the NESC. Nonetheless, insulated electric fences used in livestock operations can be instantly charged with an induced voltage from transmission lines. The induced charge may continuously drain to ground when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. The local electrical utility can provide site specific information about how to prevent possible shocks when the charger is disconnected.

Farm equipment, passenger vehicles, and trucks may be safely used under and near power lines. The power line will be designed to meet or exceed minimum clearance requirements with respect

to roads, driveways, cultivated fields, and grazing lands as specified by the NESC; recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

Vehicles, or any conductive body, under high voltage transmission lines will be immediately charged with an electric charge. Without a continuous grounding path, this charge can provide a nuisance shock. Such nuisance shocks are a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, the induced charge on vehicles will normally be continually flowing to ground unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally discouraged within the right-of-way itself because a structure under a line may interfere with the safe operation of the transmission facilities. For example, a fire in a building within the right-of-way could damage a transmission line. The NESC establishes minimum electrical clearance zones from power lines for the safety of the general public and transmission owners often acquire easement rights that require clear areas in excess of these established zones. Transmission owners may permit encroachment into that easement for buildings and other activities when they can be deemed safe and still meet the NESC minimum requirements. Metal buildings may have unique issues due to induction concerns. For example, conductive buildings near power lines of 200 kV or greater must be properly grounded.

East Route

Electric and Magnetic Fields

The description of EMF and associated regulations for the East Route is the same as described for the West Route above.

Implantable Medical Devices

The description of implantable medical devices for the East Route is the same as described for the Solar Project.

Stray Voltage

The description of stray voltage for the East Route is the same as described for the Solar Project.

Farming Operations, Vehicle Use, and Metal Buildings

The description of farming operations, vehicle use, and metal buildings for the for the East Route is the same as described for the West Route.

5.2.2.2 Impacts and Mitigation

Solar Project

Electric and Magnetic Fields

Levels of EMF from the Solar Project will be considerably below acceptable guidelines. Project-specific EMF levels were not modeled for the 34.5 kV electrical collection lines or inverters and transformers. However, several studies have documented EMF exposure of various high voltage transmission lines. The National Institute of Environmental Health Sciences provides typical EMF levels for power transmission lines (NIEHS, 2002). For 161 kV transmission lines, the lowest voltage with typical EMF levels reported in the study, electric fields directly below the transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (approximate edge of right-of-way). Similarly, average magnetic fields directly below the transmission line were reported at 29.7 mG before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). A Canadian study of collection lines at a wind facility measured EMF of the Project's 27.5 kV collection lines, slightly lower voltage than the electrical collection lines proposed for the Solar Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at 1m above ground and up to 16.5 mG directly beneath overhead 27.5 kV lines (McCallum et al., 2014). As demonstrated here, both electric and magnetic fields will be well below the Minnesota guidelines for electric fields (8.0 kV/meter) and international guidelines of 833 mG for magnetic fields. Additionally, since the transformers at inverters are enclosed in a grounded metal case (shielded), they typically emit limited EMF. Similarly, EMF levels from transformers within the collector substations will be at or very near background levels at the edge of the substation fence, as EMF emitting equipment is generally centrally located within the fenced boundary.

Implantable Medical Devices

The electric fields associated with the Solar Project will be well below the 7 kV/m metric noted by Medtronic and Guidant. The closest residence to solar arrays is 185 feet (see Table 5.2-7 in Section 5.2.5), at which electric fields will have dissipated to background levels. As such, impacts to implantable medical devices are not anticipated and no mitigation is proposed.

Stray Voltage

All electrical components in the Project, including inverters and transformers, will be grounded in accordance with NESC. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the Solar Project will be negligible. Should a fault occur during operation of the Solar Project, it would be quickly identified by monitoring systems and corrected.

The nearest residence to solar arrays is 185 feet and 599 feet to the nearest inverter, electrical collection line, and transformer (see Table 5.2-7 in Section 5.2.5 and Figures 4a and 4b – Preliminary Project Layout and 5a – 5r Detailed Preliminary Project Layout). Similarly, the closest residence to a substation is 200 feet. At these distances, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible and no mitigation measures are proposed.

West Route

Electric and Magnetic Fields

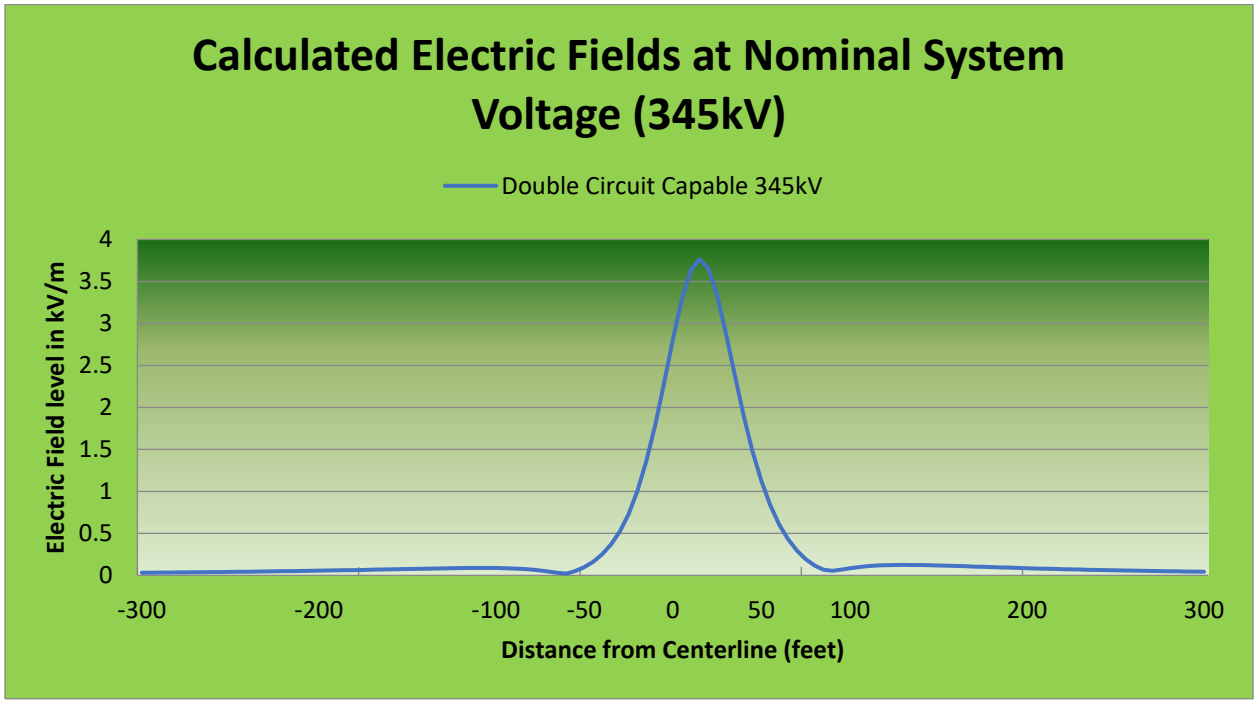
Electric field modeling for the West Route was conducted based on the assumption of a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading. Table 5.2-1 provides the maximum calculated electric fields and Chart 5.2-1 provides a graphic view of this information. The maximum calculated electric field for the single circuit West Route is 3.29 kV/m at 10 feet from the centerline. At the edge of the right-of-way (i.e., 75 feet from centerline), the electric field from the single circuit line is 0.3 kV/m. The closest residence to the West Application Alignment is approximately 285 feet from the West Collector Substation. Electric fields at this residence are modeled to be less than 0.10 kV/m, which is well below the Commission standard of 8.0 kV/m.

Table 5.2-1: Electric Field Calculations for 345 kV Single Circuit Monopole

Electric Field Strength (kV/m)[1] Distance from Centerline												
-300	-200	-100	-75	-50	-10	0	10	50	75	100	200	300
0.03	0.06	0.09	0.07	0.05	1.36	2.29	3.29	1.48	0.3	0.07	0.09	0.05

[1] Electric field values assume 230 MVA loading.

Chart 5.2-1: Calculated Electric Field Strength in kV/m for Single Circuit 345 kV Transmission Line (5 feet above ground)



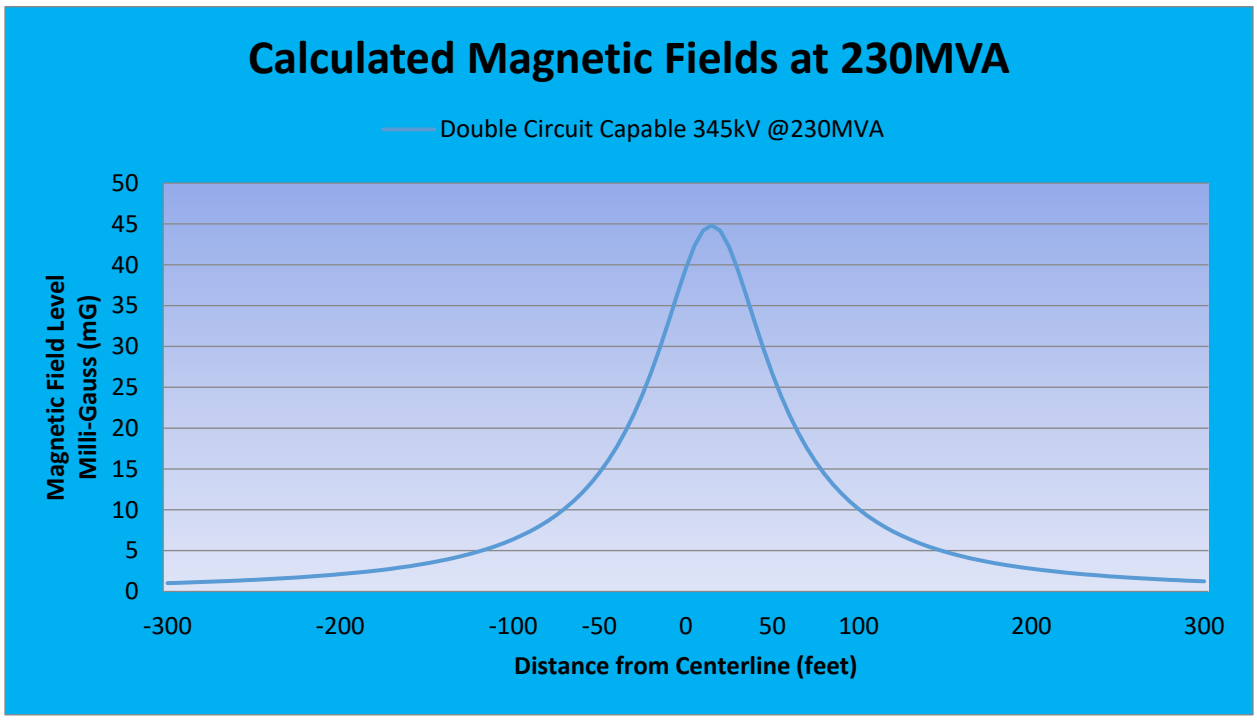
Magnetic field modeling for the West Route was conducted based on the assumption of a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading. Table 5.2-2 provides the maximum calculated magnetic fields and Chart 5.2-2 provides a graphic view of this information. The maximum calculated magnetic field for the single circuit West Route is 42.30 mG at 10 feet from the centerline. At the edge of the right-of-way (i.e., 75 feet from centerline), the magnetic field from the single circuit line is 17.58 mG.

Table 5.2-2: Magnetic Field Calculations for 345 kV Single Circuit Monopole

Magnetic Field Strength (mG)[1] Distance from Centerline												
-300	-200	-100	-75	-50	-10	0	10	50	75	100	200	300
1.02	2.12	5.95	8.62	13.24	29.82	36.34	42.30	29.69	17.58	11.00	2.93	1.28

[1] Magnetic field values assume 230 MVA loading.

Chart 5.2-2: Calculated Magnetic Field Strength in mG for Single Circuit 345 kV Transmission Line (5 feet above ground)



Implantable Medical Devices

The electric fields for the West Route are well below levels at which modern bipolar devices are susceptible to interaction with the fields[28]

[28] *In the Matter of the Application of Great River Energy for a Route Permit for the Bull Moose 115 kV Transmission Line Project in Cass County, Minnesota*. Order Adopting Findings of fact, Conclusions of Law, and Recommendations, Granting Certificate of Need, and Issuing Route Permit at p. 31,Finding of Fact No. 102. (March 11, 2019).

Stray Voltage and Induced Voltage

Impacts from stray voltage are typically related to improper grounding of electrical service to the farm (distribution lines) or on-farm electrical wiring. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences and they are typically grounded properly. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line.

Appropriate measures, such as proper grounding, will be taken to prevent stray voltage problems. Xcel Energy would be required to remedy any stray voltage issues caused by the West HVTL Project as a condition of a Route Permit. Additionally, there are no dairy farms along the West Route.

Farming Operations, Vehicle Use, and Metal Buildings near Power Lines

There are no residences or other structures (barns, agricultural buildings, sheds) within the 150-foot-wide right-of-way for the West Application Alignment. Xcel Energy will work with landowners to ground fences, gates, buildings, or other structures that may be subject to induced current from the line and educate landowners on these concerns and protective measures. Should landowners identify safety concerns, Xcel Energy will investigate and take corrective action.

East Route

Electric Fields

Because the East Route has the same MVA loading as the West Route and the same conductor configuration, electric field calculations for the East Route are the same as presented in Table 5.2-1 and Chart 5.2-1. There are no residences within the East Route.

Implantable Medical Devices

As discussed above for the West Route, EMF may interfere with implantable electromechanical devices. However, modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and other implantable medical devices, have indicated that electric fields below 7 kV/m are unlikely to cause interactions affecting operation of most of their devices. The electric fields for the East Route are well below levels at which modern bipolar devices are susceptible to interaction with the fields.

Magnetic Fields

Similar to electric fields, magnetic field modeling for the East Route is the same as presented for the West Route in Table 5.2-2 and Chart 5.2-2 because both the West and East Routes have the same conductor configuration and loading.

As described for the West Route above, there has been considerable research on the potential influence of EMFs on organisms and human health. Overall, the published conclusions of these scientific review panels have been consistent. None of the panels concluded that either electric

fields or magnetic fields are a known or likely cause of any adverse health effect at the long-term, low exposure levels found in the environment.

Stray Voltage and Induced Voltage

As described for the West Route, stray voltage can occur with electrical distribution lines to residences and high voltage transmission lines that parallel them. Xcel Energy will implement appropriate measures, such as proper grounding, to prevent stray voltage problems. Xcel Energy would be required to remedy any stray voltage issues caused by the East HVTL Project as a condition of a Route Permit.

Farming Operations, Vehicle Use, and Metal Buildings near Power Lines

As described for the West Route, transmission lines may impact farming operations, vehicle use, and metal buildings. However, the East Route will be designed to NESC standards and there are no farming operations or buildings within the East Route. The East Route crosses one road, but induced charges on vehicles would be rare due to modern tires grounding the current.

5.2.3 Displacement

Displacement is defined as compelling a person or persons to leave their home. For solar projects, displacement would result from solar facilities being sited within a homestead. For transmission lines, NESC standards require certain clearances between and transmission line facilities and the ground, and between transmission line facilities and buildings for safe operation of the solar facility and transmission line. To comply with NESC standards and allow sufficient space for transmission line maintenance, transmission lines are generally routed to avoid residences or other buildings within the right-of-way. Residences or other buildings located within a proposed right-of-way that cannot be avoided are generally removed or displaced. Displacements are relatively rare and are more likely to occur in heavily populated areas where avoiding all residences and businesses is not always feasible.

5.2.3.1 Description of Resources

Solar Project

There is one residence and associated structures within the Solar Project Area, and under ownership by the participating landowner, in the East Block on the south side of 137th Street. While not within the Solar Project Area, there is a residence immediately adjacent to the Solar Project Area West Block, an "exception" or cut out of the Solar Project Area such that the homestead parcel is surrounded by the Solar Project Area. Additionally, there are several small groupings of agricultural buildings for storage and associated grain bins in the Solar Project Area: a building and four grain bins on the south side of River Road SE (CSAH 8) in the West Block, and eight buildings on either side of 137th Street in the northeast corner of the East Block.

West Route

The West Route crosses sparsely populated rural areas that are used for agricultural production and the Sherco Generating Plant. To limit proximity to residences and other buildings, Xcel Energy

designed the West Route and alignment to avoid residences along 115th Avenue SE (County Road 53). There is one residence on the east side of 115th Avenue SE (County Road 53) between U.S. Highway 10 and River Road SE (CSAH 8). Xcel Energy has designed the West Route on the west side of the road across from this residence and on the east side of this road south of this residence. Similarly, there is a residence on the northwest corner of the intersection of 115th Avenue SE (County Road 53) and River Road SE (CSAH 8). Xcel Energy designed the West Route on the east side of 115th Avenue SE (County Road 53) to avoid the transmission line in the side yard of this residence.

East Route

The East Route is primarily located within the Sherco Generating Plant. As such, there are no residences or buildings within the East Route.

5.2.3.2 Impacts and Mitigation

Solar Project

The participating residence, buildings, and grain bins in the East Block are avoided by the Solar Project Footprint. The building and four grain bins in the West Block are either abandoned or used for miscellaneous temporary uses. NG Renewables coordinated with the landowner of these structures, who has agreed to their removal as part of the Project; the landowner will remove these structures prior to construction. There will not be any other displacement; as such, no mitigation is proposed.

West Route

There will not be displacement of any residences or building because there are none within the West Route or its right-of-way. As described above, the West Route alignment is routed to avoid parcels with residences. As such, no mitigation is proposed.

East Route

Displacement of residences or business properties is not anticipated because there are no residences or buildings within the East Route or its associated right-of-way. Therefore, no mitigation is proposed.

5.2.4 Noise

Solar facility and transmission line projects have the potential to create temporary increases in noise during construction from operation of construction vehicles and equipment. During operation of a solar facility the inverters generate low levels of noise from the air conditioners housed in each and to a lesser extent from the transformers and rotation of the tracking system. Transmission lines may produce noise during rainy conditions due to the corona effect, a type of electrical conduction that occurs in the atmosphere near the conductor that may result in an audible hissing and cracking sound.

5.2.4.1 Description of Resources

Solar Project

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies. Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. According to American National Standards Institute/Acoustical Society of America S12.9-2013/Part 3, rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA.

Background noise in the vicinity of the Solar Project is typically a result of farming equipment/operations, wind, snowmobiles, and vehicle and rail traffic along U.S. Highway 10. A comparison of typical noise-generating sources is outlined below in Table 5.2-3.

Table 5.2-3: Common Noise Sources

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

Source: MPCA, 2008

The Minnesota Pollution Control Agency (MPCA) has the authority to adopt noise standards pursuant to Minnesota Statute Section 116.07, subd. 2. The adopted standards are set forth in Minnesota Rule Chapter 7030. The MPCA standards require weighted noise measurements. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L10) and 50 percent of any hour (L50). The noise limits are set by "noise area classifications" (NACs) based on the land use at the location of the person that hears the noise. Household units, including farmhouses, are included in NAC 1,

which includes most of the Solar Project Area. There are approximately 72 acres of the East Block that are within the existing Sherco Generating Plant that fall into the industrial classification. Table 5.2-4 shows the MPCA state noise standards.

Table 5.2-4: MPCA State Noise Standards - Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 - Industrial	80	75	80	75
Source: Minn. R. § 7030.0040				

West Route

A transmission line can generate a small amount of sound due to corona activity. Corona is the manifestation of energy loss through the line, and this energy loss can produce sound, such as buzzing or crackling. This noise can be greater in rainy or foggy conditions. During heavy rains, the sound of the rain generally is greater than the noise emitted from the transmission line and thus the transmission line noise is not noticeable. Transmission lines are equipped with circuit breakers which open to de-energize the transmission lines for fault conditions and for maintenance. As such, the circuit breakers are rarely opened and closed, at which time there is sound associated with the mechanical operation of the breakers. Circuit breakers do not emit a humming noise.

As described above and demonstrated in Table 5.2-4, the MPCA state noise standards for the West Route include areas classified as residential for the portion of the West Route outside the Sherco Generating Plant and industrial within the Sherco Generating Plant. Ambient noise levels in these locations are generally between 35 and 40 dBA during daytime hours. Noise levels will increase sporadically with passing vehicle and rail traffic, high winds, or use of farm equipment, all-terrain vehicles, or snowmobiles. The primary noise receptors within the local vicinity of the West Route are residences and farmsteads. Residences are assigned to NAC 1, which have lower daytime and nighttime limits than areas classified as NAC 3 - Industrial.

East Route

The East Route is classified as NAC 3 – Industrial within the Sherco Generating Plant. Ambient noise levels in these locations are generally between 60 and 70 dBA during daytime hours. Noise levels will increase sporadically with passing vehicle and rail traffic, high winds, or use of farm equipment at adjacent properties, or snowmobiles. There a few noise receptors in proximity to the East Route; the closest residences to the East Route are half mile east and south of the East Application Alignment (see Residences E-2 and E-1, respectively, on Figure 4b).

5.2.4.2 Impacts and Mitigation

Solar Project

Construction

During construction, noise will be emitted by the construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. Construction associated noise will likely be perceptible at adjacent residences (see Section 5.2.5 for locations). Grading equipment, bobcats, and other construction equipment are anticipated to emit noise between 76-85 dBA at 50 feet (USDOT, 2017). Noise associated with these types of equipment will primarily occur during the initial site set up – grading and access road construction which is expected to last approximately four months for each the West Block and East Block. Xcel Energy anticipates pile driving of the rack supports to create the most noise measured at 101 dBA at 50 feet (USDOT, 2017). Installation of each rack support takes between 30 seconds to 2 minutes depending on the soil conditions; Xcel Energy anticipates this activity will take up to 15 months to complete for the entire Solar Project. Finally, installation of the solar panels on the tracking similar would emit noise levels similar to general construction equipment described above. Typically, a forklift is used to place individual panels on the tracking rack system. The noise from any of these construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Note that construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location with the locations of impact shifting as construction proceeds in a sequence across the area. As stated above, these noise impacts will be temporary and limited to daytime hours.

Operation

The main source of noise from the Solar Project during operation will be from the inverters, which includes the air conditioners housed in each, and to a lesser extent from the transformers and rotation of the tracking system. Table 5.2-7 summarizes the anticipated distance to reach the most stringent MPCA noise standard (50 dBA) from a range of inverters and trackers under consideration for use at the Solar Project. Table 5.2-5 also provides the dBA at 50 feet so noise levels can be calculated at greater distances.

Table 5.2-5: Representative Inverter and Tracker Noise Levels

Facility Type	Equipment Model	Distance to 50 dBA	dBA at 50 feet
Inverter	Power Electronics HEM 660V	93 feet	55.4
	SMA Sunny Central UP	143 feet	59.1
	TMEIC Ninja	104 feet	56.3
Tracker	ATI DuraTrack HZ v3	5 feet	30
	NexTracker	82 feet	54

The results of noise modeling conducted by technology manufacturers outlined in Table 5.2-5 show that noise levels will be less than 50 dBA between 93 and 143 feet from the inverter, depending on which model is selected. Similarly, noise levels will be less than 50 dBA between 5

and 82 feet from the trackers, depending on which model is selected. As such, the Solar Project has been designed to meet the nighttime L50 dBA noise standard, as the closest home to the solar facility is 185 feet away from the edge of a solar array. Further, because the inverters are typically located within the middle of the solar arrays, the noise levels from Project equipment are not expected to be discernible from background noise levels at homes in the vicinity. The distance of the nearest inverter to a residence is 599 feet (see Table 5.2-7 in Section 5.2.5 and Figures 4a and 4b – Preliminary Project Layout).

During construction, Xcel Energy plans to limit construction to daylight hours. No noise impacts are anticipated during operation; therefore, no mitigation measures are proposed.

West Route

Construction

The overall impact intensity level is anticipated to be minimal. Potential impacts are anticipated to be short term; these unavoidable and localized impacts will affect residences and will be minimized.

During construction, noise will be emitted by the construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. Major noise-producing activities are associated with clearing and grading, material delivery, auguring foundation holes, setting structures, and stringing conductors. Noise from heavy equipment and increased vehicle traffic will be intermittent and occur during daytime hours. Based on information from the U.S. Department of Transportation (2017), these major activities are anticipated to have the following noise, measured at 50 feet from the source:

- Clearing and grading: grader (85 dBA), chainsaw (84 dBA), and tractor (85 dBA);
- Material delivery: flatbed truck (74 dBA) and crane (81 dBA);
- Auguring foundation holes: augur drill rig (84 dBA); and
- Setting structures: crane (81 dBA).

Construction activity would only be present at a particular location for a few days at a time, but on multiple occasions throughout the period between right-of-way clearing and restoration. As such, construction noise would be highly localized, temporary, and minor. Additionally, construction will typically occur between 7 a.m. and 7 p.m. Construction will occur in accordance with Minn. R. Ch. 7030.

Xcel Energy will use sound-control devices on vehicles and equipment (for example, mufflers), conduct construction activities during daylight hours, and not idle vehicles and equipment unnecessarily.

Operation

During fair conditions, noise from the transmission line is anticipated to be inaudible. The transmission line may produce noise during rainy conditions due to the corona effect, a type of electrical conduction that occurs in the atmosphere near the conductor that may result in an audible

hissing and cracking sound. It is likely, however, that most of the time when climatic conditions result in corona, the noise levels of falling rain would exceed the corona noise making the noise from the transmission line inaudible.

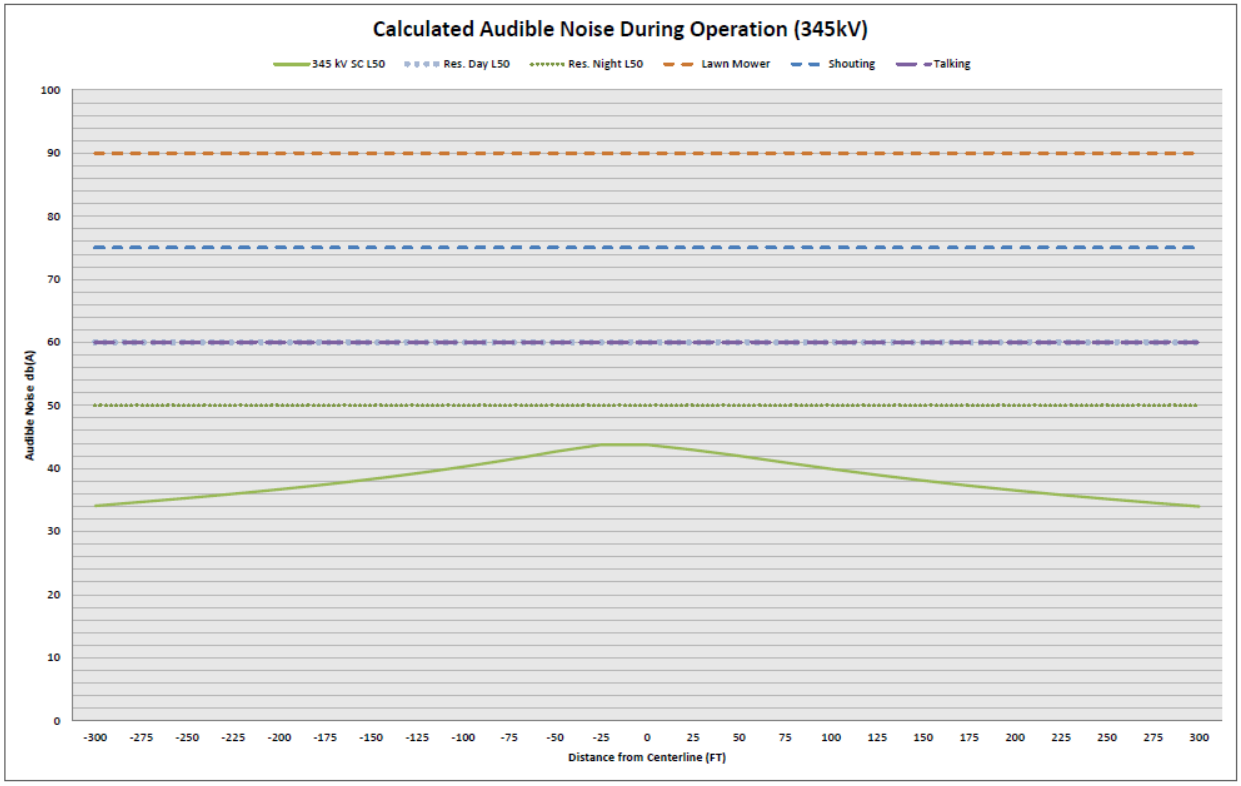
In its audible noise analysis for the West Route, Xcel Energy considered the potential noise generated by operation of single circuit 345 kV transmission line. Predictive modeling for the West Route assumed a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading. Table 5.2-6 presents predicted noise levels for the West Route, and Chart 5.2-3 provides a graphic representation of the data. Audible noise from the transmission line would only be expected during quiet, foggy, or rainy conditions and would be rare. Even in these rare cases, noise levels would be well below state standards (nighttime limit of 50 dBA in residential areas and 75 dBA in industrial areas). Noise impacts resulting from the operation of the West Route would therefore not be expected and no mitigation is proposed.

Table 5.2-6: Noise Calculations for 345 kV Single Circuit Monopole in Vertical Configuration

Predicted Audible Noise Level Results, L_{50} [1] [dB(A)] Distance from Centerline												
-300	-200	-100	-75	-50	-25	0	25	50	75	100	200	300
34.1	36.7	40.3	41.4	42.7	43.7	43.8	43.0	42.0	41.0	39.9	36.5	34.0

[1] L_{50} is defined as the noise level exceeded 50 percent of the time, or for 30 minutes in an hour.

Chart 5.2-3 Audible Noise Levels (L_{50} dBA) for Single Circuit Vertical Conductor Configuration – 345 kV Transmission Line



East Route

Construction

The construction impacts (equipment, duration, sound levels) described for the West Route apply to the East Route. The overall impact intensity level is anticipated to be minimal and short term because the nearest residences are at their closest one-half mile to the East Route. Construction will typically occur between 7 a.m. and 7 p.m. to the extent reasonably practical and in accordance with Minn. R. Ch. 7030.

Operation

As described for the West Route, noise from the operation of the transmission line would only occur during rainy conditions, which can cause the corona effect. It is likely, however, that most of the time when climatic conditions result in corona, the noise levels of falling rain would exceed the corona noise making the noise from the transmission line inaudible.

Because noise for transmission lines is a function of voltage and conductor geometry, differences in loading do not influence noise levels. Therefore, the audible noise analysis presented for the West HVTL line above is also applicable to the East Route. At the edge of the right-of-way, noise levels are modeled to be at 41 dBA (see Table 5.2-6 above), below the state standard for residential areas (nighttime limit of 50 dBA) and well below the state standard for industrial areas for which

the majority of the East Route is within (nighttime limit of 75 dBA). Audible noise from the transmission line would only be expected during quiet, foggy, or rainy conditions and would be rare. Even in these rare cases, noise levels would be well below state standards. Noise impacts resulting from the operation of the East Route would therefore not be expected and no mitigation is proposed.

5.2.5 Aesthetics

Solar facilities and transmission lines have the potential to affect the aesthetics of an area if they contrast with the surrounding landscape or designated scenic resources (e.g., federally or state-designated trails and byways).

5.2.5.1 Description of Resources

Solar Project

The topography of the Solar Project Area is generally flat with elevations ranging from 925 to 985 feet above sea level. As discussed in Section 5.1, land use within the Solar Project Area is predominantly agricultural, with potatoes and corn being the most common crops. There are windbreaks along some roadways that bisect the Solar Project Area and between some agricultural fields as well as around most farmsteads and former farmsteads with agricultural buildings still present in the Project vicinity.

The existing Sherco Generating Plant and the Sherburne County Substation are located between the West and East Blocks. Additionally, there are several 345 kV transmission lines that generally run in a north-south direction on the north side of the Mississippi River and south of the East Block into the Sherburne County Substation and from the Sherburne County Substation north on the west side of the Sherco Generating Plant and east of the West Block. There are several other transmission lines within or adjacent to the Solar Project Area. There are six transmission lines within or adjacent to the East Block:

- A 69 kV transmission line that parallels U.S. Highway 10 on the south side that is within the Solar Project Area.
- A 69 kV that parallels 157th Street SE immediately adjacent to the southern portion of the East Block.
- A double circuit 230/115 kV line that bisects the southeast portion of the East Block in a north-south direction between agricultural fields.
- A 115 kV transmission line adjacent to the western boundary of the East Block that runs in a southeast to northwest direction.
- A 69 kV line on the western boundary along 140th Avenue.

The Becker Substation is also adjacent to the western border of the East Block on the west side of 140th Avenue (Sherburne Avenue) and within the Sherco Generating Plant. There are two transmission lines within or adjacent to the West Block: a 69 kV line that parallels River Road SE (CSAH 8) and a 115 kV line that bisects the southern portion of the West Block in an east-west

direction through agricultural fields. Transmission lines that are within or adjacent to the Solar Project Area are displayed on Figures 9a – 9b – Existing Infrastructure and AADT. The Sherco Generating Plant, Sherburne County Substation, and multiple transmission lines are the current man-made focal points.

There is one residence within, and several residences and agricultural buildings on parcels adjacent to the Solar Project Area (see Figures 4a and 4b – Preliminary Project Layout). Table 5.2-7 summarizes the residence's location and existing screening, and approximate distances to the Solar Project Area, edge of the solar arrays, and nearest inverter (per preliminary design). In addition, there is a residential development south of the West Block along the Mississippi River. While these homes are adjacent to the Solar Project Area, the Mississippi River District (zoning) creates a buffer from the Project Footprint as solar facilities will not be sited in this zoning district. Additionally, the homes in this area have dense vegetative screening of the Mississippi River riparian corridor and generally are designed to maximize views toward the river, which is the opposite direction of the Solar Project. Therefore, these residences are not discussed in detail below.

Table 5.2-7: Proximity of Residences to Sherco Solar Project

Residence[1]	Location	Existing Vegetative Screening?[2]	Distance to Project Area (feet)	Distance to Solar Arrays (feet) [3]	Distance to Nearest Inverter (feet) [3]
W1	North side of River Road SE (CSAH 8); west of West Block	Dense	530	637	1371
W2	South side of River Road SE (CSAH 8); west of West Block	Dense	625	710	1701
W3	North side of River Road SE (CSAH 8); within West Block "exception"	Moderate	90	232	599
W4	North side of River Road SE (CSAH 8); north of West Block	Limited	75	273	1058
W5	South side of River Road SE (CSAH 8); south of West Block	Dense	165	318	961
W6	North side of River Road SE (CSAH 8); south of West Block	Dense	471	605	1140
W7	North side of River Road SE (CSAH 8); east of West Block	Dense	313	404	1248
W8	East of 115th Avenue SE (County Road 53); east of West Block	Moderate	190	462	915
W9	East of 115th Avenue SE (County Road 53); east of West Block	Dense	134	398	821
E1	East of Sherburne Avenue; south of East Block	Dense	96	185	776
E2	South of 137th Street; within East Block	Dense	Within	288	825

1 W corresponds to residences within or adjacent to the West Block and E corresponds to residences within or adjacent to the East Block.

2 Limited screening represents no existing trees or scattered trees that do not create a visual obstruction of vegetation; moderate screening represents existing trees on at least one side of the residence that are one tree line in density; dense screening represents multiple tree lines and a dense visual obstruction.

3 Based on preliminary design.

West Route

Similar to the Solar Project Area, topography in the West Route is generally flat. There are existing tree lines around farmsteads, along roads, and that serve as windbreaks between some agricultural fields. Viewsheds in this area include several vertical elements such as the Sherco Generating Plant and existing transmission lines. There is a 69 kV transmission line within the West Route on the north side of River Road SE (CSAH 8) between 115th Avenue SE (County Road 53) and 125th Avenue SE (County Road 52). Within the Sherco Generating Plant, the West Route crosses (perpendicular) two collocated 345 kV and 115 kV transmission lines on the north side of the facility.

East Route

The East Route is also generally flat and the vegetation cover is uniformly low. The viewshed on the east side of the Sherco Generating Plant is comprised of the vertical elements of the Sherco Generating Plant and several transmission lines. There are four 345 kV transmission lines that connect into the Sherburne County Substation from the southeast that are south and west of the East Route; these lines are not crossed by the East Route. there are also two transmission lines crossed by the East Route: a 69 kV line along Sherburne Avenue and a 115 kV line within the Sherco Generating Plant. Both of these crossings are perpendicular.

5.2.5.2 Impacts and Mitigation

Solar Project

The Solar Project will convert approximately 2,988.1 acres of predominately agricultural land (cultivated crops and hay/pasture; see Table 5.2-13 in Section 5.2.9.2 and associated discussion) to a solar facility characterized by complex geometric forms, lines, and surfaces that may be divergent from the surrounding agricultural landscape but be consistent with the industrial character around the Sherco Generating Plant. Most of the Project Footprint will be utilized with rows of solar PV panels. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. The images in Section 2.2.1 provide a reference for how the Solar Project will appear during operation. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials.

The solar arrays will occupy most of the disturbed area for the Solar Project. The electrical transformers and inverters, the West and East Collector Substations, and access roads will utilize the rest of the disturbed area. Most of the solar facility, including the solar arrays, will be low-profile. The East and West Collector Substations will be of similar vertical profile as the existing Becker Substation adjacent to the East Block and of lower vertical profile than the several transmission lines in and near the West and East Blocks.

The solar arrays will be visible from adjacent roadways and parcels but given their relatively low profile and the fact that all the facilities will be fenced for security, they will not be visible from long distances. Additionally, Xcel Energy has designed the Project to avoid tree clearing on the perimeter of the Project Footprint. As previously mentioned, the closest residence to preliminary design is approximately 185 feet immediately adjacent to the south side of the East Block. This residence has dense existing vegetative screening surrounding the farmstead. Xcel Energy will

implement vegetative screening on the perimeter of the Project Footprint near residences W-3, W-4, and E-1, which are those residences closest to the solar panels (i.e., within 250 feet; see Figures 4a and 4b – Preliminary Project Layout).

Xcel Energy conducted visual renderings of the proposed Solar Project from River Road SE (CSAH 8) near Residence W-3 (West Block), along River Road SE (CSAH 8; West Block), 115th Avenue SE (County Road 53) near Residence W-6 (West Block), and from U.S. Highway 10 (East Block). These are provided below in Images 5.2-1 – 5.2-4, respectively.

Image 5.2-1: Visual Rendering of Sherco Solar Project from River Road SE (CSAH 8) near W-3 (West Block)

Image 5.2-2: Visual Rendering of Sherco Solar Project along River Road SE (CSAH 8; West Block)

Image 5.2-3: Visual Rendering of Sherco Solar Project from 115th Avenue SE (County Road 53) near Residence W-6 (West Block)

Image 5.2-4: Visual Rendering of Sherco Solar Project from U.S. Highway 10 (East Block)

Operation of the Project will require down lit security lighting at the entrance of the Solar Project and there will be down lit, switch controlled lights at each inverter for repair purposes. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operations.

West Route

The West Route's transmission line structures and conductors would create aesthetic impacts that are anticipated to be minimal. The West Route will result in an alteration of the current landscape through construction of steel poles of 135 to 165 feet in height. Xcel Energy has minimized aesthetic impacts by choosing a route where a transmission line is most harmonious with the landscape, such as collocated with existing transmission and along roads and field edges. Other minimization measures include avoiding placing structures directly in front of residences, routing within the existing industrial Sherco Generating Plant, and using construction methods that minimize damage to vegetation near the transmission line.

East Route

The East Route's transmission line structures and conductors would create aesthetic impacts that are anticipated to be minimal and similar to the multiple transmission lines within and adjacent to the East Route within the Sherco Generating Plant. The East Route will result in an alteration of the current landscape through construction of steel poles of 135 to 165 feet in height. Xcel Energy has minimized aesthetic impacts by choosing a route that maximizes its length within the existing industrial Sherco Generating Plant.

5.2.6 Socioeconomics

Solar facility and transmission line projects have the potential to impact the socioeconomic conditions of an area in the short term through an influx of non-local personnel, creation of construction jobs, construction material and other purchases from local businesses, and expenditures on temporary housing for non-local personnel. In the long term, solar facility and transmission line projects may provide beneficial impacts to the local tax base in the form of revenues from property taxes paid. Additionally, permanent job creation or relocation of project personnel to the area for operation of a solar facility or transmission line project could affect area demographics.

5.2.6.1 Description of Resources

Solar Project

The Solar Project is in a rural area just outside of Becker within Becker and Clear Lake Townships. The Solar Project is directly adjacent to the municipal boundary of Becker. Additional incorporated communities that are geographically closest to the Solar Project are Clear Lake (2.4 miles northwest), Clearwater (3.8 miles west), Big Lake (1.2 miles east), and Monticello (1.3 miles south/southeast). The nearest metropolitan area is St. Cloud, which is approximately 12 miles northwest of the Solar Project.

Table 5.2-8 presents population and economic information about Minnesota and Sherburne County gathered from the U.S. Census Bureau Quick Facts and Explore Census Data websites. Data is provided at the county level to characterize the socioeconomic environment in the Solar Project Study Area and at the state level for the purpose of comparison.

Table 5.2-8: Socioeconomic Characteristics of the Solar Project Study Area

Socioeconomic Category	Minnesota	Sherburne County
Total Population (2010)[1]	5,303,925	88,499
July 1, 2019 Population Estimate[1]	5,639,632	97,238
Population Change 2010 to 2019 (percent)[1]	6.3	9.9
Total Minority Population (percent)[1, 2]	20.9	9.5
Total Housing Units[3]	2,420,473	33,542
Vacant Housing Units[3]	252,672	1,805
Per Capita Income (U.S. Dollars)[4]	$36,245	$34,013
Unemployment Rate (percent)[4]	3.9	3.1
Persons Living Below the Poverty Rate (percent)[4]	10.1	7.1
Top Three Industries[4,5]	E (25.2%), M (13.4%), and R (11.0%)	E (21.3%), M (15.8%), and R (11.7%)

1 U.S. Census Bureau, 2019

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

3 U.S. Census Bureau, 2018a

4 U.S. Census Bureau, 2018b

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

Based on the 2010 U.S. Census, the population of Sherburne County is 88,499 persons, which represents 1.6 percent of the total population of Minnesota. When compared to the July 1, 2019 population estimate, the total population in Sherburne County has increased by just under 10 percent since the 2010 census. The per capita income of Sherburne County is $34,013, which is lower than the state average. The unemployment rate in Sherburne County (3.1 percent) is slightly lower than the state average of 3.9 percent and the percentage of individuals classified as living below the poverty level in Sherburne County is lower than the state average at 7.1 percent and 10.1 percent, respectively. The primary industries in Sherburne County are classified as educational services, health care, and social assistance (21.3 percent), followed by manufacturing (15.8 percent), and retail trade (11.7 percent). The top three industries at the state level are the same as at the county level, with the manufacturing and retail trade industries playing a slightly lower role at the state level than at the county level.

According to the 2018 American Community Survey 5-year Estimates, approximately 1,805 vacant housing units exist in Sherburne County. In the nearest metropolitan area, St. Cloud, there are approximately 1,414 vacant housing units (U.S. Census Bureau, 2018c). In addition, according to the Visit St. Cloud website (visitstcloud.com, n.d.) 23 hotels and motels, three bed and breakfasts, and seven campgrounds are available in the greater St. Cloud area.

West Route

The West Route has the same Project Study Area as the Solar Project. The West Route is in a mixed industrial and agricultural area just west of and partially within the municipal boundary of the City of Becker in Becker Township, Sherburne County. Additional incorporated communities that are geographically closest to the West Route are Monticello (3.5 miles south/southeast), Big Lake (5.4 miles southeast), Clearwater (5.3 miles west), and Clear Lake (3.7 miles northwest). The nearest metropolitan area is St. Cloud which is approximately 13 miles northwest of the West Route.

The U.S. Census data presented in Table 5.2-8 and described for the Solar Project is representative of the socioeconomic conditions in the Project Study Area.

East Route

The East Route has the same Project Study Area as the Solar Project. The East Route is in a mixed industrial and commercial area within the southern municipal boundary of the City of Becker in Becker Township, Sherburne County. Additional incorporated communities that are geographically closest to the East Route are Big Lake (4.5 miles east/southeast), Monticello (4.9 miles south/southeast), Clear Lake (6.0 miles northwest), and Clearwater (7.0 miles northwest). The nearest metropolitan area is St. Cloud which is approximately 14 miles northwest of the East Route.

The U.S. Census data presented in Table 5.2-8 and described for the Solar Project is representative of the socioeconomic conditions in the Project Study Area.

5.2.6.2 Impacts and Mitigation

Solar Project

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

Construction of the Solar Project, as well as the HVTLs addressed below, would provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, transportation, and general supplies. Procurement of construction resources will give preference to women, veteran, and minority owned business contractors. The Project will also provide the first project opportunity for participants in Xcel Energy's soon-to-be-proposed Workforce and Training Development Program, which will help provide utility industry skills and training to women and members of the black, indigenous and people of color (BIPOC) community. The Solar Project will also create new local job opportunities for various trade professionals that live and work in the area and it is typical to advertise locally to fill required construction positions. Xcel Energy will utilize union labor to construct the Solar Project. Use of union labor will ensure the payment of prevailing wages for construction workers. Xcel Energy estimates, the Project will provide an estimated $115 million in wages from nearly 900 union construction jobs. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal

income will also be generated by circulation and recirculation of dollars paid out by the Solar Project as business expenditures and state and local taxes.

General skilled labor is expected to be available in Sherburne County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town workers will likely use lodging facilities nearby. The operations and maintenance of the solar facility will require approximately 24 long-term personnel. Xcel Energy anticipates that sufficient temporary lodging and permanent housing will be available within Sherburne County, and within the St. Cloud metropolitan area, to accommodate construction workers and long-term personnel.

In general, the socioeconomic impacts associated with the Project will be positive; therefore, no mitigative measures are proposed. Wages will be paid, and expenditures will be made to local businesses and landowners during the Solar Project's construction and operation. The Solar Project will provide more than $240 million in state and local benefits over the life of the project-comprised of $172 million in landowner payments and $32 million in state and local property taxes in addition to production taxes of approximately $36 million. In addition, lease and purchase payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production.

West Route

Construction of the West Route would have minimal, short-term impacts on the existing socioeconomic conditions near the Project Study Area. The West Route would not result in long-term or significant changes in the population size or demographics, or significantly affect employment or income, in the Project Study Area. The construction and operation of West Route is not anticipated to create or remove jobs in the Project Study Area or result in the permanent relocation of individuals to or from the area.

The communities in the Project Study Area will likely experience short-term positive economic impacts related to the increase in expenditures during construction of the West Route. Construction would take approximately four months and the construction work force would be approximately 40 workers. Construction personnel would likely commute to the West HVTL Project on a daily or weekly basis instead of relocating to the area. The influx of additional construction personnel in the Project Study Area will have a small positive impact on the local economy from construction crew expenditures in the local community (e.g., lodging, fuel, food). Construction materials (e.g., lumber, concrete, aggregate) may be purchased from local vendors when feasible.

No additional permanent staff will be necessary for operation and maintenance of the proposed transmission line; therefore, the West Route is not expected to change population trends, economic indicators, or employment. In addition, long-term beneficial impacts to the local tax base will result from the incremental increase in revenues from utility property taxes. As the overall socioeconomic impact of the West Route is anticipated to be positive, no mitigation measures are proposed.

East Route

Construction of the East Route would have minimal, short-term impacts on the existing socioeconomic conditions in the Project Study Area. The East Route would not result in long-term or signification changes in the population size or demographics, or significantly affect employment or income, in the Project Study Area. The construction and operation of the East Route is not anticipated to create or remove jobs in the Project Study Area or result in the permanent relocation of individuals to or from the area.

The communities in the Project Study Area will likely experience short-term positive economic impacts related to the increase in expenditures during construction of the East Route. Construction would take approximately four months and the construction work force would be approximately 40 workers. Construction personnel would likely commute to the East HVTL Project on a daily or weekly basis instead of relocating to the area. The influx of additional construction personnel in the Project Study Area will have a small positive impact on the local economy from construction crew expenditures in the local community (e.g., lodging, fuel, food). Construction materials (e.g., lumber, concrete, aggregate) may be purchased from local vendors when feasible.

No additional permanent staff will be necessary for operation and maintenance of the East Route; therefore, the East Route is not expected to change population trends, economic indicators, or employment. In addition, long-term beneficial impacts to the local tax base will result from the incremental increase in revenues from utility property taxes. As the overall socioeconomic impact of the East Route is anticipated to be positive, no mitigation measures are proposed.

5.2.7 Cultural Values

Cultural values include those perceived community attitudes or beliefs that provide a framework for community unity. Community and regional events focused on ethnic heritage or regionally important industry (e.g., agriculture) are a common expression of cultural values. Solar projects and transmission line projects have the potential to impact public participation in community and regional events during construction or operation of these projects.

5.2.7.1 Description of Resources

Solar Project

The Solar Project is in Sherburne County, Minnesota and according to the U.S. Census Bureau, the majority of the population in Sherburne County identifies as White alone, not Hispanic or Latino with an ethnic background of European origin (see Table 5.2-8 in Section 5.2.6.1). Cultural representation in community events appears to be more closely tied to seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include summertime events like the Big Lake Spud Fest (Biglakespudfest.com, n.d.) and history classes and events at the Sherburne History Center (Sherburne History Center, n.d.).

West Route

The Project Study Area for the West Route is the same as the Solar Project. As such, the cultural values of the local populace and the community events described for the Solar Project are representative of the West Route.

East Route

The Project Study Area for the East Route is the same as the Solar Project. As such, the cultural values of the local populace and the community events described for the Solar Project are representative of the East Route.

5.2.7.2 Impacts and Mitigation

Solar Project

Construction and operation of the Solar Project would not impact public participation in the regional community cultural events described above, as the Solar Project is predominantly outside of municipal areas where these opportunities exist. In terms of aesthetic impacts, the presence of the Solar Project will be similar to existing transmission lines, railroads, highways, municipal developments, and the Sherburne County Substation and Sherco Generating Plant in this area. See Section 5.2.5 for additional discussion of how the Solar Project may affect aesthetic resources. Therefore, no impacts on cultural values are anticipated and no mitigation measures are proposed.

West Route

The presence of the West Route will not impact public participation in the regional or community cultural events in the Project Study Area. In terms of aesthetic impacts, the presence of the West Route will be similar to existing transmission lines, railroads, urban development, and the Sherburne County Substation and Sherco Generating Plant in this area. See Section 5.2.5 for additional discussion of how the West Route may affect aesthetic resources.

Because the West Route is not anticipated to impact cultural values, no mitigative measures specific to cultural values are proposed.

East Route

The presence of the East Route will not impact public participation in the regional or community cultural events in the Project Study Area. In terms of aesthetic impacts, the presence of the East Route will be similar to existing transmission lines, railroads, urban development, and the Sherburne County Substation and Sherco Generating Plant in this area. See Section 5.2.5 for additional discussion of how the West East Project may affect aesthetic resources.

Because the East Route is not anticipated to impact cultural values, no mitigative measures specific to cultural values are proposed.

5.2.8 Recreation

Solar facilities and transmission lines have the potential to impact public use and enjoyment of recreation areas. Short-term increases in noise and dust during construction, aesthetic changes, and impeding access to public recreation areas could impact public use and enjoyment of these resources.

5.2.8.1 Description of Resources

Solar Project

There are various recreational opportunities in or near the Solar Project Area, including snowmobile trails and the Mississippi River (refer to Figure 10 - Recreation). Each of these offers recreation opportunities that attract residents and tourists.

There are no MNDNR SNAs, state trails, WMAs, state parks, or migratory waterfowl feeding and resting areas within one mile of the Solar Project Area. The nearest MNDNR WMA is the Kelly-Meyer WMA, located 2.4 miles south of the Solar Project Area, and the nearest state park is the Lake Maria State Park, located 3.3 miles south of the Solar Project Area (Figure 10 - Recreation).

The Mississippi River is located approximately 200 feet south of the Solar Project at its closest point (West Block) and is a State Water Trail with a public water access site located approximately 0.5 mile southeast of the West Block. The nearest Aquatic Management Area (AMA) is the Silver Creek AMA, located approximately 0.5 mile south of the West Block, on the south side of the Mississippi River.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. There is one snowmobile trail system within the Solar Project Area (Figure 10 - Recreation). The Sherburne County Snowmobile Trail #209 follows a field road along the northern edge of the West Block Boundary for 1.3 miles before it bisects the northeastern portion of the Project Area for 0.25 mile. The route then turns south and then follows the eastern boundary of the West Block for 0.75 mile. The snowmobile trail also follows the railroad track that borders the northeast boundary of the East Block, before turning south along the field road for 0.75 mile along the edge of the boundary and then turning east/southeast following the edge of the boundary for approximately 1.2 miles before it leaves the East Block boundary.

The West and East Blocks are both within 1 mile of the City of Becker municipal boundary, with a small portion of the East Block within the municipal boundary. The City of Big Lake is located about 1 mile east of the East Block. There are additional recreational opportunities associated with these municipalities, such as various community festivals and events. See the Tourism section in 5.3.3.1 for more information on these potential recreational activities that are not on public lands. There are no city or county parks within one mile of the Solar Project Area.

West Route

There are no MNDNR SNAs, state trails, WMAs, or state parks within one mile of the West Route. The nearest MNDNR WMA is the Kelly-Meyer WMA, located 3.6 miles south of the West Route,

and the nearest state park is the Lake Maria State Park, located 3.5 miles south of the West Route (Figure 10 - Recreation).

The Mississippi River is located approximately 460 feet west of the West Route at its closest point, and is a State Water Trail with a public water access site located approximately 0.4 mile west of the West Route. The nearest AMA is the Silver Creek AMA, located approximately 1.7 miles west of the West Route area, on the south side of the Mississippi River.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. There is one snowmobile trail within the West Route. The Sherburne County snowmobile trail crosses the West Route in two locations: first at the intersection of River Rd SE (CSAH 8) and 115th Avenue SE (County Road 53) where it then continues northeast through the agricultural field, and again near the northern portion of the route where it follows an existing east-west field road.

The West Route is within one mile of the City of Becker municipal boundary, with the southern portion of the West Route located within the municipal boundary, but also within the Sherco Generating Plant. There are additional recreational opportunities associated with the City of Becker, such as various community festivals and events. See the Tourism section in 5.3.3.1 for more information on these potential recreational activities that are not on public lands. There are no city or county parks, or public golf courses within one mile of the West Route. Pebble Creek Golf Club, located along Sherburne Avenue in the northeast portion of the City of Becker is located approximately 1.1 miles east of the West Route and is discussed further in Section 5.3.3.1.

East Route

There are no MNDNR SNAs, state trails, WMAs, or state parks within one mile of the East Route. The nearest MNDNR WMA is the Kelly-Meyer WMA, located 3.4 miles south of the East Route, and the nearest state park is the Lake Maria State Park, located 3.6 miles south (Figure 10 - Recreation).

The Mississippi River is located approximately 0.2 mile southwest of the East Route at its closest point, and is a State Water Trail with a public water access site located approximately 0.8 mile northwest of the East Route. The nearest Aquatic Management Area (AMA) is the Silver Creek AMA, located approximately 2 miles west of the East Route, on the south side of the Mississippi River.

There are no snowmobile trails crossed by the East Route. The closest snowmobile trail is 0.6-mile northeast of the East Route.

The majority of the East Route is located within the City of Becker municipal boundary. There are additional recreational opportunities associated with the City of Becker, such as various community festivals and events. See the Tourism section in 5.3.3.1 for more information on these potential recreational activities that are not on public lands. There are no city or county parks, or public golf courses within one mile of the East Route. Pebble Creek Golf Club located along Sherburne Avenue in the northeast portion of the City of Becker is located approximately 1.6 miles north of the East Route and is discussed further in Section 5.3.3.1.

5.2.8.2 Impacts and Mitigation

Solar Project

Due to the location of snowmobile trails within the Solar Project Area, Xcel Energy will coordinate with the Sherburne County snowmobile club to reroute the trails around the solar facility. While the specific locations of the re-routes have not been discussed with the Sherburne County snowmobile club, possible options for rerouting the trails may include rerouting the trail within the West Block to drop south at 90th Avenue and then follow River Road SE (CSAH 8); and rather than traveling east to 149th Street SE through the East Block, continue the trail south through the East Block along the existing transmission corridor between the solar facility fenced area and east along 157th St SE, then either north along 165th Ave SE or northeast through the field to connect to the existing trail. Xcel Energy recently coordinated with the Sherburne County snowmobile club on rerouting the trails on the east side of the Sherco Generating Plant. These changes are not yet incorporated into the MNDNR data. Xcel Energy will continue to coordinate with the snowmobile club about potential reroutes related to the Solar Project

Because snowmobile trails are often located on private land, rerouting trails is a common practice as land uses change. In addition to re-routing the snowmobile trail, snowmobilers will notice the different aesthetic along the portion of the snowmobile trail in the vicinity of the Solar Project. Instead of riding through center-pivot irrigation fields that are open space during the winter months, the trail would route around the solar facility and the rider would encounter the agricultural fence along the perimeter and solar arrays and access roads on the interior. In general, snowmobile trails form a network between cities. While portions of snowmobile trails pass more rural areas, other portions pass through municipalities and various developments. The introduction of a solar facility is not expected to affect use of the snowmobile trail. Finally, by its nature, snowmobiling is a mobile activity; snowmobilers are expected to pass the Solar Project on the established trails. Therefore, any aesthetic impacts would be limited to the rider's duration in the Project vicinity.

West Route

Construction of the West Route is not anticipated to affect public access to nearby recreational opportunities. The West Route does not cross any federal, state, or local recreation areas.

Impacts to recreation areas would mostly be related to transmission line construction, and will be minimal, temporary, and isolated to specific areas along the route. Short-term increases in noise and dust would occur during construction of the West Route, and could detract from public enjoyment of nearby recreational activities. However, these impacts would be minimal, and use of BMPs to limit noise and fugitive dust during construction would effectively mitigate their effects. Section 5.2.4 discusses how Xcel Energy would mitigate potential noise impacts and Section 5.5.1 provides a discussion of how Xcel Energy would mitigate fugitive dust emissions during construction of the Project.

East Route

Construction of the East Route is not anticipated to affect public access to nearby recreational opportunities. The East Route does not cross any federal, state, or local recreation areas.

Impacts to recreation areas would mostly be related to transmission line construction, and will be minimal, temporary, and isolated to specific areas along the route. Short-term increases in noise and dust would occur during construction of the East Route, and could detract from public enjoyment of nearby recreational activities. However, these impacts would be minimal, and use of BMPs to limit noise and fugitive dust during construction would effectively mitigate their effects. Section 5.2.4 discusses how Xcel Energy would mitigate potential noise impacts and Section 5.5.1 provides a discussion of how Xcel Energy would mitigate fugitive dust emissions during construction of the Project.

5.2.9 Land Use and Zoning

Solar facilities and transmission lines have the potential to be incompatible with existing land use patterns, local zoning requirements, and the future land use planning goals of local governments. A description of existing land uses and zoning requirements is included below.

5.2.9.1 Description of Resources

Land Use

Solar Project

The Solar Project is located within a rural landscape between the City of Becker and the City of Clear Lake to the West of the Sherco Generating Plant and south and east of the City of Becker to the East of the Sherco Generating Plant. The U.S. Geological Survey's (USGS's) 2016 National Land Cover Database (NLCD) was reviewed to identify land cover/use categories present within the Solar Project Area (Yang et al., 2018). As shown in Table 5.2-9 and on Figure 11 – Land Use/Land Cover, the primary land use category within the Solar Project Area is cultivated crops (93.0 percent; Yang et al., 2018). The remainder of the Solar Project Area consists of hay/pasture land (3.8 percent), developed land (2.1 percent), emergent herbaceous wetlands (0.3 percent), open water (0.3 percent), deciduous/evergreen/mixed forest land (0.1 percent), herbaceous land (0.1 percent), barren land (0.1 percent), and less than one percent each of woody wetlands and scrub/shrub land.

Table 5.2-9: Land Use Within the Solar Project Area

Land Cover/Use Category	Acres in Solar Project Area	Percent of Total Acreage
Cultivated Crops	3,237.4	93.0
Hay/Pasture Land	133.3	3.8
Developed Areas (i.e., low density, medium density, high density, and open space)	71.8	2.1
Emergent Herbaceous Wetlands	11.7	0.3
Open Water	11.5	0.3
Deciduous/Evergreen/Mixed Forest	4.6	0.1
Herbaceous Land	5.1	0.1
Barren Land	1.8	0.1
Woody Wetlands	1.1	< 0.1

Table 5.2-9: Land Use Within the Solar Project Area		
Land Cover/Use Category	**Acres in Solar Project Area**	**Percent of Total Acreage**
Scrub/Shrub Land	1.1	< 0.1
Total	**3,479.5**	**100.0%**
Source: 2016 NLCD (Yang et al., 2018)		

Cultivated cropland within the Solar Project Area is subject to row-crop agriculture, such as corn and soybeans. Most of the row crops in the Solar Project Area are irrigated by center pivot irrigation. Developed land within the Solar Project Area generally consists of public roads, such as 137th Street and County Road 8. Deciduous, Evergreen, and Mixed Forest are categories in the NLCD data used for this environmental analysis; however, forested land within the Solar Project Area consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. The small areas of woody wetlands and shrub/scrub land (1.1 acres each) within the Solar Project Area are within the East Block and are associated with the small areas of open water (collectively 11.5 acres spread across three ponds) that are also present within this portion of the Solar Project Area. Emergent herbaceous wetlands within the Solar Project Area (11.7 acres) are predominantly within the East Block, again associated with the areas of open water present in this portion of the Solar Project Area. See Section 5.5.5 for more information on wetlands.

Farmsteads and agricultural outbuildings are sparsely scattered throughout the Solar Project Area and neighboring parcels, generally situated near public roads. The existing Sherco Generating Plant, multiple transmission lines, and other commercial and industrial facilities south of the City of Becker are also adjacent to the Solar Project. Based on review of available aerial photography, there is one residence within and several residences and agricultural buildings on parcels adjacent to the Solar Project Area; however, the Solar Project will not cause displacement or relocation of residences (see Section 5.2.3).

West Route

As noted in the description of resources for the Solar Project, information available from the 2016 NLCD was reviewed to identify existing land cover types and uses crossed by the West Application Alignment (Yang et al., 2018). Table 5.2-10 presents details about the amount of each NLCD land cover type crossed by the 150-foot right-of-way of the West Application Alignment and this information is also displayed on Figure 11 – Land Use/Land Cover.

Table 5.2-10: Land Cover Types within the West Route		
Land Cover/Use Category	**Acres**	**Percent**
Route Length (miles)	3.2	
150-foot Right-of-Way (acres)	58.0	
Land Cover		
Cultivated Crops in 150-foot Right-of-Way (acres)	35.0	60.4
Hay/Pasture Land in 150-foot Right-of-Way (acres)	5.6	9.6
Herbaceous Land in 150-foot Right-of-Way (acres)	1.2	2.0

Table 5.2-10: Land Cover Types within the West Route		
Land Cover/Use Category	**Acres**	**Percent**
Developed Areas in 150-foot Right-of-Way (acres) (i.e., low density, medium density, high density, and open space)	16.2	28.0
Barren Land in 150-foot Right-of-Way (acres)	< 0.1	< 0.1
Source: 2016 NLCD (Yang et al., 2018)		

Based on the NLCD data, approximately 35.0 acres of cultivated crop land would be within the 150-foot right-of-way for the West Application Alignment. The remaining 23.0 acres within the 150-foot right-of-way is comprised of developed, hay/pasture, and herbaceous land with the exception of less than 0.1 acre of barren land (see Table 5.2-10). The NLCD data classified land within the Sherco Generating Plant as hay/pasture; based on aerial photography, these areas are ash storage areas. Developed lands are roads that are either crossed by or co-located with the West Application Alignment or associated with the Sherco Generating Plant. There are no emergent herbaceous wetlands, woody wetlands, or forested land within the 150-foot right-of-way of the West Application Alignment.

Typical crops grown in the cultivated crop areas along the West Route include corn, soybeans, and vegetables harvested for sale (USDA, 2017). A more detailed discussion of the existing agricultural economy near the West HVTL Project is presented in Section 5.3.1.1, and a discussion of vegetation types found within the non-agricultural areas is provided in Section 5.5.6.1.

East Route

Information available from the 2016 NLCD was reviewed to identify existing land cover types and uses crossed by the East Application Alignment (Yang et al., 2018). Table 5.2-11 presents details about the amount of each NLCD land cover type crossed by the 150-foot right-of-way of the East Application Alignment and this information is also displayed on Figure 11 – Land Use/Land Cover.

Table 5.2-11: Land Cover Types within the East Route		
Land Cover/Use Category	**Acres**	**Percent**
Route Length (miles)	1.7	
150-foot Right-of-Way (acres)	30.6	
Land Cover		
Cultivated Crops in 150-foot Right-of-Way (acres)	20.2	66.0
Hay/Pasture Land in 150-foot Right-of-Way (acres)	3.1	10.0
Developed Areas in 150-foot Right-of-Way (acres) (i.e., low density, medium density, open space)	6.7	21.9
Open Water in 150-foot Right-of-Way (acres)	0.6	2.1
Source: 2016 NLCD (Yang et al., 2018)		

As noted in Table 5.2-11, approximately 20.2 acres of cultivated crop land would be within the 150-foot right-of-way for the East Application Alignment. The remaining 10.4 acres within the 150-foot right-of-way are developed and hay/pasture land, with the exception of less than 0.1 acre

of open water. Developed lands are roads that are either crossed by or co-located with the East Application Alignment or associated with the Sherco Generating Plant. Open water crossed by the 150-foot right-of-way of the East Application Alignment is a stormwater retention pond within the existing Sherco Generating Plant, just east of the Sherburne County Substation. There is no herbaceous land, emergent herbaceous wetlands, woody wetlands, forest land, or barren land within the 150-foot right-of-way of the East Application Alignment.

Zoning

The Solar Project and West and East HVTL Projects are subject to Minnesota's Power Plant Siting Act (Minn. Stat. § 216E). As such, and pursuant to Minn. Stat. § 216E.10, subd. 1, a site permit or route permit issued by the Commission, "shall be the sole site or route approval required to be obtained by the utility. Such permit shall supersede and preempt all zoning, building or land use rules, regulations or ordinances promulgated by regional, county, local and special purpose government." Therefore, Xcel Energy is not required to apply to county zoning authorities for additional building or land use permits or approvals for the Solar Project or West and East HVTL Projects. However, zoning information provides important insight into existing human settlement patterns and future development and, for this reason, is presented herein.

Solar Project

As noted in Section 2.2.2, the Solar Project is located within three zoning jurisdictions: Sherburne County, Becker Township, and the City of Becker. All three zoning authorities have a solar energy ordinance. Table 5.2-12 shows the zoning authorities and zoning districts within the Solar Project Area; these are also displayed on Figure 6 - Zoning.

Table 5.2-12: Zoning Authorities for the Solar Project

Block	Zoning Authority	Zoning Districts in Solar Project Area
West Block	Sherburne County	Agricultural
		Recreational River
		Shoreland Overlay[1]
East Block	City of Becker	Power Generation
	Becker Township	Agricultural

[1] Xcel Energy has applied the structure setback of 150' in this overlay district.
Source: Sherburne County, 2018; Becker Township, 2019.

As noted in Sherburne County Zoning Ordinance Section 17 (General Development Regulations), Subdivision 17 (Solar Energy Systems and Solar Energy Farms, development of a solar farm (large solar energy systems) is an interim permitted use within the general agricultural district (Sherburne County, 2018). Solar farms are not permitted within the Mississippi and Rum Scenic and Recreational River Districts (Sherburne County, 2018). As noted in Table 5.2-12, the Sherburne County Zoning Ordinance applies to land in the West Block. Clear Lake Township, the township in which the Sherburne County Zoning Ordinance applies, is supportive of the Solar Project (Appendix C – Agency Correspondence).

Becker Township permits solar farms as a conditional use within the agricultural district (Becker Township Zoning Ordinance, Section 7; Becker Township, 2019). Becker Township is the zoning authority for most of the land in the East Block. There is approximately 72 acres of the East Block within the City of Becker; this area will only include a temporary laydown area during construction that is on Xcel Energy property and within the Sherco Generating Plant boundary (zoned a power generation). Solar panels will not be sited within the City of Becker.

Sherburne County also has a Shoreland Overlay District that is comprised of land located within 1,000 feet from the ordinary high-water level of natural environment lakes listed in the Sherburne County Shoreland Ordinance (Sherburne County, 2018). Xcel Energy applied the Shoreland Ordinance Structure Setback of 150 feet from the ordinary highwater mark of natural environment lakes subject to the Shoreland Ordinance, which is consistent with other permitted uses in the shoreland overlay district. For example, the permitted uses in the Sherburne County shoreland overlay district include: agricultural uses (such as cultivation, grazing, nurseries, horticulture, truck farming, sod farming and wild crop harvesting), animal feedlots, commercial, industrial, public, and semi-public uses that need access to and use of public waters, extractive uses (sand/gravel mining), and mining of metallic minerals and peat. Other uses may be permitted as conditional uses or as planned unit developments. The shoreland overlay district occurs on waters within and adjacent to the West Block. Becker Township does not have a Shoreland Overlay District for public waters and the public water wetlands within the East Block are not listed in or otherwise subject to the Sherburne County Ordinance.

As described in Section 2.2.2, the Solar Project complies with the setbacks within each of these three zoning authorities and districts. The structure setback in each of the four zoning jurisdictions is the same, with minor differences in the side yard or rear yard setback. In this instance, Xcel Energy applied the most conservative setback across the Solar Project, which is 50 feet.

West Route

The West Route is sited with the agricultural district of Sherburne County (Clear Lake Township) and power generation district of the City of Becker. As noted in Section 5.2.3, NESC standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Areas zoned as commercial, industrial, or residential are the most likely areas where future development of residences and other structures may occur. The industrial area of the Sherco Generating Plant has several existing transmission lines; residential development is unlikely adjacent to the Sherco Generating Plant. Zoning for the West Route is depicted on Figure 6 - Zoning.

East Route

The East Route is located within the agricultural district of Becker Township and the power generation district of the City of Becker. The industrial area of the Sherco Generating Plant has several existing transmission lines; residential development is unlikely adjacent to the Sherco Generating Plant. Zoning for the East Route is depicted on Figure 6 - Zoning.

5.2.9.2 Impacts and Mitigation

Solar Project

Table 5.2-13 provides the total acres of each land cover/use type within the Solar Project Footprint. Based on the NLCD data, the Solar Project Footprint predominately would affect cultivated cropland (96.3 percent).

Table 5.2-13: Land Use Impacts for the Solar Project

Land Cover/Use Category	Acres in Project Footprint	Percent of Total Acreage
Cultivated Crops	2,912.7	96.3
Hay/Pasture Land	86.5	2.9
Developed Areas (i.e., low density, medium density, high density, and open space)	13.9	0.5
Emergent Herbaceous Wetlands	2.3	0.1
Open Water	4.3	0.1
Deciduous/Evergreen/Mixed Forest	1.0	< 0.1
Herbaceous Land	1.1	< 0.1
Barren Land	0.2	< 0.1
Woody Wetlands	1.1	< 0.1
Scrub/Shrub Land	1.1	< 0.1
Total	**3,024.2**	**100.0%**

Source: 2016 NLCD (Yang et al., 2018)

Cultivated crop land will be converted from an agricultural use to solar energy use for the life of the Project. The conversion of agricultural land to solar facility within the Project Footprint will have a minimal impact on the rural character of the surrounding area or Sherburne County. As discussed further in Section 5.3, Land-based Economies, of the 277,069 acres that comprise Sherburne County, approximately 102,544 acres (37 percent) are farmland. The conversion of 2,912.7 acres of cultivated cropland to solar facility use for the life of the Project would reduce the amount of agricultural land in the county by 2.8 percent.

As agricultural land is impacted by the Project, Xcel Energy coordinated with the Minnesota Department of Agriculture (MDA). After consultation with the Agency, Xcel Energy voluntarily prepared an AIMP (Appendix F). Xcel Energy and NG Renewables met with MDA on April 6, 2021 to discuss the AIMP's contents and site-specific characteristics. This AIMP has incorporated BMPs into siting procedures, and identifies pre-construction and construction methods to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following decommissioning. The Decommissioning Plan and VMP were also developed in concert with the AIMP so as to maintain the land in a condition to allow for conversion back to agricultural use at the end of the Project's life. The VMP addresses best practices to conserve and manage soil erosion and decompaction during site restoration and operations. The Decommissioning Plan identifies

best practices to ensure rapid and effective conversion back to agricultural land at the end of Project life.

As noted above, development of solar farms in agricultural districts (Sherburne County and Becker Township) is an interim or conditional permitted use. There will not be solar facilities sited in the Recreation River District (Sherburne County) or within the City of Becker. As the Solar Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the Site Permit will serve as the land use permit. NG Renewables and Xcel Energy will continue to coordinate with Sherburne County, Clear Lake Township, and Becker Township on potential permits (i.e., driveway and utility crossing permits) for the Solar Project.

While developed land is present within the Solar Project Footprint in the form of public roadways (13.9 acres), Xcel Energy will avoid impacting this land cover/use type by incorporating setback requirements from Sherburne County and Becker Township in the solar facility design (refer to Table 2.2-1 for a listing of these setback requirements).

As noted in the description of resources, forested land within the Solar Project Area consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. Some tree clearing will be necessary for installation of the solar facility; however, Xcel Energy has designed the Project to avoid tree clearing on the perimeter of the Project Footprint which minimizes the amount of tree clearing required for the Project.

Areas of open water and emergent herbaceous wetlands are predominantly within the East Block of the Solar Project Footprint (4.0 and 2.1 acres, respectively). Open water and emergent herbaceous wetlands in the West Block (0.3 and 0.2 acre, respectively) are associated with ponds located just outside the fenceline of the northwestern corner of this block. The scale of the NLCD data used for the land cover/use analysis is such that the ponds within the East Block and directly adjacent to the West Block are captured in the analysis of the Project Footprint even though these areas are technically just outside of the Project Footprint. However, Xcel Energy has designed the solar facility to avoid impacts open water and emergent herbaceous wetlands and no facilities will be placed in these areas (see the Site Plan in Appendix E) and Section 5.5.5 for a more detailed discussion of potential wetlands impacts. The small areas of woody wetlands and shrub/scrub land (1.1 acres each) within the Solar Project Footprint are within the East Block and are associated with the small areas of open water discussed above; these areas will also not be impacted.

West Route

Construction and operation of the West Route is not expected to have a significant impact on land use within Sherburne County or the City of Becker. Existing land uses will experience minimal, short-term impacts during the period of construction. As described in Section 3.3.1, the Application Alignment for the West Route will be co-located with roads or property lines outside the Sherco Generating Plant to minimize impacts. When transmission line construction is complete, Xcel Energy will restore workspaces as described in Section 3.4.3, and agricultural land uses outside the Sherco Generating Plant will be allowed to continue as before. No additional mitigation measures are proposed. For a more detailed discussion of impacts and mitigation measures that will be employed in agricultural land, refer to Section 5.3.1.2.

The West Application Alignment crosses areas zoned as agricultural in Sherburne County and power generation in the City of Becker. In both zoning districts, the construction and operation of the West Route is not anticipated to affect the underlying land use, as the West Route is collocated with roads in the agricultural district (avoiding greenfield crossings of agricultural fields) and within the Sherco Generating Plant. This routing facilitates future planned commercial and industrial development within and adjacent to the Sherco Generating Plant; therefore, no mitigation measures are proposed.

East Route

Construction and operation of the East Route is not expected to have a significant impact on land use within Sherburne County. Existing land uses will experience minimal, short-term impacts during the period of construction. As described in Section 4.3.1, after the East Application Alignment leaves the East Collector Substation, and crosses 140th Avenue (Sherburne Avenue), the East Application Alignment is sited within the fenceline of the existing Sherco Generating Plant. When transmission line construction is complete, Xcel Energy will restore workspaces as described in Section 4.4.3, and land uses will be allowed to continue as before. No additional mitigation measures are proposed. For a more detailed discussion of impacts and mitigation measures that will be employed in agricultural land, refer to Section 5.3.1.2.

The East Application Alignment predominantly crosses areas zoned as power generation within the Sherco Generating Plant. The East Route has been sited to facilitate potential future commercial, industrial and energy generation development within and adjacent to the Sherco Generating Plant and to avoid existing infrastructure and land uses associated with the Sherco Generating Plant; therefore, no mitigation measures are proposed.

5.2.10 Public Services and Infrastructure

Solar and transmission line projects have the potential to impact public services during both construction and operation. This section provides information about public services in the Project Study Areas including water and wastewater services; school districts; utilities; and other public services and public utility infrastructure. It also discusses whether the Solar Project and the West and East Routes have the potential to affect these public services.

The influx of large numbers of non-local personnel to an area has the potential to increase enrollment in local school districts, if the non-local personnel are accompanied by their families. Finally, the location of existing utilities is one of the factors to be considered when siting of a solar facility or transmission line. While co-location with existing utilities is encouraged, any co-location with existing utilities should be done in a way that avoids impacting the safe operation and routine maintenance of those utilities.

5.2.10.1 Description of Resources

Solar Project

Public Services

Public services are those typically provided by a government entity to its citizens to benefit public health and safety. These services can include emergency services, potable water, sanitary systems, and utilities. Emergency services are discussed in Section 5.2.1.

In Sherburne County, most rural residences rely on private wells for their water supply. Sewage is serviced by residential septic tanks and/or drain fields. In the rural areas in the Project Study Area, residents often use private septic systems and wells (wells are discussed further in Section 5.5.2.1). Cities and towns in the Project Study Area rely on municipal water and sewer services, including in Becker. The residences nearest to the Solar Project have private septic systems and wells.

Telephone services in the Project Study Area are provided by Frontier Communications, Mid-Continent, and Windstream Communications. There are several broadband providers in Sherburne County offering a range of available technologies including mobile, fiber, satellite, and cable broadband service (Minnesota Department of Employment and Economic Development, 2020).

School districts in the Project Study Area include Becker (Independent School District [ISD] 726), St. Cloud (ISD 742), Big Lake (ISD 727), Foley (ISD 51), Princeton (ISD 477), Elk River (ISD 728), and Monticello (ISD 882).

Other public services in the Project Study Area are located primarily within municipalities. Public works and utility departments design, build, and maintain streets and sidewalks, sanitary sewers, water mains, and public landscaping. Public facilities within municipalities in the Project Study Area include swimming pools, ice rinks, parks, and libraries.

Public Utilities

The Solar Project is adjacent to the existing Sherco Generating Plant and Sherburne County Substation. As described in Section 2.2.1.7, the proposed West and East HVTLs will tie into the Sherburne County Substation to connect the Solar Project to the transmission grid. There are numerous existing 345 kV transmission lines that tie into the Sherburne County Substation between the East and West Blocks of the Solar Project; however, no 345 kV transmission lines are within the Solar Project Area.

Various transmission lines between 69 kV and 230 kV are located within the East and West Blocks of the Solar Project Area (Figures 9a and 9b – Existing Infrastructure and AADT). Within the West Block of the Solar Project, there is one 115 kV transmission line that bisects the southern portion of the West Block in an east-west direction through agricultural fields and one 69 kV transmission line that parallels River Road SE (CSAH 8). Within the East Block there are:

- A 69 kV transmission line that parallels U.S. Highway 10 on the south side that is within the East Block.

- A 69 kV that parallels 157th Street SE immediately adjacent to the southern portion of the East Block.
- A double circuit 230/115 kV line that bisects the southeast portion of the East Block in a north-south direction between agricultural fields.
- A 115 kV transmission line adjacent to the western boundary of the East Block that runs in a southeast to northwest direction.
- A 69 kV line on the western boundary along 140th Avenue.

Electrical service in the Project Study Area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint Energy (Xcel Energy, 2019; CenterPoint Energy, 2021). There are no pipelines in the Solar Project Area (National Pipeline Mapping System, 2019).

Communication Systems (Radio, Television, Cellular Phone, and GPS Systems)

There 58 Amplitude Modulation (AM) and Frequency Modulation (FM) radio broadcasting stations operating near Becker, Minnesota including, KCMP (89.3 FM), KNOW (91.1 FM), KQRS (92.5 FM), KSTP (94.5 FM), KQQL (107.9 FM), WXYG (540 AM), WDGY (740 AM), and WCCO (830 AM). These stations, and others, operate or can be heard within the vicinity of the Solar Project (Radio-Locator, n.d.).

There are more than 44 television channels broadcast in the Project Study Area; these channels would be received from cities including St. Cloud and the Minneapolis-St. Paul area (Antennas Direct.com, 2021). Mid-Continent is the local cable television service provider for the Becker area.

Telephone services are provided by Frontier Communications, Mid-Continent, and Windstream Communications. There are several broadband providers in Sherburne County offering a range of available technologies including mobile, fiber, satellite, and cable broadband service (Minnesota Department of Employment and Economic Development, 2020).

There are 33 cellular phone towers registered with the Federal Communications Commission (FCC) that are located near the City of Becker and in the Project Study Area. One tower is in Becker, about 1.2 miles east of the Solar Project. Several cellular phone service providers operate in the Project Study Area, including large carriers like Verizon, AT&T, Sprint, T-Mobile, Virgin Mobile, and Consumer Cellular.

GPS applications are important components of daily life, used in aviation, vehicle navigation, surveying, and agricultural activities. GPS equipment relies on satellites and typically mobile receiver equipment to provide locational information for navigation between endpoints, as well as geographic orientation for farm and other equipment. GPS equipment is likely used throughout the Project Study Area.

Transportation

The major roadway near the Solar Project is U.S. Highway 10 and the Solar Project Area is south of U.S. Highway 10 with some small portions of the boundary paralleling the highway. Other

roadways near and within the Solar Project Area are a mix of County State Aid Highways (CSAHs), county roads, and local and township roads.

The West Block of the Solar Project is generally about one mile south of U.S. Highway 10, but the northeast corner of the West Block extends northward toward the highway, putting the northeast corner of the West Block directly adjacent to U.S. Highway 10. The eastern edge of the West Block is bounded by 115th Avenue SE (County Road 53); the southern edge is bounded by riparian areas along the north side of the Mississippi River and River Road SE (CSAH 8); and the western edge is bounded by 95th Avenue for a short stretch and then continues along the edge of an agricultural field.

The East Block of the Solar Project is generally bounded by 137th Street on the north, by CSAH 11 on the east, by 157th Street SE on the south, and by 140th Street (Sherburne Avenue) on the west. While most of the northern edge of the East Block parallels 137th Street SE, a portion of the East Block juts out toward U.S Highway 10 and parallels the highway for about one mile.

Annual Average Daily Traffic (AADT) counts based on Minnesota Department of Transportation's (MNDOT's) Traffic Mapping Application for the roads surrounding and within the Solar Project Area are provided in Table 5.2-14 and displayed on Figures 9a and 9b – Existing Infrastructure and AADT (MNDOT, 2021).

Table 5.2-14: Annual Average Daily Traffic in the Solar Project Study Area

Roadway	Year	AADT Traffic Volume
U.S. Highway 10	2016	13,900 – 19,300[1]
CSAH 11	2018	12,800
CSAH 23	2018	5,800
125th Avenue SE (County Road 52)	2018	430
Minnesota Highway 25	2016	3,650
River Road SE (CSAH 8)	2018	2,750
115th Avenue SE (County Road 53)	2018	160

[1] As is typical for most roadways, AADT traffic volumes for U.S. Highway 10 are available in distinct segments along the length of the highway. Five of these distinct segments are in the vicinity of the Solar Project Area (i.e., between east of Becker and Clear Lake); for this reason, the lowest and highest volumes are provided.

Source: MNDOT, 2021

There will be multiple access points to each of the solar facility blocks:

- the West Block will be accessed from 115th Avenue SE (County Road 53; two access points), 108th Avenue, (five access points), 100th Avenue SE (one access point), and River Road SE (CSAH 8; two access points).

- the East Block of the Solar Project will be accessed from 165th Avenue SE (one access point), 157th Street SE (two access points), 140th Avenue (Sherburne Avenue; two access points), and 137th Street (one access point).

- There will also be an access to the East Collector Substation from 137th Street and to the West Collector Substation from 115th Avenue SE (County Road 53; this same access point provides access to the Solar Project).

On January 27, 2021, MNDOT provided comments on the Solar Project in its response to NG Renewables' Project notification letter. These comments revolved around access, vegetation management, and permitting (see Appendix C – Agency Correspondence).

There are no railroads within Solar Project Area. However, the Burlington Northern-Santa Fe Railroad (BNSF Railroad) parallels U.S. Highway 10 near the Solar Project Area. Just east of 125th Avenue SE (County Road 52), a spur from the BNSF Railroad turns south for about 1.3 miles until it reaches the BNSF Rail Loop, just north of the Sherco Generating Plant. The main route of the BNSF Railroad continues along U.S. Highway 10 through the City of Becker and beyond. In addition, a second spur of the BNSF Railroad (about 0.75 mile in length), separate from the spur to the BNSF Rail Loop described above, is located along the south side of Liberty Lane between Liberty Paper Company and U.S. Highway 10.

There are six Federal Aviation Administration (FAA)-registered airports in Sherburne County (FAA, 2020). The nearest FAA-registered airport to the Solar Project is the Leaders Clear Lake airport located approximately 1.9 miles north/northwest of the West Block of the Solar Project. This airport operates one asphalt runway.

West Route

Public Services

The Project Study Area for the West Route is the same as the Solar Project. As such, public services described for the Solar Project area also representative of the West Route.

Public Utilities

The West Route is located between 115th Avenue SE (County Road 53) and the existing Sherco Generating Plant and Sherburne County Substation. As described in Section 3.0, the proposed West Route will tie into the Sherburne County Substation to connect the West Block of the Solar Project to the transmission grid.

There is a 69 kV transmission line within the West Route on the north side of River Road SE (CSAH 8) between 115th Avenue SE (County Road 53) and 125th Avenue SE (County Road 52); the West Application Alignment crosses this transmission line when it turns south near the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52). There are numerous existing 345 kV transmission lines that tie into the Sherburne County Substation. Within the Sherco Generating Plant, the West Route crosses (perpendicular) two collocated 345 kV and 115 kV transmission lines on the north side of the facility. Approximate locations of these transmission lines are displayed on Figure 9c – Existing Infrastructure and AADT.

As described for the Solar Project, electrical service in the Project Study Area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint

Energy (Xcel Energy, 2019; CenterPoint Energy, 2021). There are no pipelines crossed by the West Application Alignment (National Pipeline Mapping System, 2019).

Communication Systems

Operation of transmission lines has the potential to interfere with reception of radio, television, cellular, and GPS signals. Corona, as well as spark discharge, from transmission line conductors can generate electromagnetic "noise" at the same frequencies that some radio, television, cellular, and GPS signals are transmitted. Electromagnetic noise, which typically occurs from about 0.1 to 50 megahertz (MHz), can interfere with the reception of these signals, depending on the frequency and overall strength of the radio and television signal.

AM radio frequencies are most commonly affected by corona-generated noise. Interference from a spark discharge source can be found and corrected. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side. If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system.

Television broadcast frequencies are typically high enough that they are not affected by corona-generated noise. In particular, digital and satellite television transmissions are not affected by corona-generated noise because they are dependent on packets of binary information, or transmitted in the Ku band of radio frequencies (12,000-18,000 MHz), respectively. Digital and satellite transmissions are more likely to be affected by multi-path reflections (shadowing) generated by nearby towers. In addition, line-of-sight interference from transmission line structures can affect satellite television transmissions. The use of shielded coaxial cable for cable television transmittals generally makes them insusceptible to interference from electromagnetic noise.

Cellular phone signals use an ultra-high frequency, generally around 900 MHz, which is significantly higher than the range of electromagnetic noise generated by transmission line conductors. GPS signals operate at a higher frequency as well, within the range of 1,225 to 1,575 MHz. Because both cellular phone signals and GPS operate at frequencies outside the range of electromagnetic noise generated by transmission line conductors, the risk of interference is negligible.

The Project Study Area for the West Route is the same as the Solar Project. As such, the radio, television, cellular phone, and GPS communication systems described for the Solar Project are representative of the West Route.

Transportation

The major roadway nearest to the West Route is U.S. Highway 10 and the West Route is south and west of U.S. Highway 10. Other roadways near and crossed by the West Route are a mix of CSAHs, county roads and local and township roads. The West Application Alignment crosses and then parallels 115th Avenue SE (County Road 53), parallels then crosses River Road SE (CSAH 8), and then parallels 125th Avenue SE (County Road 52) until it reaches the Sherburne County Substation. AADT counts based on MNDOT's Traffic Mapping Application for the roads

surrounding and crossed by the West Application Alignment are provided in Table 5.2-15 and displayed on Figures 9c – Existing Infrastructure and AADT (MNDOT, 2021).

Table 5.2-15: Annual Average Daily Traffic in the West Route Vicinity

Roadway	Year	AADT Traffic Volume Total
U.S. Highway 10	2016	16,400
115th Avenue SE (County Road 53)	2018	160
River Road SE (CSAH 8)	2018	2,750
125th Avenue SE (County Road 52)	2018	430
Source: MNDOT, 2021		

The West Application Alignment does not cross railroads. As described for the Solar Project, there are also several rail lines that service the Sherco Generating Plant on the north side of the facility.

As noted in the description of resources for the Solar Project, there are six FAA-registered airports in Sherburne County (FAA, 2020). The nearest FAA-registered airport to the West Application Alignment is the Leaders Clear Lake airport located approximately three miles northwest of the West Application Alignment. This airport operates one asphalt runway.

East Route

Public Services

The Project Study Area for the East Route is the same as the Solar Project. As such, public services described for the Solar Project Area are also representative of the East Route.

Public Utilities

The East Route is located between U.S. Highway 10 and the existing Sherco Generating Plant and Sherburne County Substation. As described in Section 4.0, the proposed East Route will tie into the Sherburne County Substation to connect the East Block of the Solar Project to the transmission grid.

There are four 345 kV transmission lines that connect into the Sherburne County Substation from the southeast that are south and west of the East Route; these lines are not crossed by the East Route. There are also two transmission lines crossed by the East Route: a 69 kV line along Sherburne Avenue and a 115 kV line within the Sherco Generating Plant. Both of these crossings are perpendicular. Approximate locations of these transmission lines are displayed on Figures 9d – Existing Infrastructure and AADT.

As described for the Solar Project, electrical service in Project Study Area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint Energy (Xcel Energy, 2019; CenterPoint Energy, 2021). There are no pipelines crossed by the East Application Alignment (National Pipeline Mapping System, 2019).

Communication Systems

As described for the West Route, operation of transmission lines has the potential to interfere with reception of radio, television, cellular, and GPS signals. The Project Study Area for the East Route is the same as the Solar Project. As such, the radio, television, cellular phone, and GPS communication systems described for the Solar Project are representative of the East Route.

Transportation

Similar to the Solar Project and West Route, the major roadway nearest to the East Route is U.S. Highway 10 and the proposed East Route is south and east of the highway. Other roadways paralleled and crossed by the East Route are local roads. The East Application Alignment parallels 137th Street at the East Collector Substation, then crosses 140th Avenue SE (Sherburne Avenue) into the Sherco Generating Plant, then continues traveling westward until it reaches the Sherburne County Substation.

AADT counts based on MNDOT's Traffic Mapping Application for U.S. Highway 10 in the vicinity of the East Route is 19,300 (2016). AADT counts for the local roads surrounding and crossed by the East Application Alignment are not available in MNDOT's Traffic Mapping Application (MNDOT, 2021). Roads in the Project Study Area are displayed on Figure 9d – Existing Infrastructure and AADT.

The East Application Alignment for the East Route does not cross railroads. The nearest railroad is the BNSF Railroad and BNSF Rail Loop, which are just north of the Sherco Generating Plant and about 0.3 mile north of the East Application Alignment. In addition, a second spur of the BNSF Railroad (about 0.75 mile in length), separate from the spur to the BNSF Rail Loop noted above, is located along the south side of Liberty Lane between Liberty Paper Company and U.S. Highway 10, about 0.4 mile north of the East Application Alignment.

As noted in the description of resources for the Solar Project, there are six FAA-registered airports in Sherburne County (FAA, 2020). The nearest FAA-registered airport to the East Route is the Leaders Clear Lake airport located approximately 5.9 miles northwest of the East Application Alignment. This airport operates one asphalt runway.

5.2.10.2 Impacts and Mitigation

Solar Project

Public Services

The Solar Project is not anticipated to interfere with the availability of public services or schools. Sherco Solar will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Xcel Energy will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Xcel Energy will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start. If Xcel Energy needs to cross an underground utility or other underground infrastructure with

heavy equipment, they will employ BMPs to protect the infrastructure, such as construction matting. Because no impacts on public services or schools are anticipated, no mitigation measures are proposed.

Public Utilities

As described in Section 2.2.1.7, the Solar Project will interconnect into the existing Sherburne County Substation via the proposed West and East Routes. The Solar Project will not impact existing transmission lines and Xcel Energy does not anticipate any customer outages for interconnect to the Sherburne County Substation.

Communication Systems

Due to the low-profile nature of a solar facility (i.e., less than 20 feet), which is well below the line of sight of some communication system signals, interference with communication systems has not been reported at solar facilities. This interference is typically caused by the conductors on a transmission line, which are not a component of a solar facility. As such, impacts to communication systems is not anticipated and no mitigation is proposed.

Transportation

Access to the Solar Project facilities will be via existing county and township roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Solar Project are shown on Figures 9a and 9b - Existing Infrastructure and AADT. During the construction phase, temporary impacts are anticipated on some public roads within and immediately adjacent to the Solar Project, primarily through additional traffic and slow-moving construction vehicles. No impacts to the BNSF Railroad mainline or spurs are anticipated from construction or operation of the Solar Project.

Construction traffic will use the existing federal, state, and county roadway system to access the Solar Project facilities and deliver construction materials and personnel. Traffic during construction is estimated to be approximately on average 275-350 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 30-40 semi-trucks per day will be used for delivery of solar facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment. Overweight or oversized loads are unlikely. If they are required, Xcel Energy will obtain the appropriate approvals prior to construction. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (AADT). Since some roadways in the area have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However, these delays should be minimal for the relatively short construction delivery period.

After construction is complete, traffic impacts during the operations phase of the Solar Project will be negligible. A small maintenance crew driving through the area in pickup trucks on a regular

basis will monitor and maintain the facilities as needed, but traffic function will not be impacted as a result.

The FAA Notice Criteria Tool was used to determine the need for filing 7460-1 Notice of Proposed Construction forms (Appendix C – Agency Correspondence). The results indicated the Solar Project does not exceed the Notice Criteria, however NG Renewables filed 7460-1 forms for the perimeter of the Solar Project Boundary in February of 2021. On February 18, 2021, the FAA provided Determinations of No Hazard to air navigation for each of the 49 points around the Solar Project Boundary. As such, Solar Project facilities will not exceed obstruction standards and would not be a hazard to air navigation. No mitigation measures are anticipated or proposed for air traffic.

West Route

Public Services

The West Route is not anticipated to interfere with the availability of public services or schools. Xcel Energy will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Xcel Energy will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Xcel Energy will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start. If Xcel Energy needs to cross an underground utility or other underground infrastructure with heavy equipment, they will employ BMPs to protect the infrastructure, such as construction matting. Because no impacts on public services or schools are anticipated, no mitigation measures are proposed.

Public Utilities

As described in Section 2.2.1.7, the West Route will interconnect into the existing Sherburne County Substation to deliver power from the West Block of the Solar Project to the grid. The West Application Alignment will cross a collocated 345 kV transmission line and 115 kV transmission line in the same location. The West Route will be designed to cross over these existing lines. Xcel Energy does not anticipate any customer outages for interconnect to the Sherburne County Substation.

Communication Systems

No impacts to radio, cellular phones, or GPS units are expected from construction or operation of the West Route. Similarly, interference to digital and satellite television signals as a result of the West Route is not anticipated. If interference to these signals were to occur from multi-path reflections or line-of-sight interference, such interference can be mitigated by use of an outdoor antenna to improve digital signals or by moving the affected satellite antenna to a slightly different location. Because no impacts on radio, television, cellular phones, or GPS units are anticipated from construction or operation of the West Route, no mitigation measures are proposed.

Transportation

Construction activities are not expected to permanently or significantly impact transportation in the Project Study Area. Construction could create a minor increase in traffic from construction vehicles and material/equipment delivery along these and other roadways; however, this increase would be temporary and traffic volumes would return to normal conditions after construction activities are completed. Line and construction maintenance at crossing locations could also cause temporary delays if maintenance vehicles are present. To minimize overall impacts, Xcel Energy will limit vehicle traffic to the West Route right-of-way and existing access points to the greatest extent feasible.

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner mounted on the back of a digger/derrick truck. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because of the generally rural nature of the area and subsequent low traffic levels on most roads. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow. Roadways in the Project Study Area are shown on Figure 9c - Existing Infrastructure and AADT.

As noted in Section 3.4.3, after the completion of construction, Xcel Energy will ensure that township, city, and county roads used for purposes of access during construction are returned to either the condition they were in, or better, before right-of-way clearing began. Xcel Energy will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.

East Route

Public Services

The East Route is not anticipated to interfere with the availability of public services or schools. Xcel Energy will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Xcel Energy will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Xcel Energy will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start. If Xcel Energy needs to cross an underground utility or other underground infrastructure with heavy equipment, they will employ BMPs to protect the infrastructure, such as construction matting. Because no impacts on public services or schools are anticipated, no mitigation measures are proposed.

Public Utilities

As described in Section 2.2.1.7, the East Route will interconnect into the existing Sherburne County Substation to deliver power from the East Block of the Solar Project to the grid. The East Application Alignment will cross the existing 69 kV transmission line which travels along 140th Avenue SE (Sherburne Avenue) and 115 kV transmission line about 0.5 mile west of 140th Avenue SE. The East Route will cross over both of these existing transmission lines. Xcel Energy does not anticipate any customer outages for interconnect to the Sherburne County Substation.

Communication Systems

The impacts and mitigation described for the West Route are applicable to the East Route. No impacts to radio, television, cellular phones, or GPS units are expected from construction or operation of the East Route. As such, no mitigation measures are proposed.

Transportation

Construction activities are not expected to permanently or significantly impact transportation in the Project Study Area. Furthermore, because the majority of the East Route is within the existing Sherco Generating Plant, use of public roadways will be limited. Construction could create a minor increase in traffic from construction vehicles and material/equipment delivery along these and other roadways; however, this increase would be temporary and traffic volumes would return to normal conditions after construction activities are completed. Line and construction maintenance near the intersection of 140th Street SE and 137th Street could also cause temporary delays if maintenance vehicles are present. To minimize overall impacts, Xcel Energy will limit vehicle traffic to the East Route right-of-way and existing access points to the greatest extent feasible.

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner mounted on the back of a digger/derrick truck. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because of the generally rural nature of the area and subsequent low traffic levels on most roads. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow. Roadways in the Project Study Area are shown on Figure 9d - Existing Infrastructure and AADT.

As noted in Section 4.4.3, after the completion of construction, Xcel Energy will ensure that township, city, and county roads used for purposes of access during construction are returned to either the condition they were in, or better, before right-of-way clearing began. Xcel Energy will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.

5.3 Land-Based Economies

Construction and operation of a solar facility and transmission lines have the potential to affect land-based economies through introduction of a physical, long-term presence which could prevent or otherwise limit use of the land for other purposes. The following subsections present an overview of agricultural, forestry, tourism, and mining operations in the Project Study Area and discuss how the Solar Project and West and East Routes may affect these industries and what measures Xcel Energy will implement to mitigate Project effects.

5.3.1 Agriculture

The placement of a solar facility on land used for row crop cultivation would result in a permanent conversion from row crop production to solar facility use for the life of the project. The placement of transmission line structures in cultivated cropland has the potential to interfere with farming operations if co-location with field edges and roadways is not possible due to other routing constraints. Interference with farming operations can negatively affect farm income.

5.3.1.1 Description of Resources

Solar Project

According to the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, of the 277,069 acres that comprise Sherburne County, approximately 102,544 acres (37 percent) are farmland. A total of 501 individual farms are located in Sherburne County, with the average farm size at 205 acres. The top crops (in acres) include corn, soybeans, and vegetables harvested for sale. Cattle tops the list of livestock inventory (by number) in Sherburne County, followed by poultry (broilers and other meat-type chickens sold), and sheep and lambs (USDA, 2017).

The market value of agricultural production in Sherburne County in 2017 was approximately $89 million. Crop sales accounted for 83.9 percent of the total value of agricultural production, while livestock, poultry, and their products accounted for the remaining 16.1 percent (USDA, 2017).

As noted in Section 5.5.3.1, no prime farmland or farmland of statewide importance is present within the Solar Project Area.

West Route

The USDA 2017 Census of Agriculture information described for the Solar Project is representative of the description of agricultural resources for the West Route. As noted in Section 5.5.3.1, no prime farmland or farmland of statewide importance is present within the proposed West Route.

East Route

The USDA 2017 Census of Agriculture information described for the Solar Project is representative of the description of agricultural resources for the East Route. As noted in Section 5.5.3.1, no prime farmland or farmland of statewide importance is present within the East Route.

5.3.1.2 Impacts and Mitigation

Solar Project

The Project will impact approximately 2,913 acres of cultivated crop land within the Solar Project Footprint and will not result in a significant impact on land-based economies in the Project Study Area, as this acreage constitutes 2.8 percent of the agricultural land in Sherburne County (102,544 acres). Agricultural production would continue in the surrounding areas during construction and operation of the Solar Project. The revenue lost from removing land from agricultural production will be offset by the leases and purchase options with the landowners. Areas disturbed during construction will also be repaired and restored to pre-construction contours and characteristics to the extent practicable. This restoration will allow the Solar Project's land surfaces to drain properly, blend with the natural terrain, re-vegetate, and avoid erosion. During construction and operation of the solar facility, agricultural production would be allowed to continue outside the fence of the Solar Project Footprint if practicable, particularly in the agricultural area that is zoned as Recreation River District that is avoided by Solar Project facilities..

Center-pivot irrigation systems are present within the Solar Project Area. Center-Pivot systems and the water/utility lines servicing them within the Project Footprint will be decommissioned and left in place. Any wells noted in the Project Footprint will either be marked with flagging and a five-foot buffer around them fenced so as to avoid impacting these structures, or fully decommissioned. If Xcel Energy identifies a need for wells during operations, these wells may be uncapped or new wells may be installed.

No areas used for animal husbandry are located within the Solar Project Area; therefore, no impacts on livestock production are anticipated.

West Route

Construction of the West Route could cause minimal, temporary impacts to farmland from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface. Table 5.3-1 summarizes the potential impacts of the West Application Alignment on farmland.

Table 5.3-1: Summary of Impacts of the West Route on Agricultural Land

Resource	West Route
Segment Length (miles)	3.2
150-foot Right-of-Way (acres)	58.0
Cultivated Crop Land in 150-Foot Right-of-Way (acres)[1]	35.0
Number of Structures in Cultivated Crop Land (based on preliminary engineering design)[1]	14
Total Impact from Structures in Cultivated Crop Land (acres)	< 0.1

[1] Agricultural land includes row crops. Pasture and hay are not included as they are classified separately in Table 5.2-10 in Section 5.2.9.1. The West Application Alignment is co-located with roads for the majority of its length and roads are classified as developed. Where structures are adjacent to roads (developed), the next closest land use type was used to reflect that poles will not be placed on roadways.

Xcel Energy will implement measures to reduce compaction, soil erosion, and the introduction of noxious weeds. Construction impacts to farmland would be short term and minimal in nature and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil during right-of-way clearing and transmission line construction. Xcel Energy will further mitigate impacts on agricultural production by coordinating with farm operators regarding the timing of construction to avoid peak growing season by constructing the West Route before spring planting or after harvest in the fall. If this is not possible, Xcel Energy will compensate the farm operator for crop damage, including any compaction that results from construction. See Sections 3.4.2 through 3.4.4 for a discussion of construction and restoration methods and operation and maintenance procedures.

The West Application Alignment was developed with attention to minimizing impacts on agricultural land; however, permanent impacts to agricultural land will occur where structures are placed in cultivated fields. Structures in cultivated fields act as barriers and can hinder efficient operation of large machinery. As described in Section 3.0, the proposed West Application Alignment predominately follows roads and property lines (avoiding greenfield crossings of agricultural fields) and within the Sherco Generating Plant. Xcel Energy proposes to minimize impacts to agricultural land by placing structures along field edges, as closely as feasible (approximately 10 feet) from the edge of road rights-of-way or property lines. Furthermore, Xcel Energy will work with landowners to finalize the structure locations. The final spacing and location of structures will be designed to accommodate the movement of farm equipment within agricultural fields while still maintaining safety and design standards. The estimated permanent impacts from each transmission structure foundation will be up to 12 feet in diameter at the surface. Refer to Table 5.3-1 for an estimate of total acres of permanent impact from structures in agricultural lands.

Post-construction restoration efforts will include restoration of any temporary access modifications and deep plowing to remove compaction. Both crop and livestock activities will be able to continue around West Route facilities after construction. While no impacts on agricultural land are anticipated during operation of the West Route, if crop impacts do occur during operation or maintenance of the transmission line, Xcel Energy will compensate the landowner or farm operator for crop damages.

East Route

Construction of the East Route could cause minimal, temporary impacts to farmland from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface. Table 5.3-2 summarizes the potential impacts of the East Application Alignment on farmland.

Table 5.3-2: Summary of Impacts of the East Route on Agricultural Land

Resource	East Route
Segment Length (miles)	1.7
150-foot Right-of-Way (acres)	30.6
Cultivated Crop Land in 150-Foot Right-of-Way (acres)[1]	20.2

Table 5.3-2: Summary of Impacts of the East Route on Agricultural Land	
Resource	**East Route**
Number of Structures in Cultivated Crop Land (based on preliminary engineering design)[1]	5
Total Impact from Structures in Cultivated Crop Land (acres)	< 0.1

[1] Agricultural land includes row crops. Pasture and hay are not included as they are classified separately in Table 5.2-11 in Section 5.2.9.1. The East Application Alignment is co-located with roads between the East Collector Substation and the fenceline of the existing Sherco Generating Plant; roads are classified as developed. Where structures are adjacent to roads (developed), the next closest land use type was used to reflect that poles will not be placed on roadways.

The East Application Alignment was developed with attention to minimizing impacts on agricultural land. As described in Section 4.0, the proposed East Application Alignment is predominately located within the Sherco Generating Plant and the short segment that is outside of the plant is co-located with roads. The NLCD land cover data classifies the land within the Sherco Generating Plant fenceline as a mix of cultivated cropland and hay/pasture land; however, this land is not used for agricultural production as it is part of an existing industrial facility. Based on preliminary design, only two transmission line structures would be placed outside of the Sherco Generating Plant, between the East Collector Substation and 140th Avenue SE. One of these structures will be within the East Collector Substation and the other structure will be placed approximately 10 feet from the edge of road right-of-way in a vegetated area that is outside of the agricultural field (located in the corner margin of the center pivot irrigation field). As such, there will not be any impacts to agricultural land and no mitigation is proposed.

5.3.2 Forestry

The introduction of a solar facility on land that is used for silviculture (i.e., forestry) would limit the continued use of that land for the life of the project. Similarly, trees are not allowed transmission line rights-of-way due to safety concerns.

5.3.2.1 Description of Resources

Solar Project

There are no forestry operations in the Solar Project Area. Wooded areas within the Solar Project Area consist of isolated rows of trees that are used as shelter belts between agricultural fields, near farmsteads, along roadways, and in riparian areas along waterbodies.

West Route

There are no forestry operations within the proposed West Route. Wooded areas within the West Route consist of isolated rows or clusters of trees that are used as shelter belts or wind breaks along the edges of agricultural fields and roadways.

East Route

There are no forestry operations along the proposed East Route. Wooded within the East Route consist of isolated rows of trees that are used as shelter belts or wind breaks along the edges of agricultural fields and roadways.

5.3.2.2 Impacts and Mitigation

Solar Project

As none of the trees in the Solar Project Area are considered forestry resources, no mitigative measures specific to forestry operations are proposed. Some tree clearing will be necessary for Solar Project; however, Xcel Energy has designed the Project to avoid tree clearing on the perimeter of the Project Footprint which minimizes the total amount of tree clearing required and also provides a natural buffer between the Solar Project and the surrounding area.

West Route

No forestry operations are present along the proposed West Route. Xcel Energy made every effort to site the West Application Alignment in a way that minimizes tree clearing. However, the West Route will result in the removal or trimming of trees within and/or adjacent to the transmission line right-of-way to ensure it is clear of obstructions. Vegetation management is necessary for the safe operation of the transmission line as tree branches can cause stress on transmission lines and increase the risk of outages. However, because none of the wooded areas along the West Application Alignment are forestry operations, no mitigation measures specific to forestry operations are proposed for the West Route.

To the extent possible, Xcel Energy will minimize the need for trimming and removal of trees during construction and operation of the transmission line. Where trimming of trees is necessary, it will be performed with best practices for tree trimming to minimize stress on the tree.

East Route

No forestry operations are present along the proposed East Route. Xcel Energy made every effort to site the East Application Alignment in a way that minimizes tree clearing. However, the East Route may result in the removal or trimming of trees within and/or adjacent to the transmission line right-of-way to ensure it is clear of obstructions. Vegetation management is necessary for the safe operation of the transmission line as tree branches can cause stress on transmission lines and increase the risk of outages. However, because none of the wooded areas along the East Application alignment are forestry operations, no mitigation measures specific to forestry operations are proposed for the East Route.

To the extent possible, Xcel Energy will minimize the need for trimming and removal of trees during construction and operation of the transmission line. Where trimming of trees is necessary, it will be performed with best practices for tree trimming to minimize stress on the tree.

5.3.3 Tourism

Solar facility and transmission line projects have the potential to impact tourism through aesthetic changes to the existing landscape or interruption of public access to nearby recreational and tourism opportunities.

5.3.3.1 Description of Resources

Solar Project

Tourism in the Project Study Area centers around outdoor recreational opportunities described in Section 5.2.8.1 and various community festivals and events.

The City of Big Lake, which is about 1 mile east of the East Block of the Solar Project, hosts various community events throughout the year. The Big Lake Block Party is held during August each year at McPete's Sports Bar & Lanes and offers family friendly activities like mini-golf and bowling and various food and beverage options (Big Lake Chamber of Commerce & Industry, 2021). Big Lake Spud Fest is held each year during the month of June and offers carnival rides, food vendors, a parade, and various other community events (Biglakespudfest.com, n.d.). Both of these events are held within the city limits of Big Lake.

The Sherburne History Center, located within the city limits of Becker, regularly hosts a number of public events including book clubs, history classes, tours of its museum exhibits (Sherburne History Center, n.d.). The history center is open year-round Tuesday through Saturday and is closed Sunday and Monday and on major holidays. The Sherburne History Center is about 1.5 miles east of the West Block of the Solar Project and the West Collector Substation.

Also, within the City of Becker is Pebble Creek Golf Club, located along Sherburne Avenue in the northeast portion of the city (Pebble Creek Golf, n.d.). In addition to its golf packages, the Pebble Creek Golf Club hosts public events throughout the year, including golf tournaments between May and October. Concert at the Creek is held annually in July and features live music and food and beverage offerings. The Pebble Creek Grill is open year-round and offers casual dining options. The Pebble Creek Golf Club also has banquet and conference facilities available to rent for weddings and other private events. The Pebble Creek Golf Club is about 1.5 miles north of the East Block and 2.2 miles east of the West Block of the Solar Project, respectively.

West Route

The description of tourism presented for the Solar Project is representative of tourism opportunities for the West Route. The City of Big Lake, and the events held within the city, is about six miles east of the West Route. The Sherburne History Center is about 0.8 mile northeast of the West Route. The Pebble Creek Golf Club is about 1.1 miles east of the West Route. See Section 5.2.8.1 for more details on recreation in the Project Study Area for the West Route.

East Route

The description of tourism for the Solar Project is representative of tourism opportunities for the East Route. The City of Big Lake, and the events held within the city, is about four miles east of

the East Route. The Sherburne History Center is about 2.6 miles north of the East Route. The Pebble Creek Golf Club is about 1.6 miles north of the East Route. See Section 5.2.8.1 for more details on recreation in the Project Study Area for the East Route.

5.3.3.2 Impacts and Mitigation

Solar Project

Xcel Energy will construct the Project facilities within the limits of the Solar Project Area and no road closures are anticipated to be necessary during active construction. No tourism opportunities were identified within or directly adjacent to the Solar Project Area. The annual events hosted by the City of Big Lake are held within the city limits and the Solar Project is about one mile west of Big Lake at the closest point. Events at the Sherburne History Center and Pebble Creek Golf Club in Becker would not be impacted by construction or operation of the Solar Project, and no impacts on public access to these events is anticipated during construction or operation of the Solar Project. Because no tourism impacts are anticipated, no mitigative measures are proposed.

West Route

Construction of the West Route is not anticipated to affect public access to nearby opportunities for tourism, as no tourism opportunities were identified within or directly adjacent to the proposed West Route. Xcel Energy has minimized potential impacts to tourism opportunities by siting the West Application Alignment to avoid recreation areas and other tourism opportunities. The West Route would not impact access to the Sherburne History Center, the Pebble Creek Golf Club, or any of the recreational areas described in Section 5.2.8.1.

East Route

Construction of the East Route is not anticipated to affect public access to nearby opportunities for tourism, as no tourism opportunities were identified within or directly adjacent to the proposed East Route. Xcel Energy has minimized potential impacts to tourism opportunities by siting the East Application Alignment to avoid recreation areas and other tourism opportunities. The East Route would not impact access to the Sherburne History Center, the Pebble Creek Golf Club, or any of the recreational areas described in Section 5.2.8.1.

5.3.4 Mining

Placement of solar facility components or transmission line towers near mining operations could interfere with access to existing mines and could limit the expansion of the mines.

5.3.4.1 Description of Resources

Solar Project

Gravel mining operations are found throughout Sherburne County. Based on review of MNDOTs Aggregate Source Information System (ASIS) data and County Pit Map for Sherburne County, there are no gravel pits within the Solar Project Area (MNDOT, 2018; MNDOT, 2001). The ASIS data and County Pit Map both show most gravel operations in the Project Study Area are north of

U.S. Highway 10. According to the ASIS data, the nearest gravel pits to the Solar Project Area are about 0.5 mile southwest of the East Block. The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 0.6-mile northeast of the East Block. Neither of these data sources show gravel mining operations near the West Block of the Solar Project.

Xcel Energy also reviewed several years of aerial imagery to identify gravel mining operations in the Solar Project vicinity. This review showed areas within the existing fenceline of the Sherco Generating Plant where gravel may be mined. One of these areas is within the western edge of the East Block, near a coal ash pond associated with the existing Sherco Generating Plant. These potential gravel pits are not shown in the ASIS data or on the County Pit Map and they are likely not commercial gravel pits, but are used exclusively by Xcel Energy.

West Route

As noted above, gravel mining operations are found throughout Sherburne County and most gravel operations in the Project Study Area are north of U.S. Highway 10. Based on review of MNDOTs ASIS data and County Pit Map for Sherburne County, there are no gravel pits within the proposed West Route (MNDOT, 2018; MNDOT, 2001). According to the ASIS data, the nearest gravel pit to the West Route is about 0.5 mile to the south, on the south side of the Mississippi River. The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 2.2 miles east of the West Route.

Review of several years of aerial imagery did not identify any additional commercial gravel pits near the West Route.

East Route

As noted above, gravel mining operations are found throughout Sherburne County and most gravel operations in the Project Study Area are north of U.S. Highway 10. Based on review of MNDOTs ASIS data and County Pit Map for Sherburne County, there are no gravel pits within the proposed East Route (MNDOT, 2018; MNDOT, 2001). According to the ASIS data, the nearest gravel pit to the East Route is about 1.3 miles to the south/southeast. The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 1.3 miles northeast of the East Route.

As described for the Solar Project, based on several years of aerial imagery, there are two potential areas within the existing fenceline of the Sherco Generating Plant where gravel may be mined. Both areas are within the East Route, near a coal ash pond associated with the existing Sherco Generating Plant. These potential gravel pits are not shown in the ASIS data or on the County Pit Map and they are likely not commercial gravel pits, but are used exclusively by Xcel Energy.

5.3.4.2 Impacts and Mitigation

Solar Project

Xcel Energy proposed a temporary laydown area during construction in a location where aerial photography indicates graveling may have occurred within the Sherco Generating Plant (private use). If necessary, this laydown area will be graded prior to construction to create a flat and stable workspace for staging and parking. No other mining resources are located within or directly

adjacent to the Solar Project Area. Construction and operation of the Solar Project would not impact commercial mining operations and therefore no mitigative measures are proposed.

West Route

No mining resources are located within the West Route, as such no direct impacts to mining operations will occur as a result of the West Route and no mitigation measures are proposed.

East Route

There are two areas within the East Route within the Sherco Generating Plant that may have been used by Xcel Energy for aggregate or gravel (private use). Prior to construction, these areas will be graded to create a suitable workspace for the four proposed transmission structures. No direct impacts to commercial mining operations will occur as a result of the East Route and no mitigation measures are proposed.

5.4 Archaeological and Historic Resources

Cultural resources include archaeological and historic architectural resources that provide important information about the history of human occupation and alteration of the landscape over time. Archaeological resources include prehistoric and historic artifacts, structural ruins, or earthworks that are typically found either partially or completely below the ground surface. Historic architectural resources include standing structures, such as buildings and bridges, as well as historic districts and landscapes.

Construction and operation of solar facility and transmission line projects has the potential to impact archaeological and historic resources. Archaeological resources could be impacted by the disruption or removal of subsurface archaeological materials, structural remains, or earthworks during solar facility and transmission line construction. Historic architectural resources may be impacted by the placement of a solar facility or a transmission line within the established viewshed of an historic property, which could affect the integrity of the viewshed in a way that decreases the historic value of the resource.

The following subsections present an overview of previously recorded archaeological and historic architectural resources within and within one mile of the Solar Project Area and West and East HVTL Projects, and discuss how the Solar Project and West and East HVTL Projects may affect these cultural resources and what measures Xcel Energy will implement to mitigate Project effects.

5.4.1 Description of Resources

5.4.1.1 Solar Project

Xcel Energy conducted a Phase Ia literature review to identify previously recorded archaeological and historic architectural resources within and within one mile of the Solar Project Area. Westwood conducted the Phase Ia literature review for the East Block of the Solar Project; literature review for the West Block of the Solar Project was conducted by Tetra Tech, Inc. (Tetra Tech). The Phase Ia literature reviews included review of the online portal maintained by the Office of the State Archaeologist (OSA) and a request for documentation on file at the Minnesota

State Historic Preservation Office (SHPO) including site maps, archaeological site forms, burial files, historic structure inventories, and survey reports. Because of restrictions related to the COVID-19 pandemic, in-person review of documentation on file at the OSA and Minnesota SHPO was not possible.

Westwood and Tetra Tech also conducted Phase I surveys of the Solar Project Area to identify any previously undocumented archaeological resources. The results of the Phase Ia literature reviews and the Phase I surveys are summarized below. Xcel Energy notes that the Phase I surveys were completed for the Solar Project Area, except the two proposed temporary laydown areas outside the Solar Project Footprint. Both laydown areas are on Xcel Energy land, one in cultivated cropland and the other within the Sherco Generating Plant. Xcel Energy will survey these two additional areas in the Spring of 2021; following the survey, Xcel Energy will submit the Phase I report to SHPO.

Previously Recorded Archaeological and Historic Architectural Resources

Table 5.4-1 summarizes the results of the Phase Ia literature review for the Solar Project. Because the West and East Blocks of the Solar Project are geographically distinct, some previously recorded archaeological sites and historic architectural resources are within one mile of both blocks. The Phase Ia literature reviews results in Table 5.4-1 include a complete count for each block. A discussion of previously recorded archaeological sites and historic architectural resources follows the table and explains which sites are within one mile of both blocks.

Table 5.4-1: Summary of Previously Recorded Archaeological and Historic Architectural Resources for the Solar Project

Cultural Resources Categories	Within 1 Mile of Solar Project Boundary[1]		Within Solar Project Boundary	
	East Block	West Block	East Block	West Block
Total Archaeological Sites	3	2	0	0
Total Eligible for NRHP	0	0	0	0
Number of Historic Architectural resources	13	5	0	0
Total Eligible for NRHP	3	1	0	0
Total Previously Recorded Cultural Resources	**16**	**7**	**0**	**0**
Total NRHP-eligible Resources	**3**	**1**	**0**	**0**

Note: NRHP = National Register of Historic Places

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

No previously recorded archaeological sites were identified within the West Block. However, two previously recorded archaeological sites were identified within one mile of the West Block. One of these sites is a ‘site lead’ for a ghost town named Freemont City. Site leads are reported sites that have not been verified or their precise location is unknown. The other site is a Precontact-Woodland habitation site. According to information obtained from OSA and SHPO, neither of these resources were evaluated for listing in the National Register of Historic Places (NRHP).

No previously recorded archaeological sites were identified within the East Block. However, three previously recorded archaeological sites were identified within one mile of the East Block. The sites consist of two precontact lithic scatters and recording of a single precontact artifact in an area of heavy disturbance. According to information obtained from OSA and SHPO, none of these resources were evaluated for listing in the NRHP.

No previously recorded historic architectural resources were recorded within the West Block. However, five previously recorded historic architectural resources were identified within one mile of the West Block. The previously recorded historic architectural resources consist of one halfway house, the Ed Johnson Farm, the W. G. White Farmhouse, District School No. 23, and Minnesota Highway 10 (Elk River to St. Cloud). Minnesota Highway 10 (Elk River to St. Cloud), is also within one mile of the East Block. Of these five previously recorded historic architectural resources, four have not been evaluated for listing in the NRHP. As noted above in the discussion of the East Block Phase Ia literature review, Minnesota Highway 10 (Elk River to St. Cloud) has been determined eligible for listing in the NRHP.

No previously recorded historic architectural resources were recorded within the East Block. Thirteen previously recorded historic architectural resources were identified within one mile of the East Block. The previously recorded historic architectural resources consist of five residences, four farmsteads (one of which has been removed), one bridge, the Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud). Ten of the previously recorded historic architectural resources have not been evaluated for listing in the NRHP. The Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud) have been determined to be eligible for listing in the NRHP.

Phase I Survey

In September, October, and December 2020, Tetra Tech conducted a Phase I survey of the West Block. In September and October of 2020, Westwood conducted a Phase I survey of the East Block. Both Phase I surveys included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent.

Ground visibility at the time of surveys within the West Block ranged from 25 to 100 percent in agricultural fields and from 0 to 25 percent in vegetated areas, wooded areas, road rights-of-way, and developed areas. Ground visibility at the time of survey within the East Block ranged from 25 to 95 percent. No cultural resources were identified in the West or East Blocks as a result of survey. Additional survey of temporary laydown yards will be conducted during the 2021 field season.

The Phase I survey results (which include the Phase Ia literature review results) for the Solar Project will be submitted to the Minnesota SHPO in the second quarter of 2021, after the 2021 field surveys for the Solar Project are complete.

5.4.1.2 West Route

Tetra Tech was engaged to conduct a Phase Ia literature review to identify previously recorded archaeological and historic architectural resources within and within one mile of the proposed

West Route. The Phase Ia literature review included review of the online portal maintained by the OSA and a request for documentation on file at the Minnesota SHPO including site maps, archaeological site forms, burial files, historic structure inventories, and survey reports. Because of restrictions related to the COVID-19 pandemic, in-person review of documentation on file at the OSA and Minnesota SHPO was not possible.

Tetra Tech also conducted a Phase I survey to identify any previously undocumented archaeological resources. The results of the Phase Ia literature review and the Phase I survey are summarized in Tetra Tech's Phase I survey report available in Appendix J – Phase I Survey Reports.

Previously Recorded Archaeological and Historic Architectural Resources

Table 5.4-2 summarizes the results of the Phase Ia literature review for the West HVTL Project. A discussion of previously recorded archaeological sites and historic architectural resources follows the table.

Table 5.4-2: Summary of Previously Recorded Archaeological and Historic Architectural Resources for the West HVTL Project

Cultural Resources Categories	Within 1 Mile of Route	Within Route
Total Archaeological Sites	2	0
Total Eligible for NRHP [1]	0	0
Number of Historic Architectural resources	1	0
Total Eligible for NRHP [1]	1	0
Total Previously Recorded Cultural Resources	**3**	**0**
Total NRHP-eligible Resources	**1**	**0**

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

No previously recorded archaeological sites were identified within the West Route as a result of the Phase Ia literature review. Two previously recorded archaeological sites lie within one mile of the West Route. The sites consist of one Precontact artifact scatter and one Precontact - Woodland habitation site (this site is also within one mile of the West Block of the Solar Project and the East Route). Neither site has been evaluated for listing in the NRHP.

No previously recorded historic architectural resources were identified within the West Route, but one previously recorded historic architectural resource was identified within one mile of West Route. The previously recorded historic architectural resources is Minnesota Highway 10 (Elk River to St. Cloud), which has been determined to be eligible for listing in the NRHP.

Phase I Survey

In September, October, and December 2020, Tetra Tech conducted a Phase I survey for the West HVTL Project. The Phase I survey included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent. Ground visibility

at the time of survey within the West Route ranged from 25 to 100 percent in agricultural fields and from 0 to 25 percent in vegetated areas, wooded areas, road rights-of-way, and developed areas. No cultural resources were identified within the West Route as a result of survey.

The Phase I survey results (which include the Phase Ia literature review results) for the West HVTL Project are included in the same report as the Phase I survey results for the West Block of the Solar Project. The report will be submitted to the Minnesota SHPO in the second quarter of 2021, after the 2021 field surveys for the Solar Project are complete.

5.4.1.3 East Route

Westwood was engaged to conduct a Phase Ia literature review to identify previously recorded archaeological and historic architectural resources within and within one mile of the East HVTL Project. The Phase Ia literature review included review of the online portal maintained by the OSA and a request for documentation on file at the Minnesota SHPO including site maps, archaeological site forms, burial files, historic structure inventories, and survey reports. Because of restrictions related to the COVID-19 pandemic, in-person review of documentation on file at the OSA and Minnesota SHPO was not possible.

Westwood also conducted a Phase I survey for the East HVTL Project to identify any previously undocumented archaeological resources. The results of the Phase Ia literature review and the Phase I survey are summarized in Westwood's Phase I survey report available in Appendix J – Phase I Survey Reports.

Previously Recorded Archaeological and Historic Architectural Resources

Table 5.4-3 summarizes the results of the Phase Ia literature review for the East HVTL Project. A discussion of previously recorded archaeological sites and historic architectural resources follows the table.

Table 5.4-3: Summary of Previously Recorded Archaeological and Historic Architectural Resources for the East HVTL Project

Cultural Resources Categories	Within 1 Mile of Route	Within Route
Total Archaeological Sites	3	0
Total Eligible for NRHP [1]	0	0
Number of Historic Architectural resources	6	0
Total Eligible for NRHP [1]	3	0
Total Previously Recorded Cultural Resources	**9**	**0**
Total NRHP-eligible Resources	**3**	**0**

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

No previously recorded archaeological sites were identified within the East Route as a result of the Phase Ia literature review. Three previously recorded archaeological sites lie within one mile of the East Route. The sites consist of two Precontact lithic scatters and one Precontact - Woodland

habitation site (this site is also within one mile of the West Block of the Solar Project and the West Route). The lithic scatters are recommended as not eligible for NRHP listing as both sites possess low research potential; the habitation site has not been evaluated for listing in the NRHP.

No previously recorded historic architectural resources were identified within the East Route. Six previously recorded historic architectural resources were identified within one mile of East Route. The previously recorded historic architectural resources consist of one residence, two farmsteads (one of which has been removed), the Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud). Three of the previously recorded historic architectural resources have not been evaluated for listing in the NRHP. The Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud) have been determined to be eligible for listing in the NRHP.

Phase I Survey

In September and October of 2020, Westwood conducted a Phase I survey for the East HVTL Project. The Phase I survey included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent. Ground visibility at the time of survey ranged from 25 to 95 percent; no cultural resources were identified as a result of survey. The portion of the East Route that is within the existing Sherco Generating Plant was visually examined and determined to be heavily disturbed making the presence of intact archaeological deposits unlikely.

The Phase I survey results (which include the Phase Ia literature review results) for the East HVTL Project are included in the same report as the Phase I survey results for the East Block of the Solar Project. The report will be submitted to the Minnesota SHPO in the second quarter of 2021, after the 2021 field surveys for the Solar Project are complete.

5.4.2 Impacts and Mitigation

5.4.2.1 Solar Project

No archaeological or historic sites, or historic architectural resources were identified within the Solar Project Area as a result of Phase Ia literature review or Phase I survey. The three NRHP-listed resources that are within one mile of the Solar Project were determined to be eligible for listing in the NRHP based on their historic association with transportation. Construction and operation of the Solar Project would not adversely affect the ability of these resources to convey their historic association with transportation nor would the Solar Project affect the NRHP eligibility of these resources. Therefore, the construction and operation of the Solar Project will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

Before construction of the Solar Project begins, Xcel Energy will prepare an Unanticipated Discoveries Plan that will outline the steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction. If archaeological resources are discovered during construction, ground-disturbing activity will be halted in that location, SHPO will be notified, and appropriate measures will be developed in conjunction with SHPO to assess and

protect the resource. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Xcel Energy and the State Archaeologist.

5.4.2.2 West Route

No archaeological or historic sites, or historic architectural resources were identified within the West Route as a result of Phase Ia literature review or Phase I survey. The NRHP-listed resource that is within one mile of the West HVTL Project was determined to be eligible for listing in the NRHP based on its historic association with transportation. Construction and operation of the West HVTL Project would not adversely affect the ability of this resource to convey its historic association with transportation nor would the West HVTL Project affect the NRHP eligibility of the resource. Therefore, the construction and operation of the West HVTL Project will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

Xcel Energy will develop an Unanticipated Discovery Plan prior to the start of West Route construction. If archaeological resources are discovered during construction, ground-disturbing activity will be halted in that location, SHPO will be notified, and appropriate measures will be developed in conjunction with SHPO to assess and protect the resource. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Xcel Energy and the State Archaeologist.

5.4.2.3 East Route

No archaeological or historic sites, or historic architectural resources were identified within the East Route as a result of Phase Ia literature review or Phase I survey. The three NRHP-listed resources that are within one mile of the East HVTL Project were determined to be eligible for listing in the NRHP based on their historic association with transportation. Construction and operation of the East HVTL Project would not adversely affect the ability of these resources to convey their historic association with transportation nor would the East HVTL Project affect the NRHP eligibility of these resources. Therefore, the construction and operation of the East HVTL Project will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

Xcel Energy will develop an Unanticipated Discovery Plan prior to the start of East Route construction. If archaeological resources are discovered during construction, ground-disturbing activity will be halted in that location, SHPO will be notified, and appropriate measures will be developed in conjunction with SHPO to assess and protect the resource. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Xcel Energy and the State Archaeologist.

5.5 Natural Environment

Construction and operation of solar facility and transmission line projects has the potential to impact natural resources through temporary, construction-related impacts and/or long-term impacts on air quality, geology and groundwater, soils, water resources, vegetation, and wildlife. Construction of the Solar Project and West and Routes would temporarily impact air quality with vehicle emissions and dust, impact bedrock and groundwater resources with structure foundations, and temporarily disturb soils and vegetative cover which could affect water quality in adjacent water resources and could affect habitat for wildlife. Avian species could also potentially be impacted by operation of a transmission line through collisions with transmission line structures and conductors.

The following subsections present an overview of the natural resources in the Project Study Area and discuss how the Solar Project and West and East Routes may affect these resources and what measures Xcel Energy will implement to mitigate Project effects.

5.5.1 Air Quality

Solar facility and transmission line projects have the potential to impact air quality through temporary, construction-related impacts from vehicle emissions and dust. Operation of transmission lines has the potential to create ozone due to corona discharges which can affect air quality.

5.5.1.1 Description of Resources

Solar Project

Section 109(b) of the Clean Air Act (CAA) requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) "requisite to protect" public health and welfare (40 Code of Federal Regulations Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly; and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife, and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), particulate matter (PM_{10}/$PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Minnesota has been in compliance with the primary and secondary NAAQS for all criteria pollutants since 2002 (MPCA, 2021a).

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups (USG), unhealthy, or very unhealthy (MPCA, 2021b).

The Project is located nearest to the air quality monitor in St Cloud, Minnesota. This station monitors for O_3 and $PM_{2.5}$. The AQI for St. Cloud for the past five years is provided in Table 5.5-1 (MPCA, 2021c).

Table 5.5-1: Days in Each Air Quality Index Category (St. Cloud, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2019	313	31	0	0	0
2018	310	54	1	0	0
2017	329	36	0	0	0
2016	338	28	0	0	0
2015	327	27	1	0	0

Source: MPCA, 2021c.

Air quality has been considered good for the majority of the past five reported years in St. Cloud. Since 2015, the largest number of days classified as moderate or USG occurred in 2018. No days have been classified as unhealthy or very unhealthy.

West Route

The description of resources for the West Route is the same as provided for the Solar Project above.

East Route

The description of resources for the East Route is the same as provided for the Solar Project above.

5.5.1.2 Impacts and Mitigation

Solar Project

When necessary, dust from construction traffic will be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover.

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

The Solar Project will partially replace energy generation from Unit 2 at the Sherco Generating Plant. Therefore, operation of the Solar Project will result in a direct reduction of NO_x, SO_x, and CO_2 in the vicinity of the Solar Project. Air quality in the vicinity of the Solar Project will likely improve.

West Route

Similar to the Solar Project, dust will be generated during construction of the West Route. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and road surface characteristics. Dust emissions would be greater during dry periods and in areas where fine-textured soils are subject to surface activity. If construction activities generate problematic dust levels, Xcel Energy may employ construction-related practices to control fugitive dust such as application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic, reducing the speed of vehicular traffic on unpaved roads, and covering open-bodied haul trucks.

Air emissions during construction would primarily consist of emissions from construction equipment and would include carbon dioxide, nitrous oxide, and particulate matter; dust generated from earth disturbing activities would also give rise to particulate matter. Emissions would be dependent on weather conditions, the amount of equipment at any given location, and the period of operation required for construction at that location. Any emissions from construction would be similar to those from agricultural activities common in the vicinity of the West Route and would only occur for short periods of time in localized areas.

During operation of the line, air emissions would be minimal. An insignificant amount of ozone is created due to corona from the operation of transmission lines (Electric Power Research Institute, 1982; Whitmore and Durfee, 1973; U.S. Department of Energy, Bonneville Power Administration, 1989). A corona signifies a loss of electricity and Xcel Energy has engineered the transmission line to limit the corona. The production rate of ozone due to corona discharges decreases with humidity and less significantly with temperature. Rain causes an increase in ozone production, but also accelerates the decay of ozone. Ozone production by high voltage transmission lines is not detectable during fair weather above ambient conditions. Ozone production under wet-weather conditions is detectable with special efforts, but is still considered insignificant.

Design of the transmission line also influences its ozone production rate. The production rate decreases significantly as the conductor diameter increases and is greatly reduced for bundled conductors over single conductors. The production rate of ozone increases with applied voltage. The emission of ozone from the operation of a transmission line of the voltages proposed for the West Route is not anticipated to have a significant impact on air quality and no mitigation is proposed.

East Route

The impacts and mitigation discussed for the West Route above are the same for the East HVTL Project.

5.5.2 Geology and Groundwater Resources

Construction and operation of solar facility and transmission line projects has the potential to impact geology and groundwater through temporary, construction-related impacts and/or long-term impacts. Installation of structure foundations could impact bedrock and groundwater. In addition, disturbance of soils and vegetative cover could affect water quality in adjacent groundwater resources. Impervious surfaces created from construction of associated facilities (i.e., access roads, inverter skids, and collector substations) could affect regional groundwater recharge. Solar facility or transmission line projects also have the potential to impact private wells if the location of private wells is not considered in project design.

5.5.2.1 Description of Resources

Solar Project

Minnesota has an abundance of unconsolidated sediments deposited by glaciation. The most recent glaciation, the Wisconsin glaciation, deposited a layer of drift material with variable thicknesses throughout the state. Topography is dictated by historic river meandering of the Mississippi River south of the Solar Project Area.

Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The aquifers within these provinces occur in two general geologic settings: bedrock, and unconsolidated sediments deposited by glaciers, streams, and lakes. The Solar Project is within the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. In this province, groundwater is typically derived from limited extent surficial and buried sand aquifers. (MNDNR, 2001).

The Solar Project Area was reviewed for EPA designated sole source aquifers (SSA), wells listed on the Minnesota County Well Index (CWI), and Minnesota Department of Health (MDH) Wellhead Protection Areas (WHPAs).

The EPA defines a SSA or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). There are currently no EPA-designated SSAs in the Project vicinity (EPA, 2017).

The CWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. A search of the CWI (MDH, 2019a) identified 39 verified and unverified wells within the Solar Project Area (Figures 9a and 9b - Existing Infrastructure and AADT).

Under the Safe Drinking Water Act (SDWA), 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. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and

surface water through a watershed approach. A 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 (2019b). A search for WHPAs in the MDH database indicated there are none in the Solar Project Area. The closest WHPA is located west of the West Block, in the town of Clear Lake.

West Route

As described for the Solar Project, the West Route also occurs in the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. There are no EPA-designated SSAs within the West Route (EPA, 2017). Based on review of the CWI data, there are 15 verified wells in the West Route. Lastly, there are no WHPAs in the West Route; the closest WHPA is located just east of the West Route, in the town of Becker.

East Route

As described for the Solar Project, the East Route also occurs in the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. There are no EPA-designated SSAs within the East Route Area (EPA, 2017). There are seven verified and unverified wells in the East Route. Lastly, there are no WHPAs in the East Route; the closest WHPA is located north of the East Route, in the town of Becker.

5.5.2.2 Impacts and Mitigation

Solar Project

Impacts of the proposed Solar Project to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 87 feet; MGS, 2018), excavation or blasting of bedrock is extremely unlikely. Impacts to geologic resources are not anticipated and mitigation is not expected to be necessary. Project facilities are not likely to affect the use of existing water wells because the breadth of work does not entail digging deeper than 15 feet for the racking piers.

Any dewatering required during construction will be discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, Xcel Energy will obtain a Water Appropriation Permit from MNDNR.

Impacts to groundwater resources, including aquifers and the Mississippi River, are not anticipated as water supply needs will be limited. Based on the small proportion of increased impervious surface area that will be created by Project components (access roads, inverter skids, and collector substations – 78.4 acres [see Table 2.2-2 in Section 2.2.3]), the Project will likely have minimal impacts on regional groundwater recharge. The foundations of the tracking rack system will likely be a driven steel pier and will likely not require concrete, although some concrete foundations may be required. Geotechnical soil testing will determine final installation process. Similarly, the

exterior agricultural fence may require concrete foundations in some locations. If concrete is needed, it will be locally sourced; an on-site concrete batch plant will not be required for the Project.

In addition, per the lease agreements with the landowners, the landowners will be required to remove irrigation equipment and cap existing wells prior to construction. Doing so will avoid impacts to this infrastructure.

A National Pollutant Discharge Elimination System permit application to discharge stormwater from construction facilities will be acquired by Xcel Energy 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. A SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion. Because the Project will disturb more than 50 acres, Xcel Energy will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

West Route

Xcel Energy does not anticipate any impacts to bedrock during construction or operation of the West Route as bedrock is at depths greater than proposed foundation depths of 12 to 58 feet deep. Similarly, Xcel Energy does not expect any impacts to groundwater resources as there are no SSAs or wellhead protection areas within the West Route's right-of-way. None of the unverified wells are located within the West Route right-of-way. If shallow depths to groundwater resources are identified during geotechnical investigations, specialty structures requiring wider, but shallower, excavation for foundations may be used. Xcel Energy will continue to work with the landowners to identify springs and any additional wells near the West Route.

East Route

Xcel Energy does not anticipate any impacts to bedrock during construction or operation of the HVTL Project as bedrock along the East Route is at depths greater than proposed foundation depths of 18 to 48 feet deep. Similarly, Xcel Energy does not expect any impacts to groundwater resources as there are no SSAs or wellhead protection areas within the East Route's right-of-way. There is one unverified well within the East Route right-of-way; Xcel Energy will verify this well's location to minimize any impacts. If shallow depths to groundwater resources are identified during geotechnical investigations, specialty structures requiring wider, but shallower, excavation for foundations may be used. Xcel Energy will continue to work with the landowners to identify springs and any additional wells near the East Route.

5.5.3 Soils and Prime Farmland

Solar facility and transmission line projects have the potential to impact soils during the construction and decommissioning stages of the Project. Construction may require some amount of grading to provide a level surface for safe operation of construction equipment. In addition, potential soil impacts may result from the excavation, stockpiling, and redistribution of soils during

installation of project components. Localized soil erosion, compaction, and topsoil and subsoil mixing could affect revegetation within temporary work areas.

5.5.3.1 Description of Resources

Soil characteristics within the study area were assessed using the Soil Survey Geographic database (SSURGO; Soil Survey Staff, 2021). The SSURGO database is a digital version of the original county soil surveys developed by NRCS for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the SSURGO database to information about the component soils and their properties (USDA NRCS, 2021a). Table 5.5-2 summarizes characteristics of soils located within the Solar Project Area; table 5.5-3 summarizes soil characteristics along the West Route; and table 5.5-4 summarizes soil characteristics along the East Route.

Soil Characteristics

The characteristics most applicable for an assessment of the Project's potential to impact soils during construction and operation include farmland classification, compaction potential, wind and water erodibility, hydric rating, and revegetation concerns. See Appendix K - Soil Map Units and Characteristics for a detailed listing for relevant soil characteristics broken out by soil map unit name within each project area. Soil characteristics discussed below are summarized by project component in Tables 5.5-2, 5.5-3, and 5.5-4. Soil characteristics are also included in the AIMP (Appendix F).

Prime Farmland and Farmland of Statewide Importance

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating; USDA NRCS, 2021a).

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

Soils categorized as prime farmland and farmland of statewide importance are protected under the Farmland Protection Policy Act (FPPA) because of their value for agricultural production, and a

significant or irreversible loss of these high-quality farmlands could have local economic impacts for the agricultural industry (see Section 5.3.1.2). The intent of the FPPA is to protect high-quality farmland by minimizing the impact of federal programs on "the unnecessary and irreversible conversion of farmland to non-agricultural uses" (USDA NRCS, 2021b). Protection under the FPPA extends to all lands that meet the criteria for prime farmland or prime farmland if a limiting factor is mitigated, regardless of whether the land is currently used for agricultural production.

Compaction-Prone Soils

Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure because of mechanical deformation caused loading by equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Compaction-prone soils, particularly within agricultural fields, may require additional mitigation measures during construction to minimize compaction and/or additional protocols during restoration of Project workspaces.

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting.

Soils classified as having somewhat poor to very poor drainage classes and surface textures of clay loam and finer are considered to have a high potential for compaction.

Wind Erodible Soils

Soils categorized as wind erodible may require additional mitigation measures to minimize the likelihood of soil migration outside of Project workspaces. Susceptibility to wind erosion is less affected by slope angles and is more directly influenced by physical soil factors including moisture, texture, calcium carbonate content, and organic matter; and landform and landscape conditions including soil roughness factors, unsheltered distance, and vegetative cover. Wind Erodibility Groups (WEGs) are a direct indicator of the inherent susceptibility of soils to wind erosion. WEGs may range from 1 to 8, with 1 being the highest potential for wind erosion, and 8 the lowest (USDA NRCS, 2021a). Soils with WEGs of 1 or 2 are considered highly erodible due to wind.

Water Erodible Soils

Soils categorized as water erodible may require additional mitigation measures to minimize the likelihood of soil migration outside of Project workspaces. Soils most susceptible to water erosion are typified by bare or sparse vegetative cover, non-cohesive soil particles, low infiltration rates, and/or moderate to steep slopes. Soils more typically resistant to water erosion include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. The potential for soils to be eroded by water was evaluated based on the K factor, where available, and slope. The K factor represents a relative quantitative index of the susceptibility of bare soil to particle detachment and transport by water and is one of the factors used in the Revised Universal Soil Loss Equation to calculate soil loss. K factor values range from

0.02 to 0.69. Soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent are considered highly erodible by water.

Hydric Soils

Hydric soils are generally indicative of long periods of saturation or flooding during soil formation and can indicate wetland environments if vegetation and other hydrologic factors are present. Hydric soils are soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA NRCS, 2021a). Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some soils designated as hydric have phases that are not hydric depending on water table, flooding, and ponding characteristics. A combination of hydric soil, hydrophytic vegetation, and hydrologic properties define wetlands as described in the *National Food Security Act Manual* (Soil Conservation Service, 1994).

Soils with Revegetation Concerns

Soils with revegetation concerns can indicate a need for additional mitigation measures during restoration to ensure revegetation of Project workspaces is successful. The vegetation potential of soils is based on several characteristics including topsoil thickness, soil texture, available water capacity, susceptibility to flooding, and slope. Other considerations included whether or not the soils are natural, human transported, or disturbed. Some soils have characteristics that cause a high seed mortality. These areas may need additional management and may be difficult to revegetate. The clearing and grading of soils with poor revegetation potential could result in a lack of adequate vegetation following construction and restoration of the right-of-way, which could lead to increased erosion, a reduction in wildlife habitat, and adverse visual impacts.

The land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time (USDA NRCS, 2021a). The capability class ranges from 1 to 8, with 1 having the fewest limitations and 8 having very severe limitations that restrict their use for crops and pasture plants. Soils with a non-irrigated land capability classification of 4 or greater are characterized as having poor revegetation potential.

Solar Project

None of the soils within the Solar Project Area are considered prime farmland (Figure 12 – Soils). Less than one percent of soils are considered farmland of statewide importance, compaction prone, or water erodible. Approximately 1 percent of the Solar Project Area is underlain by hydric soils or soils containing hydric inclusions, indicating few, if any, wetlands are likely to be present (see Section 5.5.5 for further discussion of wetlands).

Nearly all soils in the Solar Project Area are considered wind erodible and present potential revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of Project workspaces and to ensure revegetation of Project workspaces is successful.

Table 5.5-2: Summary of Soil Characteristics within the Solar Project Area		
Soil Characteristics	Solar Project Area	
	Acres	Percent
Solar Project Area	3,479.5	
Prime Farmland [1]	0.0	0.0%
Farmland of Statewide Importance [2]	5.8	0.2%
Compaction-Prone [3]	16.3	0.5%
Wind Erodible [4]	3,433.2	98.7%
Water Erodible [5]	3.0	0.1%
Hydric [6]	36.8	1.1%
Revegetation Concerns [7]	3,470.0	99.7%

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

2 Includes soils classified as farmland of statewide importance by SSURGO.

3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

4 Includes soils in WEG designation of 1 or 2.

5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

6 Includes soils that are classified as hydric by SSURGO.

7 Includes soils with a non-irrigated land capability classification of 4 or greater.

See Appendix K - Soil Map Units and Characteristics for a detailed listing of relevant soil characteristics broken out by soil map unit name within the Solar Project Area.

West Route

None of the soils within the West Route are considered prime farmland, (Figure 12 – Soils). Additionally, none of the soils within the West Route are considered compaction-prone, water erodible or are underlain by hydric soils or soils containing hydric inclusions. Approximately seven percent of soils are considered farmland of statewide importance.

Approximately 72 percent of soils in the West Route are considered wind erodible and present revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of Project workspaces and to ensure revegetation of Project workspaces is successful.

Table 5.5-3: Summary of Soil Characteristics Along the West Route		
Soil Characteristics	West Route	
	Acres	Percent
Total Right-of-Way Acres	58.0	
Prime Farmland [1]	0.0	0.0%
Farmland of Statewide Importance [2]	3.8	6.5%
Compaction-Prone [3]	0.0	0.0%
Wind Erodible [4]	41.5	71.6%

Table 5.5-3: Summary of Soil Characteristics Along the West Route		
Soil Characteristics	West Route	
	Acres	Percent
Water Erodible [5]	0.0	0.0%
Hydric [6]	0.0	0.0%
Revegetation Concerns [7]	41.5	71.6%

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

2 Includes soils classified as farmland of statewide importance by SSURGO.

3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

4 Includes soils in WEG designation of 1 or 2.

5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

6 Includes soils that are classified as hydric by SSURGO.

7 Includes soils with a non-irrigated land capability classification of 4 or greater.

See Appendix K - Soil Map Units and Characteristics for a detailed listing of relevant soil characteristics broken out by soil map unit name within the West Route.

East Route

None of the soils within the East Route are considered prime farmland, (Figure 12 – Soils). Additionally, none of the soils within the West Route are considered farmland of statewide importance, compaction-prone, water erodible or are underlain by hydric soils or soils containing hydric inclusions.

Approximately 60 percent of soils in the East Route are considered wind erodible and present revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of Project workspaces and to ensure revegetation of Project workspaces is successful.

Table 5.5-4: Summary of Soil Characteristics Along the East Route		
Soil Characteristics	East Route	
	Acres	Percent
Total Right-of-Way Acres	30.6	
Prime Farmland [1]	0.0	0.0%
Farmland of Statewide Importance [2]	0.0	0.0%
Compaction-Prone [3]	0.0	0.0%
Wind Erodible [4]	18.5	60.1%
Water Erodible [5]	0.0	0.0%
Hydric [6]	0.0	0.0%
Revegetation Concerns [7]	18.5	60.1%

Table 5.5-4: Summary of Soil Characteristics Along the East Route		
Soil Characteristics	East Route	
	Acres	Percent

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

2 Includes soils classified as farmland of statewide importance by SSURGO.

3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

4 Includes soils in WEG designation of 1 or 2.

5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

6 Includes soils that are classified as hydric by SSURGO.

7 Includes soils with a non-irrigated land capability classification of 4 or greater.

See Appendix K - Soil Map Units and Characteristics for a detailed listing of relevant soil characteristics broken out by soil map unit name within the East Route.

5.5.3.2 Impacts and Mitigation

Solar Project

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

Impacts to soils will occur during the construction and decommissioning stages of the Project. Construction may require some amount of grading to provide a level surface for the solar arrays. Because the Project location is on relatively level existing agricultural fields, the Project will minimize grading to the extent practicable. Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil. Topsoil shall have temporary and permanent stabilization measures established in accordance with the Project's SWPPP. Internal roads will be constructed of inorganic fill (road aggregate base) to match the surrounding existing ground elevations to allow existing drainage patterns to persist. Once the necessary grading is complete, subsoil will be placed followed by topsoil, blending the grade into existing topography. Xcel Energy will implement dust control measures including water trucks during construction, as practicable.

Solar Array Construction

Once grading activities are complete, the racking system supports will be constructed using steel piles driven into the ground. Soil disturbance would be restricted to the hydraulic ram/ screw machinery, about the size of a small tractor, temporarily disturbing soil at each pile insertion location and while driving between drilling locations.

Electrical Collection System

Below-ground DC and AC collection systems will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During trench excavation the topsoil and subsoil will be removed and stockpiled separately. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil. If the Project utilizes above-ground DC collection

lines, they will hang under the solar panels; there would not be ground disturbance associated with installation of this collection system.

Project Substation Construction

Construction work within the substation sites will include site preparation and installation of substructures and electrical equipment. Installation of concrete foundations and embedments for equipment will require the use of trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. The limit of disturbance will be within the footprint of the substations for both the foundation equipment and the concrete delivery trucks. All topsoil from the West and East Collector Substation footprints will be removed to a pre-established suitable location for storage. The storage area would be near the site where the soil was removed, accurately located (GPS boundary, soil depth) and graded to facilitate revegetation. Subsoil would be removed, if necessary, to an acceptable preestablished and approved area for storage.

Restoration

Following construction, areas that will not contain permanent facilities (area under the arrays, the laydown yards, and stormwater basins) Xcel Energy will restore disturbed areas to pre-construction conditions to the extent practicable. Soil erosion will be minimized by implementing environmental protection measures. These measures will include BMPs for erosion and sediment control, such as temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. The site will be seeded with site specific seed mixes developed in coordination with the MNDNR. Additionally, a cover crop will be planted with the native mixes to stabilize the soil and prevent erosion during the time it takes for the native seeds to establish. Xcel Energy will design construction access and manage construction passes to minimize the number of trips occurring on a given soil and will implement wet weather procedures any time that rutting is observed. Deep compaction is not anticipated to be a significant problem as the number of construction equipment passes over a given area is limited, and construction equipment consists of smaller, low-ground-pressure tracked vehicles.

Additionally, recent research on the environmental impacts of solar farms indicates that there could be some net benefits to soil resources over the lifecycle of the Project. Writing in Cleantechnica, one of the world's top cleantech-focused news sites, engineer Jeff Briberg highlights the utility and specific benefits of using native plants on solar sites (Briberg, 2016 and Selbig and Balster, 2010).

> *"[Compared to row crops,] storm water runoff is reduced 23 percent for the 2-year storm (2.9 inches of rain) and 8 percent for the 100-year storm.*
>
> *Further, we expect a mix of prairie plants to provide superior hydrologic performance compared to monocrop turf-grasses that are common on solar sites in some areas of the country. In 2008, the U.S. Geological Survey completed a five-year storm water study in cooperation with a consortium of 19 cities and towns in the area of Madison, Wisconsin that revealed 'striking differences between turf and prairie vegetation.'*

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

In addition to superior stormwater management, native plants improve the soil with organic matter over the 35-year life the Project, allowing microorganisms and soil fauna to recover after years of intensive compaction, pesticide, and fertilizer application. And, over time, native plants out-compete weeds allowing ground cover to be maintained with just a single annual mow, reducing operating costs."

With the proper implementation of environmental protection measures intended to prevent, minimize, and/or reclaim soil erosion effects, no unmitigated loss of soil will result from the Project. Additionally, taking 2,999.2 acres of agricultural land (cultivated crops and hay/pasture) out of production will give the soils an opportunity to rest and regenerate. Agricultural land within the fenced area of the solar facility will be converted to native prairie with the exception of the substations, inverters, and access roads which will be converted to developed land and impervious surfaces (78.4 acres). Seed mixes are discussed in more detail in Section 5.5.6.

Prime Farmland

As shown in Table 5.5-2, there is no prime farmland within the Solar Project Area, and therefore, none in the Solar Project Footprint. See Section 5.3.1 for additional discussion of agricultural land use in the Solar Project Area.

West Route

Impacts to soils will occur during the construction of the West Route. During construction of the West Route, a small portion of land will be temporarily taken out of agricultural production for temporary workspace associated with erecting structures along the right-of-way; however, as previously discussed none of the soils are classified as prime farmland. During construction of the West Route, soil compaction and localized soil erosion may occur during clearing and grading of work areas. In addition, potential soil impacts may result from the excavation, stockpiling, and redistribution of soils. Xcel Energy will implement measures to reduce soil compaction and will commit to decompaction of soils during restoration of Project workspaces. Impacts to soils would be temporary and minor and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil, during right-of-way clearing and generation tie line construction. Xcel Energy will also develop a SWPPP that complies with MPCA rules and guidelines; implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

Landowners will be compensated accordingly for any localized crop damage and soil compaction that may occur. Refer to Section 5.3.1.2 for additional information related to agricultural impacts.

East Route

Impacts to soils will occur during the construction of the East Route. During construction of the East Route, soil compaction and localized soil erosion may occur during clearing and grading of work areas. In addition, potential soil impacts may result from the excavation, stockpiling, and

redistribution of soils. Xcel Energy will implement measures to reduce soil compaction and will commit to decompaction of soils during restoration of Project workspaces. Impacts to soils would be temporary and minor and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil, during right-of-way clearing and generation tie line construction. Xcel Energy will also develop a SWPPP) that complies with MPCA rules and guidelines; implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

5.5.4 Surface Waters and Floodplains

Solar facility and transmission line projects have the potential to impact water resources and floodplains. These projects could directly impact water resources and floodplains if these features cannot be avoided through project design. During construction, disturbance of soils and vegetative cover could affect water quality in adjacent water resources and which could in turn affect habitat for wildlife.

5.5.4.1 Description of Resources

Solar Project

The Solar Project is located in the Upper Mississippi-Crow-Rum Watershed Basin (MNDNR, 2021b). There are no lakes, rivers, watercourses, or water basins in the West or East Blocks of the Solar Project Area. The nearest PWI waterbodies are the Mississippi River, located approximately 0.1 mile to the south at its nearest point to the Solar Project Area (West Block), and the Elk River, located approximately 0.5 mile to the north at its nearest point to the Solar Project Area (East Block). The Surface waters within the Solar Project Area are limited to two PWI wetlands in the East Block. Wetlands are valuable for surface and subsurface water storage, nutrient cycling, retention of sedimentation, and plant and animal habitats, and are described further in Section 5.5.5.

Water Quality

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 majority of impairments to adjacent surface waters are caused by agricultural sources (fecal coliform, dissolved oxygen, turbidity, excess nutrients/eutrophication, aquatic life impairments). The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota. The Mississippi River and Elk River are listed by the MPCA as impaired waters; both are within one mile of the Solar Project Area.

Floodplains

A floodplain is 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 strong current. Floodplains function to prevent 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 each year.

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

There are no FEMA-designated floodplains within the Solar Project.

West Route

The West Route is located in the Upper Mississippi-Crow-Rum Watershed Basin (MNDNR, 2021b). There are no lakes, rivers, watercourses, or water basins in the West Route. The nearest PWI waterbody is the Mississippi River, located approximately 0.15 mile to the south at its nearest point to the West Route. There are no surface waters within the West Route.

Water Quality

The West Route does not cross any waterbodies or surface waters. The Mississippi River is listed by the MPCA as an impaired water and it is within one mile of the West Route.

Floodplains

There are no FEMA-designated floodplains within the West Route.

East Route

The East Route is located in the Upper Mississippi-Crow-Rum Watershed Basin (MNDNR, 2021b). There are no lakes, rivers, watercourses, or water basins in the East HVTL Project. The nearest PWI waterbodies are the Mississippi River, located approximately 0.3 mile to the south at its nearest point to the East Route, and the Elk River, located approximately 1.0 mile to the northeast at its nearest point to the east. There are no surface waters within the East Route.

Water Quality

As described for the Solar Project, the Mississippi River and Elk River are listed by the MPCA as an impaired waters; both are within one mile of the East Route.

Floodplains

Based on the FEMA records, the East HVTL Project is not located in a designated flood hazard area.

5.5.4.2 Impacts and Mitigation

Solar Project

The Solar Project will avoid impacts to surface waters and floodplains. Xcel Energy will apply for a MPCA construction stormwater permit and a SWPPP will be developed for the Project (Solar Project, West Route, and East Route) prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent sediment from entering waterbodies. Xcel Energy notes that estimating stormwater retained for a solar project can be challenging because the panels are impervious, but the area beneath the panels is often pervious (i.e., vegetated). Since the standard calculation for the water quality volume (1 inch times the impervious surface) required by the NPDES construction stormwater permit doesn't recognize the vegetated surface left in place under the panels, the calculation can be done using the disconnected impervious credit described in the MPCA's methodology and guidelines for solar.[29] For solar installations, the remaining water quality volume after applying the credit will still need to be treated using more traditional stormwater management practices. The SWPPP will be submitted to the MPCA for review and approval prior to construction due to the size of the Solar Project and the proximity to impaired waters within one mile (Mississippi River and Elk River). With the SWPPP, the Solar Project will obtain coverage under the General Construction Stormwater Permit. Additionally, Xcel Energy has designed stormwater basins to address runoff.

West Route

The West Route will avoid impacts to surface waters and floodplains. As described above, Xcel Energy will develop a SWPPP that includes the Solar Project and West and East HVTL Projects that will be submitted to MPCA for review and approval as a function of the Project's size and proximity to impaired waters.

East Route

The East HVTL Project will avoid impacts to surface waters and floodplains. As described above, Xcel Energy will develop a SWPPP that includes the Solar Project and West and East HVTL Projects that will be submitted to MPCA for review and approval as a function of the Project's size and proximity to impaired waters.

5.5.5 Wetlands

Solar facility and transmission line projects have the potential to impact wetlands. Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated much of the year). Wetlands are part of the foundation of water resources and are vital to the health of waterways and communities that are downstream. Wetlands detain floodwaters, recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetlands are also economic drivers because of their key role in fishing, hunting, agriculture, and recreation. Wetland types include marshes, swamps, bogs, and fens. Wetlands

[29] https://stormwater.pca.state.mn.us/index.php?title=File:Solar_panels_1.png

vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.

Solar facility and transmission line 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. If permanent facilities or impervious surfaces are placed in wetlands this would result in a total loss of wetland functionality and potentially affect water resources downstream.

5.5.5.1 Description of Resources

Solar Project

The potential for wetlands within the Solar Project Area were identified by reviewing desktop resources (i.e., National Wetlands Inventory [NWI] data, aerial photography, hydric soils map unites, LiDAR, and digital elevation models) followed by a formal wetland delineation within the Solar Project Area in the fall of 2020. The wetland delineation identified 10 wetlands in the West Block and five wetlands in the East Block. Wetland complexes consisted of small and large isolated wetlands scattered throughout the Solar Project Area. Wetlands within West Block are primarily located within the northwest corner of the Project Area and are associated with adjacent waterbodies, in addition to few small isolated wetlands. Wetlands within the East Block can be found in the center of the Solar Project Area and primarily consist of isolated basins. There are 3.6 acres of delineated wetlands in the West Block and 35.6 acres of delineated wetlands in the East Block. Delineated wetlands are displayed on Figures 13a-13d – Water Resources.

The MNDNR PWI was also reviewed to identify PWI wetlands within the Solar Project Area. There are four PWI wetlands within the Solar Project Area: two in the West Block and two in the East Block. PWI wetlands within the West Block are located in the northwest corner and are associated with adjacent PWI wetlands that are generally outside the Solar Project Area. PWI wetlands within the East Block are located within the center of the Solar Project Area and are associated with isolated basins.

West Route

There are no NWI-mapped or delineated wetlands within the West Route. There are also no PWI wetlands within the West Route.

East Route

There are two NWI-mapped wetlands within the East Route totaling 13.2 acres and associated with ash ponds. These two wetlands were not delineated. There are also no PWI wetlands within the East Route.

5.5.5.2 Impacts and Mitigation

Solar Project

The Solar Project has been designed to avoid impacts to all delineated wetlands and PWI wetlands. The delineated wetlands that are also classified as PWI wetlands will be avoided by construction; other delineated wetlands within the Project Footprint are currently farmed wetlands. Xcel Energy will also avoid impacts to these delineated wetlands and revegetate them with a wet seed mix (Appendix G – Vegetation Management Plan).

West Route

No wetlands were identified in the West Route; as such, no mitigation is proposed.

East Route

The East Application Alignment will avoid NWI-mapped wetlands; as such, no mitigation is proposed.

5.5.6 Vegetation

Solar facility and transmission line projects have the potential to impact vegetation through temporary, construction-related impacts to vegetative cover and/or long-term impacts that result in a conversion to a different vegetative cover (e.g., forested land that is converted to open herbaceous land). Removal of vegetative cover exposes soils and could result in soil erosion that, if not managed properly, could cause sedimentation in adjacent water resources. Temporary or permanent removal of vegetation also has the potential affect habitat for wildlife. In addition, construction vehicle traffic between project areas could lead to the introduction or spread of invasive species and noxious weeds.

5.5.6.1 Description of Resources

The Solar Project is located in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province (MNDNR, 2021a). The Anoka Sand Plain Subsection is bordered by the Mississippi River on its western boundary and the Anoka Sand Plain on the eastern and northern edges. The Anoka Sand Plain Subsection consists of a flat, sandy lake plain and terraces along the Mississippi River. Pre-settlement vegetation in the Anoka Sand Plain Subsection consisted predominantly of oak barrens and openings, with characteristic trees being bur oak and northern pin oak (Kratz and Jensen, 1983). Sod and vegetable crops are prominent in the present day vegetative landcover; with crops/grass/shrubs covering 60 percent of the landscape (MNDNR, 2011).

Solar Project

Table 5.2-9 in Section 5.2.9.1 provides the total acres of each land cover type within the Solar Project Area. Based on the USGS 2016 NLCD data, the Solar Project Area includes predominately agricultural land (cultivated crop land and hay/pasture; 96.8 percent). Developed, upland forest, and herbaceous land cover within the Project Footprint total 2.4 percent. Forested land within the Solar Project Area consists of shelterbelts between agricultural fields, near farmsteads, along

roadways, and clumps of trees along the margins of small waterbodies. The small areas of woody wetlands and shrub/scrub land (1.1 acres each) within the Solar Project Area are within the East Block and are associated with the small areas of open water that are also present within this portion of the Solar Project Area. Emergent herbaceous wetlands within the Solar Project Area are predominantly within the East Block of the boundary, again associated with the areas of open water present in this portion of the Solar Project. A discussion of wetland resources is provided in Section 5.5.5.

West Route

The West Route is located in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province (MNDNR, 2021a). A description of the Anoka Sand Plain Subsection is included above for the Solar Project.

Table 5.2-10 in Section 5.2.9.1 provides the total acres of each land use type within the West Application Alignment right-of-way. Based on the USGS 2016 NLCD data, the West Route would affect predominately agricultural land (cultivated crops and hay/pasture) (70.0 percent). Developed land (28.0 percent) and herbaceous land (2.0 percent) are the next most abundant categories. Barren land comprises less than one half of one percent of the right-of-way acreage. The NLCD data does not identify any forested areas along the West Route right-of-way; however, aerial imagery identifies shelterbelts between agricultural fields, near farmsteads, and along roadways within or adjacent to the West Route.

East Route

The East Route is located in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province (MNDNR, 2021a). A description of the Anoka Sand Plain Subsection is included above for the Solar Project.

Table 5.2-11 in Section 5.2.9.1 provides the total acres of each land use type within the East Application Alignment right-of-way. Based on the USGS 2016 NLCD data, the East Route would affect predominately agricultural land (cultivated and hay/pasture) (76.2 percent) and developed (21.9 percent). Developed lands are roads that are either crossed by or co-located with the East Application Alignment or associated with the Sherco Generating Plant. The NLCD data overestimates the amount of cultivated cropland within the East Route; areas within the Sherco Generating Plant are classified as cultivated crops when aerial photography confirms they should be classified as developed.

5.5.6.2 Impacts and Mitigation

Solar Project

As discussed in Section 5.2.9.2, agricultural land will be converted from an agricultural use to solar energy use for the life of the Project, but most will be preserved, and the soils given the opportunity to rest and regenerate. There will be 20 acres of agricultural land used for temporary laydown areas outside the solar fence that will only be used during construction. These areas will be returned to their pre-construction land use after construction. Agricultural land within the Project Footprint (i.e., within the racking area) will be converted to native prairie cover with the

exception of the substations, inverter skids and access roads, which will be converted to developed land and impervious surfaces (78.4 acres).

Some tree clearing will be required in the interior portions of the solar blocks; however, trees around the perimeter will remain.

Xcel Energy is committed to revegetating the Solar Project with a native prairie mix that will provide beneficial habitat. The mixes are designed to include both native grasses and wildflowers. These mixes achieve Xcel Energy's goal for operating a pollinator-friendly solar facility by providing native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators. Xcel Energy intends to follow the guidance set forth by BWSR to meet the standards of the Habitat Friendly Solar Program. Xcel Energy's VMP, which outlines the steps for meeting and maintaining the Habitat Friendly Solar standards, is included in Appendix G. In addition to promoting pollinator habitat, implementation of Xcel Energy's VMP will establish stable ground cover successfully, reduce erosion, reduce runoff, and improve infiltration. Consultation with agencies regarding the VMP, including MDA, MDNR, and BWSR is ongoing and guidance from the agencies will be incorporated, as applicable. As noted in the VMP, it is a living document that will continue to be updated as additional information and inputs are obtained.

West Route

The acreage of each land cover type crossed by the West Route is provided in Section 5.2.9.1 (refer to Table 5.2-10). Impacts on flora will primarily be associated with cultivated crop areas; see Section 5.3.1 for a discussion of impacts and mitigation measures that would be used in cropland and pasturelands. Other impacts to flora may be related to wind breaks, woodlots, fence rows, and other landscape features.

Construction of the West Route will result in short-term adverse impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities, such as site preparation and installation of structures, are anticipated to impact approximately 0.1 to 0.5 acres of vegetation per structure. Construction activities involving establishment and use of access roads, staging, and stringing areas would also have short-term impacts on vegetation by concentrating surface disturbance and equipment use.

Construction would also result in long-term impacts on vegetation by permanently removing vegetation at each structure and within portions of the right-of-way that are currently dominated by forest or other woody vegetation. Xcel Energy would permanently convert forested areas and shrub lands to low-stature vegetation by clearing woody vegetation throughout the entire right-of-way where it occurs. Impacts to woody-dominated vegetation will be minimized to the extent possible by routing to avoid areas where this vegetation type occurs.

Construction of the West Route could lead to the introduction or spread of invasive species and noxious weeds. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings. Xcel Energy will implement measures to avoid the spread of invasive species and noxious

weeds by implementing equipment inspections, ensuring equipment arrives to the site free of noxious weeds, and introducing a cover crop to avoid exposed soils for an extended period of time.

The primary means of minimizing impacts to vegetation is to avoid vegetation, particularly trees, through prudent routing. Avoidance can be achieved, in part, by using existing infrastructure rights-of-way (e.g., roadway, transmission line) such that tree removal is minimized. avoidance can also be accomplished by spanning plant communities.

Impacts to vegetation can also be minimized by a number of other strategies, including (1) placement of the alignment and of specific structures to avoid trees and other tall-growing species, (2) leaving or replanting compatible plants at the edge of the transmission line right-of-way, (3) limiting vehicle traffic to roads along the right-of-way, and (4) avoiding the introduction of invasive species and noxious weeds on equipment or through seeds or mulches.

Potential impacts due to invasive species and noxious weeds can be mitigated by:

- revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control;
- removal of invasive species/noxious weeds via herbicide and manual means; and
- cleaning and inspecting construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving construction sites.

East Route

The acreage of each land cover type crossed by the East Route is provided in Section 5.2.9.1 (refer to Table 5.2-11). Because the East Route is primarily within the Sherco Generating Plant, the area is heavily developed and sparsely vegetated or maintained by Xcel Energy (i.e., mowed areas). Within the Sherco Generating Plant, minor tree trimming or clearing may be required, depending on existing vegetation height.

Construction of the East Route will result in short-term adverse impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities, such as site preparation and installation of structures, are anticipated to impact approximately 0.1 to 0.5 acres of vegetation per structure. Construction activities involving establishment and use of access roads, staging, and stringing areas would also have short-term impacts on vegetation by concentrating surface disturbance and equipment use.

Construction would also result in long-term impacts on vegetation by permanently removing vegetation at each structure and within portions of the right-of-way that are currently dominated by forest or other woody vegetation. Xcel Energy would permanently convert forested areas and shrub lands to low-stature vegetation by clearing woody vegetation throughout the entire right-of-way where it occurs. Impacts to woody-dominated vegetation will be minimized to the extent possibly by routing to avoid areas where this vegetation type occurs.

Construction of the East Route could lead to the introduction or spread of invasive species and noxious weeds. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soils exposed for extended periods, introduction of

topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings. Xcel Energy will implement measures to avoid the spread of invasive species and noxious weeds by implementing equipment inspections, ensuring equipment arrives to the site free of noxious weeds, and introducing a cover crop to avoid exposed soils for an extended period of time.

The primary means of minimizing impacts to vegetation is to avoid vegetation, particularly trees, through prudent routing. Avoidance can be achieved, in part, by using existing infrastructure rights-of-way (e.g., roadway, transmission line) such that tree removal is minimized. avoidance can also be accomplished by spanning plant communities.

Impacts to vegetation can also be minimized by a number of other strategies, including (1) placement of the alignment and of specific structures to avoid trees and other tall-growing species, (2) leaving or replanting compatible plants at the edge of the transmission line right-of-way, (3) limiting vehicle traffic to roads along the right-of-way, and (4) avoiding the introduction of invasive species and noxious weeds on equipment or through seeds or mulches.

Potential impacts due to invasive species and noxious weeds can be mitigated by:

- revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control;
- removal of invasive species/noxious weeds via herbicide and manual means; and
- cleaning and inspecting construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving construction sites.

5.5.7 Wildlife

The introduction of a solar facility and transmission lines may affect wildlife that occur in and adjacent to the facilities. Construction impacts would be associated with habitat conversion and vehicle collisions while operational impacts would be associated with vehicle collisions and electrocutions at the substations. Revegetating a solar project with seed mixes that enhance wildlife habitat can also create a beneficial impact.

5.5.7.1 Description of Resources

Solar Project

The wildlife species that inhabit the Solar Project Area are typical of those found in agricultural areas. Species adapted to agricultural landscapes that likely occur in the Solar Project Area are listed in Table 5.5-5 (MNDNR, 2021c).

Table 5.5-5: Wildlife Species Common to the Solar Project Area	
Common Name	**Scientific Name**
Mammals	
Red fox	*Vulpes vulpes*
Virginia opossum	*Didelphis virginiana*
Striped skunk	*Mephitis*
White-tailed deer	*Odocoileus virginianus*
Eastern cottontail	*Sylvilagus floridanus*
Coyote	*Canis latrans*
Birds	
Wild turkey	*Meleagris gallopavo*
Mourning dove	*Zenaida macroura*
American crow	*Corvus brachyrhynchos*
Eastern kingbird	*Tyrannus tyrannus*
Field sparrow	*Spizella pusilla*
Reptiles and Amphibians	
American toad	*Anaxyrus americanus*
Common garter snake	*Thamnophis sirtalis*
Source: MNDNR, 2021c	

Avian Species

The Solar Project is located within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat (Audubon, undated). The Solar Project Area is also located within the Prairie Hardwood Transition Bird Conservation Region (BCR; USFWS, 2008). The U.S. Fish and Wildlife Service (USFWS) identified 30 species of birds within Prairie Hardwood Transition BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. Some of the BCC species that may be found in Sherburne County include the bald eagle (*Halieetus leucocephalus*), American bittern (*Botaurus lentiginosus*), red-headed woodpecker (*Melanerpes erythrocephalus*), bobolink (*Dolichonyx oryzivorus*), brown thrasher (*Toxostoma rufum*), marsh wren (*Cistothorus palustris*), pied-billed grebe (*Podilymbus Podiceps*), and willow flycatcher (*Empidonax traillii)* (USFWS, 2008; MNDNR, 2014).

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S. Code [USC] 703-712). The MBTA prohibits taking, killing, possession, transportation, and importation of migratory bird and their eggs, parts, and nests. Additionally, the Bald and Golden Eagle Protection Act (16 USC 668-668d) prohibits taking or possession of and commerce in bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), either alive or dead, or any egg, nest, or part of eagles.

Key bird habitats in the United States are designated by The National Audubon Society as Important Bird Areas (IBAs). The goal of IBAs is to ensure that bird populations persist by identifying and conserving significant habitats. In Minnesota, 57 IBAs have been identified

(Audubon, 2016). The Solar Project does not cross any IBAs. The nearest IBA to the Solar Project, the Lake Maria State Park - Henry Larson County Forest IBA, is approximately 1.6 miles south of the Solar Project at its closest point. The Lake Maria State Park - Henry Larson County Forest IBA is a state priority IBA that supports 230 avian species with an emphasis on the bottomland forest and upland deciduous habitat types (Audubon, 2021).

Land uses in the Solar Project Area are primarily agricultural (cultivated or hay/pasture; 96.8 percent), with some small amounts of developed areas (2.2 percent), open water (0.3 percent), wetland (0.3 percent), forested land (0.1 percent), herbaceous (0.1 percent), barren (<0.1 percent) and shrubland (<0.1 percent). The forested land that is present consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. As a result, few migratory bird species that use trees or forested areas as habitat will be present, such as Nashville warbler, black-billed cuckoo, and red-headed woodpecker. Wetlands and waterbodies within the Solar Project Area are limited to four PWI wetlands (two in the West Block and two in the East Block (see Section 5.5.5). Thus, few wetland- or water-dependent birds such as waterbirds would use the Solar Project Area for nesting. Species of migratory birds associated with grasslands would also be limited or absent. Overall, few if any BCC are likely to use the Solar Project Area as nesting habitat; the agricultural fields are likely used for foraging habitat and migratory stopover habitat.

The USFWS is also concerned about avian species that are at risk from habitat fragmentation. Species of habitat fragmentation concern are impacted when larger areas of habitat are divided into smaller areas with concomitant reductions in habitat connectivity (USFWS, 2012). At present, avian habitat within the Solar Project Area is highly fragmented given 99 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the Solar Project Area, they have adapted to the fragmentation and current land uses.

Other Wildlife Species

As shown in Table 5.5-5, other groups of wildlife that may occur in the Solar Project Area including mammals, reptiles, and amphibians. There are no lakes or rivers located in the Solar Project Area (see Section 5.5.4); thus, no fish are present. The open water in the Solar Project Area is limited to four PWI wetlands (see Section 5.5.5). There is limited foraging habitat for bats in the Solar Project Area associated with wetlands. Some pollinator insects may be present in the Solar Project Area including native bees, butterflies, and moths.

West Route

The wildlife species that inhabit the West Route are typical of those found in agricultural areas and would be similar to those described above for the Solar Project.

Avian Species

Similar to the Solar Project, the West Route is located within the Mississippi Flyway and the Prairie Hardwood Transition BCR; and does not cross any IBAs. The Lake Maria State Park - Henry Larson County Forest IBA is the closest IBA, located approximately 1.5 miles south of the West Route at its closest point.

Land uses in the West Route right-of-way are primarily agricultural (cultivated or hay/pasture, 70.0 percent) and developed (28.0 percent), with some small amounts of herbaceous (2.0 percent), and barren land (< 0.1 percent). While there is no forested land categorized in the NLCD data, aerial imagery indicates areas of treed land in the form of shelterbelts between agricultural fields, near farmsteads, and along roadways in the northern portion of the West Route. There are also scattered trees or smaller wooded patches in the southern portion of the West Route within the Sherco Generating Plant. There are no wetlands or waterbodies located within the West Route (see Sections 5.5.4 and 5.5.5). Thus, wetland- or water-dependent birds such as waterbirds would not use the West Route for nesting. Overall, given the highly fragmented nature of the West Route, and its proximity to developed land/existing infrastructure, few BCC are likely to use the West Route as habitat.

As noted above for the Solar Project, the USFWS is also concerned about avian species that are at risk from habitat fragmentation. At present, habitat in the West Route is highly fragmented given 98 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the West Route, they have adapted to the fragmentation and current land uses.

Other Wildlife Species

Other wildlife that may occur in the Solar Project Area include mammals, reptiles, and amphibians; similar to those shown in Table 5.5-5 for the Solar Project. As noted above, there are no lakes or rivers located in the West Route (see Section 5.5.4); thus, no fish are present. There are also no wetlands located in the West Route (see Section 5.5.5). Some pollinator insects may be present in the West Route including native bees, butterflies, and moths.

East Route

The wildlife species that inhabit the East Route are typical of those found in agricultural areas and would be similar to those described above for the Solar Project.

Avian Species

Similar to the Solar Project, the East Route is located within the Mississippi Flyway and the Prairie Hardwood Transition BCR; and does not cross any IBAs. The Lake Maria State Park - Henry Larson County Forest IBA is the closest IBA, located approximately 1.6 miles south of the East Route at its closest point.

Land uses in the East Application Alignment right-of-way are primarily agricultural (cultivated or hay/pasture, 76 percent) and developed (21.9 percent), with some small amounts of open water (2.1 percent). Given the highly fragmented nature of the habitat in the East Route, and its proximity to developed land/existing infrastructure, few if any BCC are likely to use the East Route as habitat.

As noted above for the Solar Project, the USFWS is also concerned about avian species that are at risk from habitat fragmentation. At present, habitat in the East Route is highly fragmented given 98 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the East Route, they have adapted to the fragmentation and current land uses.

Other Wildlife Species

Other wildlife that may occur in the Solar Project Area include mammals, reptiles, and amphibians; similar to those shown in Table 5.5-5 for the Solar Project. As noted above, there are no lakes or rivers located in the East Route (see Section 5.5.4); thus, no fish are present. There are also no wetlands located in the East Route (see Section 5.5.5). Some pollinator insects may be present in the East Route including native bees, butterflies, and moths.

5.5.7.2 Impacts and Mitigation

Solar Project

Given that the Project is comprised primarily of agricultural lands, occurrence of wildlife within the Solar Project Area is limited to those species well adapted to human disturbance and agricultural land cover. Restoration of the Solar Project Area will likely result in wildlife benefits because it will be revegetated with a beneficial habitat, pollinator-friendly seed mix. Common species of wildlife adapted to agricultural land use may be present in the Project such as white-tailed deer, red fox, striped skunk, wild turkey, rodents, snakes, and insects. During construction, highly mobile species of wildlife including deer, birds, and snakes are expected to divert to areas surrounding the Project. Xcel Energy will implement several construction best management practices (BMPs) that are also beneficial to wildlife including: wildlife training for construction personnel, posted speed limits, spill prevention measures, and general construction housekeeping such as trash removal and maintaining a clean work area. Additionally, Xcel Energy will implement specific BMPs for state-listed species (loggerhead shrike and Blanding's turtle) that will also be beneficial to wildlife in general. These include removing trees outside of the loggerhead shrike nesting season (April 1 – July 31) and implementing wildlife-friendly erosion control blankets for Blanding's turtle (see Section 5.6.2.1 for more information). Overall, construction of the Solar Project is expected to have minimal impacts on individuals of common wildlife species, and no impact on populations of these species.

During operations, any potential impacts on wildlife are also expected to be minimal and insignificant. These impacts may be related to vehicle traffic and parking or mowing. Additionally, the West and East Collector Substations will introduce an electrocution risk; these facilities will be constructed and operated according to Avian Power Line Interaction Committee (APLIC) recommended guidance to reduce the potential for avian electrocutions (APLIC, 2006; APLIC, 2012). Because any potential impacts on wildlife are anticipated to be minimal and insignificant, no species-specific mitigation is proposed. However, Xcel Energy will implement several BMPs during operations including minimizing risk of vehicular collisions by posting speed limits, minimizing fire risk by utilizing spark arrestors on all electrical equipment and restricting smoking to designated areas, and implementing environmental training for employees. Xcel Energy will also continue to coordinate with MNDNR.

After construction and during operations, the Solar Project may provide higher quality wildlife habitat than the current land use provides. As discussed in Section 5.5.6.2, Xcel Energy will restore with a seed mix that provides habitat for more diverse range of wildlife, including grassland birds, rodents, reptiles, and insects. In sum, 2,946 acres would be restored as native prairie, including a seed mix with native grasses and wildflowers, thereby potentially benefitting and increasing the

overall populations of wildlife species in the area, including birds, small mammals, reptiles, and pollinator insects.

As discussed in Section 2.2.1.4, permanent security fencing will be installed along the perimeter of the solar arrays and Project Footprint. In accordance with MNDNR recommendations, this fencing will be designed to prevent larger wildlife from entering the solar facility, but will allow safe passage for smaller wildlife. While larger wildlife like white-tail deer will be excluded from the Solar Project Area, there is an abundance of suitable habitat for this species and other large wildlife in the Project vicinity. Xcel Energy will consult with MNDNR wildlife staff to ensure that the type of fencing used and the placement of the fencing is optimal for wildlife exclusion and/or passage as well as safety.

West Route

Given that the majority of the land use along the West Application Alignment is cultivated cropland, Xcel Energy anticipates that the potential impacts on wildlife and wildlife habitat during construction and maintenance of the West Route will be minimal. In addition, most impacts on wildlife habitat would be temporary with the exception of any necessary tree clearing and habitat conversion related to concrete foundations for structures and establishing the right-of-way. Xcel Energy will avoid tree clearing during April 1 – July 31, which coincides with the loggerhead shrike nesting season and the pup season for northern long-eared bat (see Section 5.6). Potential impacts on wildlife during construction would be primarily related to temporary disturbance and displacement; wildlife may be acclimated to human activity due to the agricultural activity within the West Application Alignment right-of-way.

During operations, birds, including eagles, may be injured or killed due to either collisions with the transmission line and associated West Route components or electrocution. Avian collision risk may be greater during certain behaviors such as flushing, courtship displays, and aerial displays; these behaviors may distract birds such that they are less aware of nearby structures. Collision risk may also be greater if a powerline is located between roosting, feeding, or nesting areas. Individuals or species with poor vision, that are young or less agile, or that are unfamiliar with the area may also be at greater risk of collision with transmission lines. Electrocutions typically result when an individual bird's wingspan is equal to or greater than the distance between two energized and/or grounded components of a transmission line (APLIC, 2006).

Xcel Energy will coordinate with USFWS and MNDNR as needed to identify avian movement pathways and migration flyways that may be crossed by the West Application Alignment and to discuss areas along the transmission line that may need to be marked with avian flight diverters to minimize impacts to birds. In addition, the West Route will be constructed and operated according to Avian Power Line Interaction Committee (APLIC) guidance to reduce the potential for avian collisions and electrocutions (APLIC, 2006; APLIC, 2012).

No known bald eagle nests are located within one mile of the West Application Alignment. Potential impacts on eagles using these nests would be the same as those described above for other birds—specifically, potential injury or death due to collision and electrocution. Xcel Energy will avoid and minimize these potential impacts through coordination with the USFWS and MNDNR

and adherence to APLIC recommended standards regarding avian collisions and electrocutions, as described above (APLIC, 2006; APLIC, 2012).

East Route

Xcel Energy anticipates that the potential impacts on wildlife and wildlife habitat during construction and maintenance of the East Route will be minimal. In addition, most impacts on wildlife habitat would be temporary with the exception of any necessary tree clearing and habitat conversion related to concrete foundations for structures and establishing the right-of-way. Xcel Energy will avoid tree clearing during April 1 – July 31, which coincides with the loggerhead shrike nesting season and the pup season for northern long-eared bat (see Section 5.6). Potential impacts on wildlife during construction would be primarily related to temporary disturbance and displacement; wildlife may be acclimated to human activity due to the agricultural activity within the East Application Alignment right-of-way.

During operations, birds, including eagles, may be injured or killed due to either collisions with the transmission line and associated East Route components or electrocution. Avian collision risk may be greater during certain behaviors such as flushing, courtship displays, and aerial displays; these behaviors may distract birds such that they are less aware of nearby structures. Collision risk may also be greater if a powerline is located between roosting, feeding, or nesting areas. Individuals or species with poor vision, that are young or less agile, or that are unfamiliar with the area may also be at greater risk of collision with transmission lines. Electrocutions typically result when an individual bird's wingspan is equal to or greater than the distance between two energized and/or grounded components of a transmission line (APLIC, 2006).

Xcel Energy will coordinate with USFWS and MNDNR as needed to identify avian movement pathways and migration flyways that may be crossed by the East Application Alignment and to discuss areas along the transmission line that may need to be marked with avian flight diverters to minimize impacts to birds. In addition, the East Route will be constructed and operated according to APLIC guidance to reduce the potential for avian collisions and electrocutions (APLIC, 2006; APLIC, 2012).

No known bald eagle nests are located within one mile of the East Application Alignment. Potential impacts on eagles using these nests would be the same as those described above for other birds—specifically, potential injury or death due to collision and electrocution. Xcel Energy will avoid and minimize these potential impacts through coordination with the USFWS and MNDNR and adherence to APLIC recommended standards regarding avian collisions and electrocutions, as described above (APLIC, 2006; APLIC, 2012).

5.6 Rare and Unique Natural Resources

Construction and operation of a solar project and transmission lines have the potential to impact rare species and their habitats. Siting and routing these facilities to avoid sensitive habitats can avoid or minimize impacts to rare species.

5.6.1 Description of Resources

The USFWS Information for Planning and Conservation (IPaC) website was reviewed for the federal endangered and threatened species, candidate species, and designated critical habitat that may occur in Sherburne County, Minnesota (USFWS, 2021). The MNDNR's Natural Heritage Information System (NHIS) was also reviewed for documented occurrences of federally listed species, state listed species, and state species of concern within one mile of the Solar Project Area (MNDNR, 2019 and Appendix J). NG Renewables received a Natural Heritage Review Response from the MNDNR for the West Block on December 11, 2020 (Correspondence # ERDB 20210125). NG Renewables submitted a comprehensive Natural Heritage Review Request (for the West and East Blocks and West and East Routes) to the MNDNR for the Project on January 27, 2021. A copy of this request is included in Appendix J. To date, a response has not been received.

Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat (refer to Table 5.6-1). Due to the proximity of the Solar Project and West and East Routes, Table 5.6-1 includes all species within the Solar Project Area and West and East Routes and within one mile of each project. Because most species are within one mile of each project, species descriptions are included below. A description of potential habitat for each species is included under the sub-heading for each project.

Additionally, the MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance (Solar Guidance; May 2016) that recommends identification of high value resources during Project development. This guidance is specific to solar projects and is discussed in Section 5.6.1.1 below; these high value areas are not discussed for the West and East Routes.

Table 5.6-1: Federal and State-Listed Species Documented within One Mile of the Solar Project, West Route, and East Route								
Solar Project (Block)	West Route	East Route	Common Name	Scientific Name	Habitat	Status[1]		Source
						State[2]	Federal[3]	
Mammals								
West East	Yes	Yes	Northern Long-eared Bat (NLEB)[4]	*Myotis septentrionalis*	In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018a)	SC	T	USFWS
Mussels								
West East	Yes	Yes	Black Sandshell	*Ligumia recta*	Riffle and run areas of medium to large rivers in areas dominated by sand or gravel (MNDNR, 2021d).	SC	None	NHIS
West	Yes	Yes	Creek Heelsplitter	*Lasmigona compressa*	Creeks, small rivers, and the upstream portions of large rivers. Its preferred substrates are sand, fine gravel, and mud (Clarke, 1985).	SC	None	NHIS
Birds								
West East	Yes	Yes	Loggerhead Shrike	*Lanius ludovicianus*	Upland grasslands and sometimes in agricultural areas where short grass vegetation and perching sites such as hedgerows, shrubs, and small trees are found (MNDNR, 2021e)	E	None	NHIS
East	Yes	Yes	Peregrine Falcon	*Falco peregrinus*	Presently, they nest primarily on buildings and bridges in urban settings and also use historic eyries, including along the Mississippi River in the rugged bluff country of the southeastern part of the state (MNDNR, 2021f).	SC	None	NHIS
East	No	No	Red-shouldered Hawk	*Buteo lineatus*	Large tracts of mature deciduous forest with scattered wetland openings (MNDNR, 2021g; nesting sites include high, think canopies and trees with large diameters (McLeod and Anderson, 1996)	SC	None	NHIS
Plants								

Table 5.6-1: Federal and State-Listed Species Documented within One Mile of the Solar Project, West Route, and East Route

Solar Project (Block)	West Route	East Route	Common Name	Scientific Name	Habitat	Status[1]		Source
						State[2]	Federal[3]	
East	Yes	Yes	Rock Sandwort	*Minuartia dawsonensis*	Dry, sedimentary bedrock outcrops; grows in crevices and in very shallow accumulations of organic matter over exposed bedrock (MNDNR, 2021h).	T	None	NHIS
West	Yes	Yes	Seaside Three-awn	*Aristida tuberculosa*	Exclusively in dry and loose sand in sand savannas, sand prairies, and dunes, where vegetation is sparse (MNDNR, 2021i)	T	None	NHIS
Reptile								
West	Yes	Yes	Blanding's Turtle[5]	*Emydoidea blandingii*	Wetland complexes and adjacent sandy uplands (MNDNR, 2021j)	T	None	MN DNR
None	Yes	No	Gopher snake	*Pituophis catenifer*	Well-drained, loose sandy and gravel soils; dry sand prairies and bluff prairies are prime habitat (MNDNR, 2021l)	SC	None	NHIS

1 E = Endangered, T = Threatened, SC = Special Concern

2 MNDNR, 2013; MNDNR, 2019

3 USFWS, 2021

4 The NHIS review did not indicate any records of the NLEB within a mile of the Solar Project Area or within the Solar Project Area; however, review of the USFWS' IPaC indicated that this species has the potential to occur in Sherburne County.

5 Blanding's turtle was not documented within one mile of the Solar Project, West Route, or East Route; but was identified in a Natural Heritage Review Response from the MNDNR for the West Block of the Solar Project on December 11, 2020 (see Appendix J).

Federal Listed Species

According to the review of the USFWS IPaC, one species listed as threatened under the federal Endangered Species Act (ESA) may occur in Sherburne County, Minnesota: northern long-eared bat (NLEB) (*Myotis septentrionalis*).

Northern Long-eared Bat

The NLEB is listed as threatened under the ESA. It is medium-sized bat species that occurs across the eastern and central U.S. (Caceres and Barclay, 2000). The annual life history of the NLEB includes an inactive period when the species is hibernating and an active period when the species forages, raises its young, and breeds. Hibernation generally occurs in caves and mines between November 1 and March 31 (USFWS, 2016a; USFWS, 2016b). In April, the species emerges from its hibernacula and moves to summer habitat. NLEB typically forage on flies, moths, beetles, caddisflies, and other insects in the understory of wooded areas (USFWS, 2016b). Adult females form breeding or maternity colonies that are variable in size, ranging from a few individuals to as many as 60 adults (Caceres and Barclay, 2000; Wisconsin Department of Natural Resources, 2015). During the summer, the species roosts in live and dead trees in cavities and crevices and under bark (Timpone et al., 2010). The NLEB forages primarily in forested areas (USFWS, 2016b). The NLEB is currently declining due to a disease that affects hibernating bats called white-nose syndrome (WNS).

State-Listed Species

The species designated as state-threatened, endangered, or special concern with documented occurrences within 1 mile of the Solar Project, West Route, and East Route are shown in Table 5.6-1. NG Renewables received a Natural Heritage Review Response from the MNDNR for the West Block on December 11, 2020 (Correspondence # ERDB 20210125), which also identified the Blanding's turtle as a species of concern.

As noted above, NG Renewables submitted a comprehensive Natural Heritage Review Request (for the West and East Blocks; and West and East Routes) to the MNDNR for the Project on January 27, 2021. To date, a response has not been received. A summary of state-listed species identified through the NHIS review and MNDNR correspondence is below.

Black Sandshell

Black sandshell inhabit the riffle and run areas of medium to large rivers with sand or gravel substrates. Like other species of freshwater mussels, the black sandshell has a complex reproductive cycle. Fish hosts of the species' glochidial larvae include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), and sauger (*Stizostedion canadense;* MNDNR, 2021d).

Creek Heelsplitter

The creek heelsplitter typically occurs in creeks, small rivers, and the upstream portions of large rivers. Its preferred substrates are sand, fine gravel, and mud (Clarke 1985). Host fish species for the creek heelsplitter are yellow perch (*Perca flavescens*), black crappie (*Pomoxis*

nigromaculatus), slimy sculpin (*Cottus cognatus*), and the spotfin shiner (*Cyprinella spiloptera*) (MNDNR, 2021k).

Loggerhead Shrike

Loggerhead shrike occur in grasslands, agricultural fields, and upland prairies with suitable perches for hunting for prey and scattered shrubs and trees for nesting. Farms with fence lines, shelterbelts, and hedgerows may be particularly suitable. Loggerhead shrike nest within narrow windbreaks and hedgerows or in isolated trees near grasslands, pastures, and agricultural fields. The diet of loggerhead shrike includes large insects and small mammals, birds, and reptiles; prey is often impaled on barbed wire or a thorny shrub prior to consumption (MNBBA, 2019).

Peregrine Falcon

In the past, peregrine falcons in Minnesota nested on cliff ledges along rivers or lakes. Presently, they nest primarily on buildings and bridges in urban settings and also use historic eyries on cliffs along Lake Superior and several lakes in the Boundary Waters Canoe Area Wilderness and along the Mississippi River in the rugged bluff country of the southeastern part of state (MNDNR, 2021f). Because peregrine falcons specialize in direct aerial pursuit of avian prey, they prefer open non-forested areas for hunting. Many peregrine falcons migrate thousands of miles to spend the winter in Mexico and Central and South America but some overwinter in the United States, including Minnesota. They return to their northern breeding grounds in late April to early May. Young are raised in eyries (indentations scraped into the soil of rocky cliff ledges) or on flat surfaces of buildings or bridges (MNDNR, 2021f). There is a known nest box for peregrine falcons at the Sherco Generating Plant.

Red-shouldered Hawk

Red-shouldered hawks are most commonly found in large tracts of mature deciduous forest with scattered wetland openings. Suitable habitat typically occurs in uplands with diverse topography characterized by numerous small hills, ridges, and depressional wetlands or small lakes. Red-shouldered hawks also frequent mature floodplain forests (MNDNR, 2021g). Researchers have found that nesting sites include high, thick canopies and trees with large diameters (McLeod and Andersen, 1996). Red-shouldered hawks overwinter in lowland areas near water in the central and southern United States and Central America. They nest halfway up tall trees, well below the canopy. Nest sites are often re-used in subsequent years (MNDNR, 2021g).

Seaside Three-awn

In Minnesota, seaside three-awn occurs exclusively in dry and loose sand in sand savannas, sand prairies, and dunes, where vegetation is sparse (MNDNR, 2021i). The plants typically grow in full sunlight, though there may be scattered oak trees or oak groves in the vicinity, especially *Quercus macrocarpa* (bur oak), *Q. ellipsoidalis* (northern pin oak), or *Q. velutina* (black oak). Seaside three-awn is a wind-pollinated annual, with a need for open and sparsely vegetated habitats, where there is dry and shifting sand (MNDNR, 2021i).

Rock Sandwort

Rock sandwort is a small plant that grows on outcrops of sedimentary bedrock exposures in the southeastern region of the state (Paleozoic Plateau and Minnesota & Northeast Iowa Morainal sections; MNDNR, 2021h). Occurrences are typically found in crevices and in very shallow accumulations of organic matter over the exposed bedrock. Outcrops where rock sandwort are found are generally horizontal in nature; plants do not grow on the vertical walls of cliffs. Occasionally in the southeast, rock sandwort is also found in upland prairies on sands derived from the bedrock (MNDNR, 2021h).

Blanding's Turtle

Wetland complexes and adjacent sandy uplands are necessary to support viable populations of Blanding's turtles. Calm, shallow waters, including wetlands associated with rivers and streams with rich aquatic vegetation are especially preferred. In Minnesota, this species appears fairly adaptable, utilizing a wide variety of wetland types and riverine habitats in different regions of the state. In central Minnesota, shrub wetlands are utilized throughout the summer and also serve as over-wintering sites (Piepgras and Lang, 2000). In southeastern Minnesota, open marshes and bottomland wetlands provide summer and winter habitat. Ephemeral wetlands are utilized in spring and early summer, while deeper marshes and backwater pools are utilized in both the summer and winter (Hamernick, 2000; Pappas et al., 2000). Blanding's turtles typically overwinter in muddy bottoms of deep marshes, backwater pools, ponds, and streams. They emerge from overwintering sites in late March to early April. Small, temporary wetlands are frequently used by Blanding's turtles in spring and early summer, when these habitats provide basking sites and mating opportunities (Sajwaj and Lang, 2000). Shallow pools provide ideal amphibian and invertebrate breeding habitat, that in-turn provide an important food source for turtles. Aquatic vegetation, macro-invertebrates, and small fish may also be eaten (Oldfield and Moriarty, 1994). Nesting occurs in sparsely vegetated uplands with well-drained, sandy soils.

Gopher Snake

The gopher snake prefers areas of well-drained, loose sandy and gravel soils. Dry sand prairies and bluff prairies are prime habitat. Hibernation sites include rodent burrows and rock fissures in bluffs and outcrops (MNDNR, 2021l). Females will nest in old mammal burrows or excavate a nest chamber in sandy soils. Most of the Minnesota records of this species are from counties along the Minnesota, Mississippi, and St. Croix rivers (MNDNR, undated). The gopher snake is a permanent resident, emerging from hibernation in the spring for breeding. The gopher snake feeds on a variety of small animals, including gophers, mice, voles, ground squirrels, tree squirrels, frogs, and ground nesting birds. Gopher snakes will try to escape when encountered, but if cornered, they will hiss, vibrate their tail, and strike. The vibrating tail can make a sound resembling that of a rattlesnake, especially if the snake is in dry leaves, but the gopher snake is a nonvenomous species.

5.6.1.1 Solar Project

Based on IPaC and NHIS reviews and coordination with MNDNR, there is one federally-listed species (northern long-eared bat; also state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle),

and four state-listed special concern species (black sandshell, creek heelsplitter, peregrine falcon, and red-shouldered hawk) identified within one mile of the Solar Project Area (see Table 5.6-1).

The Solar Project Boundary is primarily agricultural lands with only a small area of forested habitat (<0.2 percent), which consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. Higher quality habitat exists in areas adjacent to the Solar Project Area and (i.e., riparian areas associated with the Mississippi River and various lakes).

Federal Listed Species

During their active season (April 1 through October 31), NLEB may roost in tees within the Solar Project Area.

State-Listed Species

Habitat for state-listed species is limited in the Solar Project Area to potential habitat for loggerhead shrike (state-listed endangered) and Blanding's turtle (state-listed threatened). Habitat for the loggerhead shrike is likely present within the Solar Project Area, given the predominance of agriculture along with the isolated rows of trees along the edges of agricultural fields and roads. As noted by MNDNR, Blanding's turtles may occur in wetland complexes and sandy adjacent uplands within the Solar Project Area.

The Solar Project Area lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the Sherco Generating Plant), red-shouldered hawk (large tracts of deciduous forest that occur along the Mississippi River), Rock Sandwort (bedrock outcrops), and seaside three-awn (sand savannas).

MNDNR High Value Areas

The MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance (Solar Guidance; May 2016) that recommends identification of high value resources during Project development. High value resources include (1) rare species and native plant communities (NPCs); (2) native prairie; (3) species and habitats included in the Wildlife Action Network and Minnesota Wildlife Action Plan; (4) lakes, wetlands, streams, and rivers; (5) large block habitats; (6) public conservation and recreation lands; and (7) properties in government programs or with conservation easements (MNDNR, 2016a).

Rare Species and Native Plant Communities

Rare species including federal- and state-listed species are discussed above. This includes records of federal and state-listed species tracked by the MNDNR in the NHIS database. Additionally, the MNDNR has classified NPCs within the state using plant species, soils, and other site-specific data from vegetation plots. The current NPC classification covers most of the wetland and terrestrial vegetation in the state and was completed in 2003. It is a six-level hierarchical classification that accounts for vegetation structure and geology, ecological processes, climate and paleohistory, local environmental conditions, canopy dominants, substrate, and environmental conditions

(Aaseng et al., 2011). Based on a review of the MNDNR's data, there are no NPCs or mapped native prairie within the Solar Project Area.

MNDNR's Minnesota Biological Survey (MBS) assesses Minnesota landscapes for NPCs, rare animals, rare plants, and animal communities through desktop review and follow-up field survey. Based on this assessment, MBS designates and assigns rankings to Sites of Biodiversity Significance (SOBS), based landscape context, NPC, and occurrence of rare species populations. The MBS groups and ranks SOBS for each Minnesota's system subsections for the purpose of designating and cataloguing the state's most notable examples of NPCs and rare species. There are four ranks for SOBS: outstanding, high, moderate, and below (MNDNR, 2009). Based on a review of the MNDNR's data, there are no SOBS within the Solar Project Area. One SOBS rated "below" (East Clear Lake 21), is located directly adjacent to the north boundary of the West Block.

Native Prairie

Native prairie is defined as a grassland that has not been plowed with plant species typical of prairies (MNDNR, 2016a). The MNDNR's railroad prairie rights-of-way are native prairie remnants that occur along railroad rights-of-way. The railroad rights-of-way program was instituted in 1997 by the Minnesota legislature in the Prairie Parkland and Eastern Broadleaf Forest ECS Provinces. The MNDNR ranks railroad rights-of-way into three categories: very good, good, and fair. There is no MNDNR-mapped native prairie in the Solar Project Area.

Wildlife Action Network and Minnesota Wildlife Action Plan

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN), in addition to SOBS, Lakes of Biological Significance, and streams with exceptional indices of biological integrity. Minnesota's State Wildlife Action Plan (SWAP; 2015-2025) proactively addresses the state's conservation needs and catalyzes actions to prevent species from becoming listed under the state endangered species program or the ESA. The SWAP also entailed revisions to the state's list of SGCN. SGCN are native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility (MNDNR, 2016b).

The Solar Project Area does not intersect any habitats within the Wildlife Action Network including SOBS, lakes of biological significance, or streams with exceptional indices of biological integrity. Based on the review of the MNDNR's NHIS, one SGCN has been documented within the Solar Project Area, the loggerhead shrike, which is summarized above and discussed further in Section 5.6.2 below.

Lakes, Wetlands, Streams, and Rivers

Lakes, wetlands, streams, and rivers are discussed in sections 5.5.4 and 5.5.5. The Solar Project Area also has 39.2 acres of delineated wetlands.

Large Block Habitats

Large block habitats are grassland habitats of greater than 40 acres (MNDNR, 2016b). The Solar Project Area has highly fragmented habitat; 98.9 percent is used for agriculture or is developed. The Solar Project Area contains no large block habitats.

Public Conservation and Recreation Lands

Public conservation and recreation lands include state lands administered by the MNDNR or by counties; scientific and natural area units; publicly accessible state WMAs; state forest statutory boundaries and management units; state parks, recreation areas, and waysides; state trails of Minnesota; public water access sites in Minnesota; and state aquatic management area acquisitions (MNDNR, 2016a). There are no public conservation and recreation lands in the Solar Project Area (besides snowmobiles trails, which are not managed for public use and don't contain high quality habitat); public conservation and recreation lands in the Project vicinity are discussed in Section 5.2.8.

Properties in Government Programs or with Conservation Easements

Based on the MNDNR's Solar Guidance, properties in government programs or with conservation easements include MNDNR Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, and USFWS conservation easements (MNDNR, 2016a). There are no properties in government programs or with conservation easements in the Solar Project Area.

5.6.1.2 West Route

Based on IPaC and NHIS reviews and coordination with MNDNR, there is one federally-listed species (northern long-eared bat; also state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle), and four state-listed special concern species (black sandshell, creek heelsplitter, peregrine falcon, and gopher snake) identified within one mile of the West Route (see Table 5.6-1).

The West Route is primarily agricultural lands or developed with in the Sherco Generating Plant. Based on aerial imagery, there are small area of forested habitat that consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. High quality habitat exists in areas adjacent to the Sherburne County Substation (i.e., riparian areas associated with the Mississippi River).

Federally listed species

During their active season (April 1 through October 31), NLEB may roost in the trees within the West Route.

State-listed species

Habitat for state-listed species is limited in the West Route to potential habitat for loggerhead shrike (state-listed endangered). Habitat for the loggerhead shrike is likely present within the West

Route, given the predominance of agriculture along with the isolated rows of trees along the edges of agricultural fields and roads.

The West Route lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the Sherco Generating Plant), Rock Sandwort (bedrock outcrops), seaside three-awn (sand savannas), Blanding's turtle (wetland complexes with adjacent sandy uplands), and gopher snake (dry sand and bluff prairies).

Natural Resource Sites

NG Renewables reviewed the West Route for sites that have been specially designated as having notable natural resources. Natural resource sites designated by the State of Minnesota include SOBS, NPCs, native prairie, railroad right-of-way prairie, WMAs, MNDNR SNAs, and state parks. Sites with notable natural resource value designated by the federal government include National Wildlife Refuges (NWRs), wilderness areas, national wild and scenic rivers, national forests, Waterfowl Protection Areas, and grassland and wetland easements. None of these features are present within the West Route.

5.6.1.3 East Route

Based on IPaC and NHIS reviews and coordination with MNDNR, there is one federally-listed species (northern long-eared bat; also state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle), and three state-listed special concern species (black sandshell, creek heelsplitter, and peregrine falcon) identified within one mile of the East Route (see Table 5.6-1).

The East Route is primarily agricultural lands and developed, particularly within the Sherco Generating Plant. Based on aerial imagery, there are trees associated with shelterbelts along roadways and within the Sherco Generating Plant. Higher quality habitat exists in areas adjacent to the Sherburne County Substation (i.e., riparian areas associated with the Mississippi River).

Federally listed species

During their active season (April 1 through October 31), NLEB may roost in the trees within the East Route.

State-listed species

Habitat for state-listed species is limited in the East Route to potential habitat for loggerhead shrike (state-listed endangered). Habitat for the loggerhead shrike is likely present within the East Route associated with agriculture along with the isolated rows of trees along the edges of agricultural fields and roads.

The East Route lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the Sherco Generating Plant), Rock Sandwort (bedrock outcrops), seaside three-awn (sand savannas), and Blanding's turtle (wetland complexes with adjacent sandy uplands).

Natural Resource Sites

NG Renewables reviewed the East Route for sites that have been specially designated as having notable natural resources. Natural resource sites designated by the State of Minnesota include SOBS, NPCs, native prairie, railroad right-of-way prairie, WMAs, MNDNR SNAs, and state parks. Sites with notable natural resource value designated by the federal government include NWRs, wilderness areas, national wild and scenic rivers, national forests, Waterfowl Protection Areas, and grassland and wetland easements. None of these features are present within the East Route.

5.6.2 Impacts and Mitigation

5.6.2.1 Solar Project

Federal Listed Species

The USFWS published a final 4(d) rule for the NLEB on January 14, 2016. In the final 4(d) rule, the agency limited prohibitions for the species to those that would protect the bat in WNS-affected geographic areas during the most vulnerable stages in the species' life history—specifically, during hibernation, spring staging, fall swarming, and pup rearing (USFWS, 2016a). Per the USFWS' Final 4(d) rule for NLEB, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all take within known hibernacula is prohibited (USFWS, 2016a).

Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, it was determined that there are no documented NLEB maternity roost trees within 150 feet of the Solar Project Area or documented hibernacula within 0.25 mile of the Solar Project Area. Although there are no records of NLEB, the species may still be present in the Solar Project Area. Under Section 7(a)2 of the ESA, federal action agencies may rely upon the Programmatic Biological Opinion for the Final 4(d) Rule developed by USFWS on January 5, 2016 to meet its Section 7 consultation responsibilities for the NLEB (USFWS, 2016b). Under the Programmatic Biological Opinion, project proponents may use a streamlined approach involving an online NLEB 4(d) rule determination key and verification letter. After submittal of the online determination key, the USFWS has 30 days to respond. If no response is received, the federal action agency can assume that the project may affect but is not likely to cause prohibited take of individual NLEB, and consultation requirements for the species under Section 7(a)2 are complete.

Construction of the Solar Project will include tree clearing on the interior of the Project (wind rows between agricultural fields). If Xcel Energy determines that a federal permit (e.g., USACE) will be needed for the Solar Project, the streamlined approach and Programmatic Biological Opinion for the Final 4(d) rule will be used for the Solar Project. Additionally, Xcel Energy will avoid tree clearing during the pup season (June and July).

State Listed Species

Based on the NHIS review, one state-endangered species (loggerhead shrike), and two state-threatened species (rock sandwort and seaside-three awn) were documented within one mile of the Solar Project Area (refer to Table 5.6-1).

Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use in the Solar Project Area and surrounding areas. Xcel Energy will implement the BMPs for the loggerhead shrike recommended by the MNDNR in their December 11, 2020 letter on the Project. Specifically, any tree/shrub removal will be conducted outside of the species nesting season (April 1 – July 31). Additionally, Xcel Energy will also report any loggerhead shrike sightings to the MNDNR. Overall, impacts on loggerhead shrike due to the Project are expected to be insignificant.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the Solar Project Area; therefore, impacts to these species are not anticipated.

In addition to the state-listed species identified as part of the NHIS review, NG Renewables received a Natural Heritage Review Response from the MNDNR for the West Block of the Solar Project on December 11, 2020 (Correspondence # ERDB 20210125), which also identified the state-threatened Blanding's turtle as a species of concern. As suitable habitat may be present for the Blanding's turtle in the Solar Project Area, Xcel Energy will adhere to the following avoidance measures outlined in the MNDNR's December 11, 2020 letter:

- Avoid wetland impacts during hibernation season, between October 15th and April 15th, unless the area is unsuitable for hibernation:
    - less than 14 inches deep,
    - anoxic conditions, or
    - not a suitable substrate.
- Provide the Blanding's turtle flyer to all contractors working in the area.
- The use of erosion control blanket shall be limited to 'bio-netting' or 'naturalnetting' types, and specifically not products containing plastic mesh netting or other plastic components.
    - Also, be aware that hydro-mulch products may contain small synthetic (plastic) fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with synthetic (plastic) fiber additives in areas that drain to Public Waters.
- Monitor for turtles during construction and report any sightings to the DNR Nongame Specialist.
- If turtles are in imminent danger they must be moved by hand out of harm's way, otherwise they are to be left undisturbed.

NG Renewables' review of MNDNR's NHIS records also identified four records of state species of special concern within one mile of the Solar Project Area: black sandshell, creek heelsplitter, peregrine falcon, and red-shouldered hawk (refer to Table 5.6-1). The state's designation as a

species of special concern for these four species does not afford protections under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). Xcel Energy does not expect any impacts to these special concern species as suitable aquatic habitat (i.e., the Mississippi River) required by the black sandshell and creek heelsplitter is not present within the Solar Project Area, and suitable nesting habitat for the peregrine falcon and red-shouldered hawk (cliffs, urban buildings and bridges, large tracts of deciduous forest), and is also not present in the Solar Project Area.

Additionally, Xcel Energy is committed to revegetating the Solar Project with a native prairie mix that will provide beneficial habitat. The mixes are designed to include both native grasses and wildflowers and are developed with prairie specialists in coordination with the MNDNR and BWSR. These mixes achieve Xcel Energy's goal for operating a pollinator-friendly solar facility by providing native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators. Xcel Energy intends to follow the guidance set forth by BWSR to meet the standards of the Habitat Friendly Solar Program. This habitat may provide suitable habitat for rare and unique species, particularly pollinator insects.

MNDNR High-Value Areas

Federal and state listed species are described above. There are no additional MNDNR High Value Areas in the Solar Project Area, including NPCs; native prairie; SGCN species; large block habitats; lakes, streams, and rivers; public conservation and recreation lands; and properties in government programs or with conservation easements. As such, impacts to MNDNR High Value Areas will be minimal and no mitigative measures are proposed.

5.6.2.2 West Route

Federally Listed Species

As described above in Section 5.6.2.1, the incidental take of NLEB due to tree removal is prohibited if it occurs within 0.25 mile of a documented hibernaculum or if it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July. Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, there are no documented NLEB maternity roost trees within 150 feet of the West Route or documented hibernacula within 0.25 mile of the West Route. Although there are no records of NLEB, the species may still be present in the West Route.

Construction of the West Route will include some tree clearing of wind rows within the right-of-way. If Xcel Energy determines that a federal permit (e.g., USACE) will be needed, the streamlined approach and Programmatic Biological Opinion for the Final 4(d) rule will be used for the West Route. Additionally, Xcel Energy will avoid tree clearing during the pup season (June and July).

State-Listed Species

Based on the NHIS review, one state-endangered species (loggerhead shrike), and two state-threatened species (rock sandwort and seaside-three awn) were documented within one mile of the West Route (refer to Table 5.6-1).

Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use in the Solar Project Area and surrounding areas. Xcel Energy will implement the BMPs for the loggerhead shrike recommended by the MNDNR in their December 11, 2020 letter on the Project. Specifically, any tree/shrub removal will be conducted outside of the species nesting season (April 1- July 31). Additionally, Xcel Energy will also report any loggerhead shrike sightings to the MNDNR. Overall, impacts on loggerhead shrike due to the West Route are expected to be insignificant.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the West Route; therefore, impacts to these species are not anticipated.

In addition to the state-listed species identified as part of the NHIS review, NG Renewables received a Natural Heritage Review Response from the MNDNR for the West Block of the Solar Project on December 11, 2020 (Correspondence # ERDB 20210125), which also identified the state-threatened Blanding's turtle as a species of concern. There are no wetlands within the West Route, however, the DNR notes that the turtles may use upland areas within one mile of aquatic features. Xcel Energy will provide the Blanding's turtle flyer to all contractors working in the area, monitor for turtles during construction and report any sightings to DNR and Nongame Specialist, and remove by hand any turtles in imminent danger.

NG Renewables' review of MNDNR's NHIS records also identified four records of state species of special concern within one mile of the West Route: black sandshell, creek heelsplitter, peregrine falcon, and gopher snake (refer to Table 5.6-1). The state's designation as a species of special concern for these four species does not afford protections under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). Xcel Energy does not expect any impacts to these special concern species as suitable aquatic habitat required by the black sandshell and creek heelsplitter is not present within the West Route. Suitable habitat for the gopher snake (dry sand and bluff prairies) and suitable nesting habitat for the peregrine falcon is also not present in the West Route; therefore, impacts to these species are not anticipated.

Natural Resource Sites

As noted in Section 5.6.1.2 above, there are no SOBS, NPCs, native prairie, railroad right-of-way prairie, WMAs, MNDNR SNAs, and state parks. Sites with notable natural resource value designated by the federal government include NWRs, wilderness areas, national wild and scenic rivers, national forests, Waterfowl Protection Areas, and grassland and wetland easements. As such, impacts to MNDNR High Value Areas will be minimal and no mitigative measures are proposed.

5.6.2.3 East Route

Federally Listed Species

As described above in Section 5.6.2.1, the incidental take of NLEB due to tree removal is prohibited if it occurs within 0.25 mile of a documented hibernaculum or if it involves a

documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July. Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, there are no documented NLEB maternity roost trees within 150 feet of the East Route or documented hibernacula within 0.25 mile of the East Route. Although there are no records of NLEB, the species may still be present in the East Route.

Construction of the East Route will include some tree clearing of wind rows within the right-of-way. If Xcel Energy determines that a federal permit (e.g., USACE) will be needed, the streamlined approach and Programmatic Biological Opinion for the Final 4(d) rule will be used for the East Route. Additionally, Xcel Energy will avoid tree clearing during the pup season (June and July).

State-Listed Species

Based on the NHIS review, one state-endangered species (loggerhead shrike), and two state-threatened species (rock sandwort and seaside-three awn) were documented within one mile of the East Route (refer to Table 5.6-1).

Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use in the Solar Project Area and surrounding areas. Xcel Energy will implement the BMPs for the loggerhead shrike recommended by the MNDNR in their December 11, 2020 letter on the Project. Specifically, any tree/shrub removal will be conducted outside of the species nesting season (April 1 – July 31). Additionally, Xcel Energy will also report any loggerhead shrike sightings to the MNDNR. Overall, impacts on loggerhead shrike due to the East HVTL Project are expected to be insignificant.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the East Route; therefore, impacts to these species are not anticipated.

In addition to the state-listed species identified as part of the NHIS review, NG Renewables received a Natural Heritage Review Response from the MNDNR for the West Block of the Solar Project on December 11, 2020 (Correspondence # ERDB 20210125), which also identified the state-threatened Blanding's turtle as a species of concern. There are no wetlands within the East Route, however, the DNR notes that the turtles may use upland areas within one mile of aquatic features. Xcel Energy will provide the Blanding's turtle flyer to all contractors working in the area, monitor for turtles during construction and report any sightings to DNR and Nongame Specialist, and remove by hand any turtles in imminent danger.

NG Renewables' review of MNDNR's NHIS records also identified four records of state species of special concern within one mile of the East Route: black sandshell, creek heelsplitter, peregrine falcon, and gopher snake (refer to Table 5.6-1). The state's designation as a species of special concern for these four species does not afford protections under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). Xcel Energy does not expect any impacts to these special concern species as suitable aquatic habitat required by the black sandshell and creek

heelsplitter is not present within the East Route. Suitable habitat for the gopher snake (dry sand and bluff prairies) and suitable nesting habitat for the peregrine falcon is also not present in the East Route; therefore, impacts to these species are not anticipated.

MNDNR High-Value Areas

Federal and state listed species are described above. There are no additional MNDNR High Value Areas in the East Route, including NPCs; native prairie; SGCN species; large block habitats; lakes, streams, and rivers; public conservation and recreation lands; and properties in government programs or with conservation easements. As such, impacts to MNDNR High Value Areas will be minimal and no mitigative measures are proposed.

5.7 Solar Project Unavoidable Impacts

Xcel Energy developed the Solar Project to avoid impacts to environmental resources whenever possible. In some cases, impacts to environmental resources could not be entirely avoided, but could be minimized by implementation of mitigation measures. A detailed discussion of the environmental impacts of the proposed Solar Project, as well as the mitigation measures that would be used to minimize impacts is presented in Sections 5.1 through 5.6 of this Application. Environmental impacts that would be minimized by the use of mitigation measures, but not entirely avoided are provided below. Most of these unavoidable impacts would occur during construction of the Solar Project and would resolve with the completion of construction.

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

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners;
- increased traffic on roads that bisect the Solar Project Area;
- minor air quality impacts due to fugitive dust;
- potential for soil erosion; and
- disturbance to and displacement of some species of wildlife.

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

- changes to existing aesthetics of landscape (from agrarian to solar facility), which will be visible from local roadways and parcels; and
- changes in land use and vegetation from agricultural land of predominately corn and beans to a solar facility with native prairie beneficial habitat underneath and around the Project Footprint.

6.0 AGENCY AND PUBLIC OUTREACH

This section describes outreach efforts conducted by NG Renewables and discusses pre-Application involvement by federal, state, and local agencies as well as the public information outreach campaign. Due to the interconnected nature and close geographic proximity of the Solar Project and associated HVTL Projects, NG Renewables included all three Project components in its outreach efforts.

Throughout the process, NG Renewables provided opportunities for stakeholders and potentially affected landowners to participate in the siting and routing process. This engagement provided Xcel Energy with valuable insight into landowners' and public agency preferences regarding development of the Solar Project facilities and the West and East HVTL Projects.

6.1 Agency Involvement in Pre-Application

As part of pre-Application efforts, NG Renewables and Xcel Energy initiated an outreach campaign to public agencies through virtual and in-person meetings, and Project notification letters. Many agencies, stakeholders, landowners, and interested parties, were contacted to gather feedback on the Project (refer to Table 6.1-1).

To meet notification requirements under § 216E.03, subd. 3a for the East Block of the Solar Project and East HVTL Project, Xcel Energy sent a Project notification letter to Sherburne County, Becker Township, and the City of Becker on December 8th, 2020. For the West Block of the Solar Project and West HVTL Project, NG Renewables provided a separate Project notification letter to Sherburne County, Becker Township, the City of Becker, and Clear Lake Township on December 14th, 2020. Copies of these letters are included in Appendix C – Agency Correspondence.

On January 15, 2021, NG Renewables sent an informal Project introduction letter and map to federal, state, local agencies, and other stakeholders with jurisdiction or interest in the Solar Project Area, East Route, or West Route that reflected the combined Solar Project and the West and East HVTL Projects. NG Renewables requested input with respect to the resources under the jurisdiction of federal, state, and local agencies as well as the identification of permits and/or approvals that may be potentially required for the Project. NG Renewables also attended a Project introduction meeting with Department of Commerce, Energy Environmental Review and Analysis staff on January 27, 2021.

At the time of the Project introduction letter mailing, the preliminary Solar Project Area included two blocks of solar facilities between the cities of Becker and Clear Lake (referred to in correspondence as the West and Central Blocks) and the East Block, which is east of the Sherco Generating Plant and south of Becker. As Project development progressed, Xcel Energy decided not to include the westernmost block in the proposed Solar Project. As such, what was previously referred to as the Central Block is now referred to as the West Block in this Application.

On March 3, 2021, Xcel Energy sent an informal Project introduction letter and map to tribal representatives (e.g., Tribal Historic Preservation Officers [THPOs]) that may have an interest in the Solar Project Area, East Route, or West Route requesting input on the proposed Project.

A representative Project introduction letter and responses received as of March 2021 are included in Appendix C – Agency Correspondence. A summary of responses and meetings with federal, tribal, state, and local agencies is included below. NG Renewables and Xcel Energy will continue to coordinate with federal, tribal, state, city, township and county, officials as the Project moves forward and will seek any necessary local permits. Table 6.1-1 identifies agencies that were contacted through meetings or a notification letter and the date that the consultation was conducted.

Table 6.1-1: Agency Correspondence for the Solar Project and West and East HVTL Projects

Agency	Response Date (Type)
Federal	
U.S. Army Corps of Engineers, St. Paul District	January 19, 2021 (Agency response) January 20, 2021 (Agency response)
U.S. Army Corps of Engineers, St. Paul District – Duluth Field Office	January 22, 2021 (Agency Response)
U.S. Fish and Wildlife Service – Twin Cities Ecological Services Field Office	January 22, 2021 (Agency response)
Federal Aviation Administration	February 18, 2021
Tribal Representatives	
Lower Sioux Indian Community, Tribal Historic Preservation Officer (THPO)	March 17, 2021
Upper Sioux Community, THPO	No response to date
Prairie Island Indian Community, THPO/Director	No response to date
Shakopee Mdewakanton Sioux Community, Cultural Resource Director	March 3, 2021 (Response)
Bois Forte Band of Chippewa, THPO	No response to date
Fond du Lac Band of Lake Superior Chippewa, THPO	No response to date
Gichi-Onigaming/Grand Portage Band of Lake Superior Chippewa, THPO	No response to date
Leech Lake Band of Ojibwe, THPO	No response to date
Mille Lacs Band of Ojibwe, THPO	March 4, 2021 (Response) March 10, 2021 (Response)
Red Lake Nation (Miskwaagamiiwi-Zaagaiganing), Archaeologist	No response to date
White Earth Nation, THPO	No response to date
Minnesota Indian Affairs Council, Cultural Resources Specialist	No response to date
State	
Minnesota Department of Commerce, Energy Environmental Review and Analysis – Size Determination	March 22, 2021 (Agency response)
Minnesota Historical Society – State Historic Preservation Office	February 12, 2021 (Agency response)
Minnesota Department of Natural Resources (MNDNR) – Energy Projects Review	January 15, 2021 (Agency response)

Table 6.1-1: Agency Correspondence for the Solar Project and West and East HVTL Projects	
Agency	**Response Date (Type)**
MNDNR – Region 3 (Central Region)	January 19, 2021 (Agency response) January 25, 2021 (Agency response)
MNDNR – Natural Heritage Information System Review	December 11, 2020 (Agency response – see Appendix J) Updated Request: No response to date
MNDNR- Ecological and Water Resources and Energy Projects Review	April 6, 2021 (Most Recent Agency Response)
Minnesota Department of Agriculture – Energy and Environment Section	April 6, 2021 (Meeting)
Minnesota Department of Transportation – Office of Land Management	January 27, 2021 (Agency response)
Minnesota Department of Employment & Economic Development	No response to date
Minnesota Pollution Control Agency – Brainerd Office	January 19, 2021
Minnesota Board of Water and Soil Resources	April 12, 2021 (Agency Response)
County	
Sherburne County – Board of Commissioners	March 18, 2020 (Meeting) August 12, 2020 (Meeting) August 20, 2020 (Meeting) February 8, 2021 (Meeting) March 8, 2021 (Meeting)
Sherburne County – Planning and Zoning Administration	August 12, 2020 (Meeting) February 8, 2021 (Meeting)
Sherburne County – County Administrator	March 18, 2020 (Meeting) August 12, 2020 (Meeting) August 20, 2020 (Meeting) February 8, 2021 (Meeting) March 8, 2021 (Meeting)
Local Government Units	
City of Clear Lake	September 8, 2020 (Meeting) November 12, 2020 (Letter of support to MPUC)
Clear Lake Township	November 17, 2020 (Meeting) November 24, 2020 (Letter of support to MPUC) January 26, 2021 (Letter of support)
City of Becker	January 27, 2021 (Meeting)
Becker Township	February 3, 2021 (Agency response) February 9, 2021 (Meeting)

6.1.1 Federal Agencies

6.1.1.1 U.S. Army Corps of Engineers

On January 19, 2021, the USACE, St. Paul District responded to the Project introduction letter to acknowledge receipt and provide the file number and name of the project manager assigned to the Project. On January 20, 2021, the USACE, St. Paul District sent an additional response noting that the proposed Project would not affect any current or future USACE civil works projects. The Project Manager from the USACE Duluth office also emailed on January 22, 2021 noting that wetland delineations would likely be necessary for the Project. Preceding the email, the USACE Project Manager had a short phone discussion with a NG Renewables representative to discuss wetland delineations and permitting needs associated with the Project. NG Renewables indicated during the discussions that wetland surveys had already been completed for the majority of the site and a wetland boundary confirmation and jurisdictional determination would be requested following the completion of remaining wetland surveys in the spring.

6.1.1.2 U.S. Fish and Wildlife Service

On January 15, 2021, and subsequently on January 22, 2021, the USFWS responded to the Project introduction letter and recommended that an IPaC review be completed to identify federally listed species that could occur in the Project Study Area and a review for the presence of NLEBs via its online assisted determination key. The results of the IPaC and NLEB reviews are discussed in Section 5.6.1.

6.1.1.3 Federal Aviation Administration

NG Renewables filed FAA 7460-1 Notice of Proposed Construction forms for the perimeter of the Solar Project Area. On February 18, 2021, the FAA provided Determinations of No Hazard to air navigation for each of the 49 points around the Solar Project Area. As such, Project facilities will not exceed obstruction standards and would not be a hazard to air navigation.

6.1.2 Tribal Representatives

On March 3, 2021, the Shakopee Cultural Resources Director responded to Xcel Energy's Project introduction letter and requested a copy of the archaeological studies conducted for the Project, when available, and to be kept informed about Project developments. Coordination with the Shakopee Cultural Resources Director is ongoing and Xcel Energy will provide a copy of the cultural resources survey report when complete.

The Mille Lacs Tribal Historic Preservation Officer responded to Xcel Energy's Project introduction letter on March 4, 2021, and requested information on the status of archaeological survey for the Project. NG Renewables responded the same day noting that most of the Solar Project Area, East Route and West Route has been surveyed and remaining survey will be completed in spring 2021. The officer followed up with a phone call on March 10, 2021 to inquire about cultural surveys and results. As a follow up, Xcel Energy provided the cultural survey reports and additional overview maps and inquired if there were any known significant tribal resources within the Project area. A response to the follow-up email is still pending.

The Lower Sioux Indian Community also replied to Xcel Energy's introductory email on March 17, 2021 and stated that if they had any concerns, they would plan to reach out to Xcel Energy. To date, no additional correspondence has been received.

6.1.3 State Agencies

6.1.3.1 Minnesota Department of Commerce, Energy Environmental Review and Analysis

On March 22, 2021 Minnesota Department of Commerce determined that the Sherco Solar Project is not associated with any other current or planned solar projects in Minnesota.

Xcel Energy will continue to coordinate with the Minnesota Department of Commerce, Energy Environmental Review and Analysis throughout the permitting process.

6.1.3.2 Minnesota State Historic Preservation Office

The Minnesota SHPO responded to NG Renewables' Project introduction letter on February 12, 2021 to acknowledge receipt and recommend that a Phase Ia literature review be conducted for the Solar Project Area, East Route and West Route. If the Phase Ia literature review indicated potential for archaeological sites within the project area, the Minnesota SHPO recommended a Phase I survey be conducted. The agency further recommended that both the direct and indirect effects of the Project on historic properties be considered and provided guidance on materials to be included in the report. The Minnesota SHPO also noted that its response letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 Code of Federal Regulations (CFR) § 800.

As discussed in Section 5.4, NG Renewables will submit a copy of its Phase I cultural resources inventory report to the Minnesota SHPO in the second quarter of 2021, after the remaining survey for the Solar Project is complete.

6.1.3.3 Minnesota Department of Natural Resources

The MNDNR Energy Projects Office responded to the Project notification letter on January 15, 2021 and recommended that the Applicant contact the Reginal Environmental Assessment Ecologist at the Region 3 Office and provide shapefiles of the Project for their review.

The MNDNR, Region 3 Office responded to the Project notification letter on January 19, 2021 and recommended that more detailed project design information be provided, when available, and that NHIS data review be conducted for the Project. The MNDNR noted that, based on information included in the Project notification letter, there are state-listed species in the vicinity of the Project and avoidance measures will be required. The results of the NHIS review for the Solar Project and West and East HVTL Projects are discussed in Section 5.6.1. The MNDNR further noted that multiple PWI wetlands are present in the Project Study Area and if facilities associated with the Solar Project or HVTL Projects cross these features, a MNDNR Public Water Permit will be required. The MNDNR also provided copies of guidance documents the MNDNR has prepared for commercial solar projects including, "Commercial Solar Siting Guidance" and "Prairie

Establishment and Maintenance Technical Guidance for Solar Projects." These documents contain general guidelines and standard recommendations specific to commercial-scale solar projects.

On January 25, 2021, MNDNR provided additional comments regarding the potential challenges of siting solar facilities in areas of hydric soils. The agency advised that surface drainages, wetland complexes, and farmed wetlands are present within the Project Study Area and recommended that the Project avoid construction in wetlands and minimize soil impacts during construction (e.g., soil mixing and compaction) and operation of the solar facility. In addition, the agency recommended that, following construction of the solar facility, a diverse mix of native species be established to stabilize soils and provide long-term pollinator habitat.

NG Renewables contacted the MNDNR on March 4, 2021 to request review of seed mixes that would be used to restore the Solar Project Footprint. Correspondence regarding seed mixes, vegetation management, and wildlife has been ongoing with the MNDNR since. Notably, prior to application submittal and in coordination with the agency, Xcel Energy has modified seed mixes and added select additional species to their wet-mesic and stormwater mixes. As noted in the VMP, the document is a "living document" and thus plans for vegetation management will continue to be refined throughout the process based on ongoing consultations. Xcel Energy will continue to work with the agency to identify appropriate modifications to seed mixes, vegetation management efforts, and in regard to wildlife considerations as Project planning progresses.

Per the MNDNR's request, NG Renewables submitted a comprehensive Natural Heritage Review Request (for the West and East Blocks and West and East Routes) to the MNDNR for the Project on January 27, 2021. A response from the MNDNR is still pending.

The Project received a Natural Heritage Review Response from the MNDNR for Solar Project on December 11, 2020 (Correspondence # ERDB 20210125). At that time, the preliminary Solar Project Area included two proposed blocks of solar facilities between the cities of Becker and Clear Lake. During Project development, Xcel Energy decided to add a third block to the Solar Project, the East Block. As noted in Section 5.6.1.1, A comprehensive Natural Heritage Review Request (for all three blocks of the Solar Project and the West and East Routes) was submitted to the MNDNR for the Project on January 27, 2021. To date, a response has not been received. Subsequent to the Natural Heritage Review Request, Xcel Energy decided to remove the westernmost block from the Project design due to efficiencies gained through the development of the East Block. A detailed discussion of the state-listed species that may occur within one mile of the Project and avoidance and mitigation measures proposed by MNDNR is provided in Section 5.6.1.

Xcel Energy will continue to coordinate with the MNDNR throughout the permitting process.

6.1.3.4 Minnesota Department of Agriculture

Xcel Energy and NG Renewables met with a representative from the MDA on April 6th, 2021 to discuss Xcel Energy's vegetation management goals, as well as the history of AIMPs for transmission line projects. MDA generally provided the history of AIMPs and their relation to transmission, pipelines, and power generation. At the recommendation of MDA, Xcel Energy voluntarily initiated the development of an AIMP, which is included with this application as

Appendix F. Xcel Energy recognizes the importance of soil preservation for future agricultural use, and the development of an AIMP, VMP, and Decommissioning Plan will contribute to successful site restoration following decommissioning to maintain future agriculture production.

"Dual use" solar generation, in the form of agricultural activities beneath the panels was also discussed with MDA. MDA identified practices that could potentially be employed for sheep grazing or haying of the site. Xcel Energy considered agricultural uses within the fenced area of the Project. After review of Project plans, Xcel Energy determined that haying and or grazing activities on the site would inhibit the primary vegetation management goal of establishing a "gold standard" pollinator certified site. Effectively haying a site would require more simplified seed mixes and would prohibit the use of certain species in a mix. For example, species such as milkweed could not be hayed due to their potential toxicity to certain livestock species, including sheep and cattle. Additionally, specialized haying equipment would be necessary for the site due to the placement of panels and inverters throughout the Solar Project Area. Finally, the safety and liability considerations necessary to partner with local landowners and provide access for agricultural operations, either haying or grazing, in a power generating facility pose significant challenges for Xcel Energy. For these reasons agricultural management goals during operation of the Solar Project were not considered at this time.

Xcel Energy will continue to coordinate with the MDA throughout the permitting process.

6.1.3.5 Minnesota Department of Transportation

MNDOT responded to the Project notification letter and provided early review comments on the Project on January 27, 2021. In these early comments, MNDOT noted that new access to the Solar Project Area from U.S. Highway 10 will not be permitted and permits will be required for use of any existing accesses. MNDOT also noted that new Drainage Permit applications on the trunk highway system will not be accepted. Finally, MNDOT provided guidance on additional permits and requirements that may be needed for the Project and provided links to permit applications and instructions.

Xcel Energy will continue to coordinate with the MNDOT, as needed, throughout the permitting process.

6.1.3.6 Minnesota Pollution Control Agency

NG Renewables received a response to its Project notification letter from the MPCA on January 19, 2021. The agency recommended the developer check the Standard Industrial Classification to determine if an Industrial Stormwater Permit is required.

Xcel Energy completed additional correspondence with the MPCA regarding the placement of the HVTLs in relation to ash piles associated with coal generation at the Sherco Generating Plant. Xcel Energy confirmed that they plan to avoid placement of HVTL structure in the area of the ash piles or ponds. For the West Route, the Application Alignment is on the opposite side of 125th Avenue (County Road 52) from the ash piles; for the East Route, the Application Alignment is routed north of the ash piles.

Xcel Energy will continue to coordinate with the MPCA throughout the permitting process.

6.1.3.7 Minnesota Board of Soil and Water Resources

At the request of the Minnesota Department of Commerce, Energy Environmental Review & Analysis, and based on new vegetation management guidance from the state, Xcel Energy reached out to BWSR to engage the agency regarding Xcel Energy's VMP prior to application submittal. Xcel Energy provided the draft VMP for BWSR's review. Xcel Energy will continue to engage BWSR as the permitting process progresses to ensure effective implementation of the Habitat Friendly Solar Program at the site.

6.1.4 Sherburne County and Local Government Units/Stakeholders

6.1.4.1 Sherburne County

Outreach with Sherburne County has been ongoing since 2019 for during various stages in the Project development process. On August 12, 2020, NG Renewables representatives met with county administration, county planning officials, and a subset of the county commissioners to provide a presentation regarding the Project. The presentation generally covered the solar development process, Project plans (at that time), the state siting process, followed by open discussion. General discussion topics included the avoidance of the Recreation River Zoning District (agreed upon by NG Renewables), as well as development within the shoreland overlay district surrounding public waterbodies. NG Renewables identified the long-term benefits of a pollinator friendly seed mix beneath and surrounding a solar array as compared to other potential shoreland district uses, the usefulness of the land for landowners if not developed as a part of the Project footprint and committed to abiding by the structure setback requirements of the shoreland overlay district. NG Renewables updated Xcel Energy on the discussions with the County and Xcel Energy concurs with the development plan within the shoreland overlay districts.

NG Renewables representatives also met jointly with Clear Lake Township Officials and a Sherburne County Commissioner on November 14, 2020 to discuss Project details and plans generally for the Solar Project's West Block. Discussions were high level and generally related to Xcel Energy's goal to submit a site permit application in early 2021, where the Project would be located, and what it would look like.

On February 8th, 2021, NG Renewables representatives held an additional meeting with county administration, county planning officials, and the Sherburne County Commission Chair. The meeting was scheduled in response to NG Renewables' project notification letter, distributed on January 15th, 2021. The meeting covered Project updates, including NG Renewables' RFP bid as well as a review of the Project map, revised to 460 MW. Meeting discussion topics generally covered the same zoning topics discussed at the August 12th, 2020 meeting. The county also noted their long-term vision of establishing Highway 8 as a more scenic drive throughout Sherburne County, as well as any planned screening for the Project associated with Highway 8. In response, NG Renewables representatives touched on the overall commercial development plans by the city of Becker adjacent to the Sherco Generating Plant, as well as targeted screening that will be implemented for residences directly adjacent to the Solar Project Area. NG Renewables touched on the high costs of large-scale screening efforts on a landscape wide scale for a 460 MW Project, potential for implementation of more tradition agricultural fencing, and also their commitment to pollinator friendly ground cover that will provide some visual appeal. NG Renewables offered

their continued availability to county officials throughout the planning and permitting process, and Xcel Energy is in regular correspondence with county officials in regard to the Sherco Generating Plant generally.

To date, NG Renewables has not received a written response to their January 15th notification letter.

Similarly, Xcel Energy representatives have been in regular contact with Sherburne County officials and maintained an open line of communication. Xcel Energy proactively met with County officials on March 18, 2020, August 20, 2020, and March 8, 2021. Sherburne County has also been a participant in many of the meetings with the City of Becker regarding the Project and economic development plans for the area. A general project overview and timeline along with details of the Integrated Resource Plan and Resource and Recovery filing were provided. These meetings are an integral part of providing detailed project updates.

6.1.4.2 City of Clear Lake

Following a presentation of the Project to the City of Clear Lake on September 8th, 2020, the City of Clear Lake prepared a letter of support for the Project addressed directly to the Commission. At the time, land adjacent to and within the city was under consideration for the Project. The area presented also included what is now considered the West Block of the Solar Project. In the letter, the Mayor of Clear Lake commented on the economic benefits of the Project for the City of Clear Lake and landowners participating in the Project.

6.1.4.3 City of Becker

Xcel Energy recognizes the significant impact the Sherco Generating Plant has on the local economy. Over the 40+ year history of the Plant, Xcel Energy has taken an active role in community engagement including ISD 726 and the Becker Chamber of Commerce. As the transition away from coal and towards the cessation of operations for Units 1 & 2, Xcel Energy engaged with City officials. Xcel Energy committed to working to bring jobs and capital investment to Becker, with Northern Metal Recycling and the data center being two examples. In addition, Xcel Energy provided land for expansion of the business park frontage road and are assisting with necessary land purchases and easements for water and sewer infrastructure expansion to support future growth.

Xcel Energy is in regular contact with the city of Becker due to their larger efforts associated with plans for the Sherco Generating Plant. Xcel Energy and NG Renewables met with planning and economic development officials from the City of Becker on January 27, 2021 to discuss the Solar Project specifically. At this meeting, city administrative officials requested additional setbacks for the fenceline of the West Block of the Solar Project along that portion of 115th Avenue SE (County Road 53) south of County Road 8 to accommodate future utility improvements associated with economic development efforts in the area. NG Renewables incorporated a fence setback of at least 65 feet from the centerline of 115th Avenue SE (County Road 53). Generally, officials at the meeting agreed that the project aligned with Becker's long-term development vision for the community. NG Renewables offered to present at a future City Council meeting, but a date has yet to be scheduled.

Additional meetings and correspondence have been ongoing with the City of Becker following the introduction of the Project on January 27th. In these meetings, Becker officials relayed their concerns that the Project may block future growth opportunities for the City into land currently under the control of Clear Lake Township, primarily due to the orientation of the Project's West Block. As stated earlier in the Application, Xcel Energy and the City have a long history of cooperation, and Xcel Energy and the City continue to work to find common solutions to the concerns raised by the City. Notably, Xcel Energy is exploring potential opportunities to provide a future corridor for the City to expand north and west of the Project's West Block. Any such modifications to Project, if any, would occur when it is necessary for development to expand north and west of the Project's West Block. In consultation with the City, Xcel Energy also shifted the project West Collector Substation to the south from where it was initially proposed, to allow for the potential future corridor to land north and west of the West Block. This shift in substation location allows for additional, long-term growth potential for the City along Highway 10 and the rail line, an important economic corridor for the City and the county.

During discussions with the City, Xcel Energy indicated it cannot easily accommodate significant footprint or Project design changes because Xcel Energy is relying on willing landowners to construct the Project on the nearest available lands to the Sherburne County Substation while also allowing existing Xcel Energy Owned Property to be marketed for commercial and industrial development. Xcel Energy sited the Project to allow the approximately 1,300 acres of lands nearest to the City's core be left open for economic development opportunities. Significant reductions in Project acreage to accommodate long-term potential economic growth beyond that which is already being reserved by Xcel Energy would result in a less efficient design, and reduce energy production at the. Xcel also highlighted in these discussions the support it has received from Clear Lake Township for the Project. The Township has not indicated to Xcel Energy or NG Renewables a desire to set lands aside for economic expansion in lieu of solar development.

Xcel Energy continues to work closely with the City of Becker to reach common solutions and achieve economic development goals, when practicable. Xcel Energy looks forward to a continued partnership with the City throughout the planning, development, construction, and operations of the Project.

6.1.4.4 Clear Lake Township

NG Renewables received a response from the Clear Lake Township Board of Officers on January 26, 2021 in which the Board of Officers expressed its full support for the Project. The Board noted the many benefits the Project would have on the local economy, through production taxes and property taxes, and on the environment by providing a new source of clean renewable energy for the State of Minnesota.

On November 24, 2020, the Clear Lake Township Board of Officers prepared a letter of support for the Solar Project addressed directly to the MPUC. In the letter, the Board of Officers commented on the economic benefits of the Project, through production tax payments and the generation of temporary and full-time jobs in the area.

6.1.4.5 Becker Township

Following distribution of the notification letter in January and additional email correspondence with township officials, NG Renewables and Xcel Energy presented to the Becker Township Board and officials on February 9, 2021 regarding the proposed Project. The presentation generally covered the solar development process, Project plans, the state siting process, followed by open discussion. The discussion following the presentation covered a wide a range of topics including clarification of participating parcels, screening and fencing, contamination, decommissioning, panel recycling, Xcel Energy's current Sherco Generating Plant, and future Plans for 149th Avenue in the Solar Project Area. Xcel Energy generally explained fencing plans and targeted vegetative screening of residences, the development of decommissioning plan and financial assurance, landowner lease provisions for decommissioning, and general plans for the Sherco Generating Plant, respectively. NG Renewables requested additional information regarding the township's plans for 149th Avenue.

After review of the preliminary plans for 149th Avenue, Xcel Energy indicated to the Township that they did not anticipate that they could accommodate the current proposed alignment for the road improvements, as they directly intersect the proposed array. The township inquired if Xcel Energy could look into road alternatives that better accommodate the proposed design, and further discussion with the township is ongoing. Following discussions thus far, Xcel Energy inquired to applicable participating landowners regarding these proposed road expansion plans, and the landowners indicated they had not been contacted regarding any road expansions to date. Xcel Energy will continue to update the Township on proposed plans and will work to accommodate Township planning efforts, as practicable.

7.0 REQUIRED PROJECT PERMITS AND CONSULTATIONS

The Solar Project and the West and East HVTL Projects may require various regulatory permits, reviews, and approvals. Table 7.0-1 provides a summary of the major permits, approvals, and consultations that may be required for each of the projects. All permits, licenses, approvals, or consultations required for the projects will be obtained in the applicable areas prior to construction beginning on the portion of the Project requiring such permit, license, approval, or consultation. Copies of agency correspondence to date are provided in Appendix C.

Table 7.0-1: Status of Potential Permits, Approvals, and Consultations for the Sherco Solar and HVTL Project				
Administering Agency	**Permit, Approval, or Consultation**	**Solar Project – Applicability and Status**	**West HVTL Project - Applicability and Status**	**East HVTL Project - Applicability and Status**
Federal				
Federal Aviation Administration	Form 7460-1, Notice of Proposed Construction in compliance with 14 Code of Federal Regulations § 77.9	Form 7460-1 for the Solar Project was submitted on February 3, 2021.	Not applicable	Not applicable.
U.S. Army Corps of Engineers (USACE), St. Paul District	Section 404, Clean Water Act – Dredge and Fill	The Solar Project has been designed to avoid impacts to delineated wetlands. As such, a USACE permit for dredge and fill in jurisdictional waters of the United States is not anticipated.	Based on wetland delineations, there are no wetlands within the West Route; as such, there will be no impacts to wetlands and no Section 404 permit required.	Based on wetland delineations, there are no wetlands within the East Route; as such, there will be no impacts to wetlands and no Section 404 permit required.
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasures (SPCC) Plan	The Solar Project will not have an associated operations and maintenance building; and no tanks in excess of 1320 gallons are anticipated within the Solar Project Area. If it is determined at a later date that tanks in excess of 1320 gallons are necessary for fuel or oil storage within the Solar Project Area, an SPCC plan specific to the Project will be developed.	Not applicable	Not applicable

Table 7.0-1: Status of Potential Permits, Approvals, and Consultations for the Sherco Solar and HVTL Project				
Administering Agency	**Permit, Approval, or Consultation**	**Solar Project – Applicability and Status**	**West HVTL Project - Applicability and Status**	**East HVTL Project - Applicability and Status**
U.S. Fish and Wildlife Service	Endangered Species Act of 1973, Section 9 Incidental or Non-Purposeful Take Permit, if deemed necessary	Based on a review of federally listed species, a Take Permit is not anticipated for the Solar Project.	Based on a review of federally listed species, a Take Permit is not anticipated for the West Route.	Based on a review of federally listed species, a Take Permit is not anticipated for the East Route.
State of Minnesota				
Minnesota Public Utilities Commission	Certificate of Need	Required for generating plants larger than 50 megawatts The Project is exempt – see Section 1.1.1	The Project is exempt – see Section 1.1.1	The Project is exempt – see Section 1.1.1
	Site Permit	Construction of energy conversion facility. Filed April 2021.	Not applicable	Not applicable
	Route Permit	Not applicable.	Required for transmission lines that are 100 kV or more and greater than 1,500 feet in length. Filed April 2021.	Required for transmission lines that are 100 kV or more and greater than 1,500 feet in length. Filed April 2021.

Table 7.0-1: Status of Potential Permits, Approvals, and Consultations for the Sherco Solar and HVTL Project				
Administering Agency	**Permit, Approval, or Consultation**	**Solar Project – Applicability and Status**	**West HVTL Project - Applicability and Status**	**East HVTL Project - Applicability and Status**
Minnesota Pollution Control Agency (MPCA)	Section 401 Clean Water Act Water Quality Certification	Required for filling in jurisdictional waters of the United States and if a Section 404 permit is required from the USACE. The Solar Project avoids impacts to wetlands and waterbodies. As such, a Section 401 water quality certification is not anticipated.	The West Route avoids impacts to wetlands and waterbodies. As such, a Section 401 water quality certification is not required.	The East Route avoids impacts to wetlands and waterbodies. As such, a Section 401 water quality certification is not required.
	National Pollutant Discharge Elimination System Stormwater Permit (NPDES)	For stormwater discharges from construction activities with disturbances greater than one acre. To be obtained prior to construction. One NPDES permit and Stormwater Pollution Prevention Plan (SWPPP) is anticipated to cover the Solar Project, West Route, and East Route. Additionally, because the Project will impact more than 50 acres and due to impaired waters within one mile (Mississippi River and Elk River), the SWPPP will be submitted to MPCA for review and approval.		
Board of Water and Soil Resources	Wetland Conservation Act approvals	Not applicable as the Solar Project is anticipated to avoid impacts to wetlands.	Not applicable as the Solar Project is anticipated to avoid impacts to wetlands.	Not applicable as the Solar Project is anticipated to avoid impacts to wetlands.
Minnesota Department of Natural Resources (MNDNR)	License to Cross Public Waters	Not appliable. The Solar Project will not cross any Public Waters Inventory (PWI) basins, watercourses, or wetlands.	Not appliable. The Solar Project will not cross any PWI basins, watercourses, or wetlands.	Not appliable. The Solar Project will not cross any PWI basins, watercourses, or wetlands.

Table 7.0-1: Status of Potential Permits, Approvals, and Consultations for the Sherco Solar and HVTL Project				
Administering Agency	**Permit, Approval, or Consultation**	**Solar Project – Applicability and Status**	**West HVTL Project - Applicability and Status**	**East HVTL Project - Applicability and Status**
	State Protected Species Consultations	Natural Heritage Information System (NHIS) request submitted January 27, 2021. The team will continue coordinating with MDNR.	NHIS request submitted January 27, 2021. The team will continue coordinating with MDNR.	NHIS request submitted January 27, 2021. The team will continue coordinating with MDNR.
	Water Appropriation Permit	Required if trench dewatering is necessary. To be obtained prior to construction, if necessary.	Required if trench dewatering is necessary. To be obtained prior to construction, if necessary.	Required if trench dewatering is necessary. To be obtained prior to construction, if necessary.
Minnesota Department of Health	Well construction permit	Required for installation of a well. To be obtained prior to construction if required.	Not applicable.	Not applicable.
Minnesota State Historic Preservation Office (SHPO)	Minnesota Statutes, Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)	Provide concurrence on Phase I inventory. Pending completion of remaining survey in spring of 2021. Consultation to be obtained following completion of survey.	Provide concurrence on Phase I inventory. Pending completion of remaining survey in spring of 2021. Consultation to be obtained following completion of survey.	Provide concurrence on Phase I inventory. Pending completion of remaining survey in spring of 2021. Consultation to be obtained following completion of survey.
Minnesota Department of Transportation (MNDOT)	Utility Permit on Trunk Highway Right-of-Way (Long Form No. 2525)	Not applicable.	Not applicable.	Not applicable.
MNDOT	Driveway Access	Not appliable.	Not appliable.	Not appliable.

Table 7.0-1: Status of Potential Permits, Approvals, and Consultations for the Sherco Solar and HVTL Project				
Administering Agency	**Permit, Approval, or Consultation**	**Solar Project – Applicability and Status**	**West HVTL Project - Applicability and Status**	**East HVTL Project - Applicability and Status**
MNDOT	Oversize/overweight permits	Not anticipated to be required.	To be required prior oversize/overweight delivery, if necessary.	To be required prior oversize/overweight delivery, if necessary.
Minnesota Department of Labor and Industry	Request for Electrical Inspection	Required to comply with the state electrical code. To be obtained during construction.	Not applicable.	Not applicable.
Local				
Sherburne County	Floodplain Development Permit	Not applicable. There are no Federal Emergency Management Agency mapped floodplains in the Solar Project Area.	Not applicable. There are no floodplains within the West Route.	Not applicable. There are no floodplains within the East Route.
County, Township, City	Right-of-way/utility permits	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.
County, Township, City	Overwidth/overweight loads permits	To be required prior oversize/overweight delivery, if necessary.	To be required prior oversize/overweight delivery, if necessary.	To be required prior oversize/overweight delivery, if necessary.
County, Township, City	Road crossing permits	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.
County, Township, City	Driveway/access permits	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.	The team is coordinating with Sherburne County.

8.0 REFERENCES

Aaseng, N. E., J.C. Almendinger, R.P. Dana, D.S. Hanson, M.D. Lee, E.R. Rowe, K.A. Rusterholz, and D.S. Wovcha. 2011. Minnesota's Native Plant Community Classification: A Statewide Classification of Terrestrial and Wetland Vegetation Based on Numerical Analysis of Plot Data. Biological Report No. 108. Minnesota County Biological Survey, Ecological Land Classification Program, and Natural Heritage and Nongame Research Program. St. Paul: Minnesota Department of Natural Resources. Available online at http://files.dnr.state.mn.us/natural_resources/npc/npc_methods_paper.pdf. Accessed February 2021

Antennas Direct.com. 2021. Transmitter Locator, Becker, MN. Available online at Antennas Direct | TV Transmitter Locator and Mapping Tool. Accessed January 2021.

Audubon. Undated. Mississippi Flyway. Available online at https://www.audubon.org/mississippi-flyway. Accessed February 2021.

Audubon. 2016. Important Bird Areas, Minnesota IBA Contact. Available online at Minnesota Important Bird Areas | Audubon. Accessed February 2021.

Audubon. 2021. Lake Maria State Park – Harry Larson County Forest IBA. Available online at https://netapp.audubon.org/iba/Reports/4205. Accessed February 2021.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

APLIC. 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

Becker Township. 2019. Becker Township Joint Planning and Zoning Ordinance. Available online at: https://beckertownship.org/uploads/3/5/1/9/35198150/section_seven_ag_district_rev_jan_2019.pdf. Accessed February 2021.

Big Lake Chamber of Commerce & Industry. 2021. Big Lake Block Party. Available online at Big Lake Block Party 2020 GZ New - Big Lake Chamber of Commerce. Accessed January 2021.

Biglakespudfest.com. n.d. Big Lake Spud Fest, Supporting Local Youth and Community Since 1972!. Available online at HOME (biglakespudfest.com). Accessed January 2021.

Board of Water and Soil Resources (BWSR). 2020. Habitat Friendly Solar Site Assessment Form for Project Planning (version 5-26-2020). Available online at: http://bwsr.state.mn.us/sites/default/files/2020-05/Habitat%20Friendly%20Solar%20Site%20Assessment%20Form%20for%20Project%20Planning%205-26-2020.pdf. Accessed February 2021.

BWSR. 2021. Minnesota Habitat Friendly Solar Program, List of Project that Meet the Standards, March 2021. Available online at List of HFS Sites 2_25_2021.pdf (state.mn.us). Accessed March 2021.

Briberg, Jeffrey S. Utility & Community Solar Should Use Native Landscaping. Available online at https://cleantechnica.com/2016/03/15/utility-and-community-solar-should-use-native-landscaping/. Accessed January 2021.

Caceres, M.C and R.M.R. Barclay. 2000. *Myotis septentrionalis*. Mammalian Species 634:1-4.

CenterPoint Energy. 2021. Where We Serve. Available online at: https://www.centerpointenergy.com/en-us/corporate/about-us/company-overview/where-we-serve. Accessed January 2021.

Clarke, A. H. 1985. The tribe Alasmidontini (Unionidae: Anodontinae), Part II: Lasmigona and Simpsonais. Smithsonian Contributions to Zoology No. 399. 75 pp.

Federal Aviation Administration (FAA). 2020. Airport Data & Contact Information, Location(s) Selection Form, Minnesota, Sherburne County. Available online at Airport Data and Contact Information as of 12/31/2020 (faa.gov). Accessed January 2021.

Hamernick, M. 2000. Home ranges and habitat selection of Blanding's Turtles (Emydoidea blandingii) at the Weaver Dunes, Minnesota. MS Thesis, St. Mary's University of Minnesota, Winona, Minnesota. 18 pp.

International Agency for Research on Cancer (IARC). 2002. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 80 – Non- Ionizing Radiation, Part 1: Static and Extremely Low-Frequency Electric and Magnetic Fields. Summary of Data and Evaluation. Available at: https://monographs.iarc.fr/ENG/Monographs/vol80/mono80.pdf. Accessed January 2021.

International Commission on Non-Ionizing Radiation Protection (ICNIRP). 2010. ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (1 Hertz to 100 kilohertz). Available at: http://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf. Accessed January 2021.

McCallum, L.C., M.L. Whitfield Aslund, L.D. Knopper, G.M Ferguson, and C.A. Ollson. 2014. *Measuring electromagnetic fields (EMF) around wind turbines in Canada: is there a human health concern?* Environmental Health 13:9. Available online at: https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-13-9. Accessed January 2021.

McLeod, M. A., and D. E. Andersen. 1996. Status and habitat selection of Red-shouldered Hawks in the Chippewa National Forest. Final report submitted to Chippewa National Forest. 14 pp.

Minnesota Breeding Bird Atlas (MNBBA). 2019. Loggerhead Shrike Lanius ludovicianus. Available online at: https://mnbirdatlas.org/species/loggerhead-shrike/. Accessed February 2021.

Minnesota Department of Commerce, Energy Environmental Review and Analysis. 2021. *Guidance for Developing a Vegetation Establishment and Management Plan for Solar Facilities.* Available online at https://mn.gov/eera/web/project-file/11702/. Accessed March 2021.

Minnesota Department of Employment and Economic Development. 2020. Minnesota Broadband Providers by County, Released October 2020. Available online at https://mn.gov/deed/programs-services/broadband/maps/data.jsp. Accessed January 2021.

Minnesota Department of Health (MDH). 2019a. Minnesota Well Index. Available online at https://mnwellindex.web.health.state.mn.us/. Accessed January 2021.

MDH. 2019b. Wellhead Protection Areas – GIS data. Available online at https://gisdata.mn.gov/dataset/water-wellhead-protection-areas. Accessed January 2021.

Minnesota Department of Natural Resources (MNDNR). Undated. Ecological Classification System. Available online at https://www.dnr.state.mn.us/ecs/index.html. Accessed January 2021.

MNDNR. 2001. Groundwater Provinces. Available online at https://www.dnr.state.mn.us/groundwater/provinces/index.html. Accessed January 2021.

MNDNR. 2009. Guidelines for Assigning Statewide Biodiversity Significance Ranks to Minnesota County Biological Survey Sites. Available online at https://files.dnr.state.mn.us/eco/mcbs/biodiversity_significance_ranking.pdf. Accessed February 2021.

MNDNR. 2011. Anoka Sand Plain, Subsection Forest Resource Management Plan, Preliminary Issues and Assessments. Available online at SFRMP- Anoka Sand Plain Subsection Forest Resource Management Plan-Preliminary Issues and Assessment (state.mn.us). Accessed February 2021.

MNDNR. 2013. Minnesota's List of Endangered, Threatened, and Special Concern Species. Available online at http://files.dnr.state.mn.us/natural_resources/ets/endlist.pdf. Accessed February 2021.

MNDNR. 2014. Minnesota Breeding Bird Map List – Number of Records Per Species Per County. Available at: https://www.dnr.state.mn.us/eco/mcbs/bird-map-list.html. Accessed February 2021.

MNDNR. 2016a. Minnesota Department of Natural Resources, Guidance for Commercial Solar Projects. New Ulm, Minnesota, USA. 8pp. Available online at: https://files.dnr.state.mn.us/publications/ewr/commercial_solar_siting_guidance.pdf. Accessed February 2021.

MNDNR. 2016b. Minnesota's Wildlife Action Plan 2015-2025. Available online at: https://www.dnr.state.mn.us/mnwap/index.html. Accessed February 2021.

MNDNR. 2019. Natural Heritage Information System. License to Merjent, Inc.

MNDNR. 2021a. Ecological Classification System, Anoka Sand Plain Subsection. Available online at Anoka Sand Plain Subsection | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021b. Basins of Minnesota. Available online at https://www.dnr.state.mn.us/watersheds/basins.html. Accessed January 2021.

MNDNR. 2021c. Animals. Available online at https://www.dnr.state.mn.us/animals/index.html. Accessed February 2021.

MNDNR. 2021d. Rare Species Guide, Black Sandshell (*Ligumia recta*). Available online at Ligumia recta : Black Sandshell | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021e. Rare Species Guide, Loggerhead Shrike (*Lanius ludovicianus*). Available online at Lanius ludovicianus : Loggerhead Shrike | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021f. Rare Species Guide, Peregrine Falcon (*Falco peregrinus*). Available online at Falco peregrinus : Peregrine Falcon | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021g. Rare Species Guide, Red-shouldered Hawk (*buteo lineatus*). Available online at Buteo lineatus : Red-shouldered Hawk | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021h. Rare Species Guide, Rock Sandwort (*Minuartia dawsonensis*). Available online at Minuartia dawsonensis : Rock Sandwort | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021i. Rare Species Guide, Seaside Three-awn (*Aristida tuberculosa*). Available online at Aristida tuberculosa : Seaside Three-awn | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021j. Rare Species Guide, Blanding's Turtle (Emydoidea blandingii). Available online at Emydoidea blandingii : Blanding's Turtle | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021k. Rare Species Guide, Creek Heelsplitter (*Lasmigona compressa*). Available online at Lasmigona compressa : Creek Heelsplitter | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

MNDNR. 2021l. Rare Species Guide, Gophersnake (Pituophis catenifer). Available online at Pituophis catenifer : Gophersnake | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed February 2021.

Minnesota Department of Public Safety. 2018. Minnesota Department of Transportation, ARMER Sites, January 1, 2018. Available online at https://dps.mn.gov/divisions/ecn/programs/armer/Documents/Armer%20Site%20Map/ARMER%20Site%20Map%202018-01-01.pdf. Accessed January 2021.

MNDOT. 2018. Aggregate Source Information System. Available online at http://www.dot.state.mn.us/materials/aggsource.html. Accessed June 2019.

Minnesota Department of Transportation (MNDOT). 2001. Sherburne County Pit Map. Available online at sherburne.pdf (state.mn.us). Accessed January 2021.

MNDOT. 2021. Traffic Forecasting & Analysis, Traffic Mapping Application. Available online at TFA Traffic Mapping Application - TDA - MnDOT (state.mn.us). Accessed January 2021.

Minnesota Geological Survey (MGS). 2018. Depth to bedrock (feet) and bedrock topography (feet). Web application available online at https://mngs-umn.opendata.arcgis.com/datasets/depth-to-bedrock-feet-and-bedrock-topography-feet. Accessed January 2021.

Minnesota Pollution Control Agency (MPCA). 2008. A Guide to Noise Control in Minnesota. Available online at https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf. Accessed January 2021.

MPCA. 2021a. Minnesota's Air Quality. Available online at https://www.pca.state.mn.us/air/minnesotas-air-quality. Accessed January 2021.

MPCA. 2021b. About Air Quality Data. Available online at https://www.pca.state.mn.us/air/about-air-quality-data. Accessed January 2021.

MPCA. 2021c. Annual AQI Summary Reports. Available online at https://www.pca.state.mn.us/air/annual-aqi-summary-reports. Accessed January 2021.

National Institute of Environmental Health Sciences (NIEHS) 1999. NIEHS Report on Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields. Available online at: https://www.niehs.nih.gov/health/assets/docs_p_z/report_powerline_electric_mg_predates_508.pdf. Accessed January 2021.

NIEHS. 2002. Electric and Magnetic Fields Associated with the Use of Electric Power. June 2002. Available online at: https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Accessed February 2021.

National Pipeline Mapping System. 2021. NPMS Public Viewer. Available online at https://pvnpms.phmsa.dot.gov/PublicViewer/. Accessed January 2021.

National Radiation Laboratory, Ministry of Health, New Zealand. 2008. Electric and Magnetic Fields and Your Health: Information on electric and magnetic fields associated with transmission lines, distribution lines, and electrical equipment. Available online at http://www.who.int/peh-emf/project/mapnatreps/nznrl_emfbooklet2008.pdf. Accessed February 2021.

Oldfield, B., and J. J. Moriarty. 1994. Amphibians and reptiles native to Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 237 pp.

Pappas, M. J., B. J. Brecke, and J. D. Congdon. 2000. The Blanding's Turtle (*Emydoidea blandingii*) of Weaver Dunes, Minnesota. Chelonian Conservation and Biology 3(4):557-568.

Pebble Creek Golf. n.d. Pebble Creek Golf Club. Available online at Pebble Creek Golf Club |. Accessed January 2021.

Piepgras, S. A., and J. W. Lang. 2000. Spatial ecology of Blanding's Turtle in central Minnesota. Chelonian Conservation and Biology 3(4):589-601.

Radio-Locator. n.d. Radio-Locator, Becker, Minnesota. Available online at Radio Stations in Becker, Minnesota. (radio-locator.com). Accessed January 2021.

Sajwaj, T. D., and J.W. Lang. 2000. Thermal ecology of Blanding's Turtle in central Minnesota. Chelonian Conservation and Biology 3(4):626-636.

Selbig, W.R., and Balster, Nicholas, 2010, Evaluation of turf-grass and prairie-vegetated rain gardens in a clay and sand soil, Madison, Wisconsin, water years 2004–08: U.S. Geological Survey Scientific Investigations Report 2010–5077, 72 p. Available online at https://pubs.usgs.gov/sir/2010/5077/. Assessed January 2021.

Sherburne County. 2018. Sherburne County Zoning Ordinance and Official Zoning Map, ORD-2, as amended June 2018. Available online at: https://www.co.sherburne.mn.us/390/Zoning-Ordinance. Accessed February 2021.

Sherburne History Center. n.d. Available online at Sherburne History Center – 10775 27th Ave SE, Becker MN (763) 262-4433**.** Accessed January 2021.

Soil Conservation Service. 1994. National Food Security Act Manual. Title 180. USDA Soil Conservation Service, Washington, D.C.

Soil Survey Staff. 2021. Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/. Accessed January 2021.

Swedish Radiation Protection Authority (SSI). 2007. *Fourth Annual Report from SSI's Independent Expert Group on Electromagnetic Fields, 2006: Recent Research on EMF and Health Risks*. SSI Report 2007:04. Available at: https://www.stralsakerhetsmyndigheten.se/contentassets/54f003dfe0ec4a24a9b212963841983f/200704-recent-research-on-emf-and-health-risks.-fourth-annual-report-from-ssis-independent-expert-group-on-electromagnetic-fields-2006. Accessed January 2021.

SSI. 2008. *Fifth Annual Report from SSI's Independent Expert Group on Electromagnetic Fields, 2007: Recent Research on EMF and Health Risks*. SSI Report 2008:12. Available at: https://www.stralsakerhetsmyndigheten.se/contentassets/119df5b843164b93be8f7143321af021/200812-recent-research-on-emf-and-health-risks.-fifth-annual-report-from-ssis-independent-expert-group-on-electromagnetic-fields-2007. Accessed January 2021.

Swedish Radiation Safety Authority (SSM). 2009. *Recent Research on EMF and Health Risks*. Sixth annual report from SSM's independent expert group on electromagnetic fields. SSM Report 2009:36. Stockholm, Sweden.

SSM. 2010. *Recent Research on EMF and Health Risks*. Seventh annual report from SSM's independent expert group on electromagnetic fields. SSM Report 2010:44. Stockholm, Sweden.

SSM. 2013. *Eighth Report from SSM's Scientific Council on Electromagnetic Fields 2013*. SSM Report 2013:19. Stockholm, Sweden.

SSM. 2014. *Recent Research on EMF and Health Risk*. Ninth report from SSM's Scientific Council on Electromagnetic Fields. Research 2014:16. Stockholm, Sweden.

SSM. 2015. *Recent Research on EMF and Health Risk - Tenth report from SSM's Scientific Council on Electromagnetic Fields*. Research 2015:19. Stockholm, Sweden.

SSM. 2018. *Recent Research on EMF and Health Risk: Twelfth Report from SSM's Scientific Council on Electromagnetic Fields, 2017*. Available at: https://www.stralsakerhetsmyndigheten.se/contentassets/f34de8333acd4ac2b22a9b072d9b33f9/201809-recent-research-on-emf-and-health-risk. Accessed January 2021.

Timpone, J.C., J.G. Boyles, K.L. Murray, D.P. Aubrey, and L.W. Robbins. 2010. Overlap in roosting habits of Indiana bats (*Myotis sodalis*) and northern bats (*Myotis septentrionalis*). The American Midland Naturalist 163:115-123.

Travelerscc1.com. 2020. Traveler's Country Club. Available online at Home (travelerscc1.com). Accessed January 2021.

U.S. Census Bureau. 2018a. 2018 American Community Survey 5-Year Estimates Data Profiles; Selected Housing Characteristics, Minnesota and Sherburne County. Available online at https://data.census.gov/cedsci/table?q=housing%20characteristics&g=0400000US27_0500000US27141&tid=ACSDP5Y2018.DP04&moe=false&hidePreview=true. Accessed January 2021.

U.S. Census Bureau. 2018b. 2018 American Community Survey 5-Year Estimates Data Profiles; Selected Economic Characteristics, Minnesota and Sherburne County. Available online at https://data.census.gov/cedsci/table?q=economic%20characteristics&g=0400000US27_0500000US27141&tid=ACSDP5Y2018.DP03&moe=false&hidePreview=true. Accessed January 2021.

U.S. Census Bureau. 2018c. 2018 American Community Survey 5-Year Estimates Data Profiles; Selected Housing Characteristics, St. Cloud, Minnesota. Available online at https://data.census.gov/cedsci/table?q=selected%20housing%20characteristics&g=1600000US2756896&tid=ACSDP5Y2018.DP04&hidePreview=true. Accessed January 2021.

U.S. Census Bureau. 2019. Quick Facts, Minnesota and Sherburne County. Available online at https://www.census.gov/quickfacts/fact/table/sherburnecountyminnesota,MN/PST045219. Accessed January 2021.

USDA. 2017. 2017 Census of Agriculture Volume 1, Chapter 2: County Level Data, Minnesota. Available online at https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/. Accessed January 2021.

USDA NRCS. 2021. National soil survey handbook, title 430-VI. Available online at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054242. Accessed January 2021.

USDA NRCS. 2021b. Farmland Protection Policy Act. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/. Accessed January 2021.

U.S. Department of Transportation (USDOT). 2017. Construction Noise Handbook. Available online at: https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook09.cfm. Accessed January 2021.

U.S. Environmental Protection Agency (EPA). 2016. Overview of the Drinking Water Sole Source Aquifer Program. Available online at https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program. Accessed January 2021.

EPA. 2017. EPA Sole Source Aquifers – GIS data. Available online at https://www.epa.gov/dwssa. Accessed January 2021.

USFWS. 2007. National Bald Eagle Management Guidelines. Arlington, VA. May 2007. Available online at http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf. Accessed February 2021.

USFWS. 2008. Birds of Conservation Concern 2008. U.S. Fish and Wildlife Service Division of Migratory Bird Management, Arlington, Virginia. 85 pp. Available online at Microsoft Word - BCC2008_revised appendix c.doc (fws.gov), Accessed February 2021.

USFWS. 2012. United States Fish and Wildlife Service Land-based Wind Energy Guidelines. Available online at https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf. Accessed February 2021.

USFWS. 2016a. Endangered and Threatened Wildlife and Plants; Listing the Northern Long-Eared Bat With a Rule Under Section 4(d) of the Act. Federal Register 80:2371-2378. Available online at https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebProposed4dRule16Jan2015.pdf. Accessed February 2021.

USFWS. 2016b. Northern Long-Eared Bat (*Myotis septentrionalis*) factsheet. Available online at https://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html. Accessed February 2021

USFWS. 2018a. Northern Long-Eared Bat (*Myotis septentrionalis*). Available online at https://www.fws.gov/midwest/endangered/mammals/nleb/index.html. Accessed February 2021.

USFWS. 2021. Information for Planning and Consultation: Sherburne County, Minnesota. Available online at https://ecos.fws.gov/ipac/. Accessed February 2021.

Visitstcloud.com. n.d. Places to Stay. Available online at Places to Stay • Visit Greater St. Cloud (visitstcloud.com). Accessed January 2021.

Wisconsin Department of Natural Resources. 2015. Northern Long-eared Bat (*Myotis septentrionalis*) Species Guidance. Available online at http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AMACC01150. Accessed February 2021.

World Health Organization (WHO). 2018. What are electromagnetic fields? Available online at: http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html. Accessed January 2021.

Xcel Energy. 2019. 2019 Minnesota Communities Served by Xcel Energy. Available online at MN-Communities-Served-2019.pdf (xcelenergy.com). Accessed January 2021.

Yang, L., Jin, S., Danielson, P., Homer, C., Gass, L., Case, A., Costello, C., Dewitz, J., Fry, J., Funk, M., Grannemann, B., Rigge, M. and G. Xian. 2018. A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and Implementation Strategies, ISPRS *Journal of Photogrammetry and Remote Sensing*, 146, pp.108-123